7TH ANNUAL



Fall

SYMPOSIUM OF STUDENT SCHOLARS

November 18 - 20
2026



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THANK YOU!

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The Symposium of Student Scholars

Kennesaw State University

November 18-20, 2026

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Bagwell College of Education

Department of Educational Leadership

Sense of Belonging
In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Vedi Patel, Blessing Chukwuebuka & Isabelle Wilkens
Research Mentor: Jennifer Wells

Loneliness and a sense of belonging are common experiences that can shape college students' lives and their relationships with others. However, loneliness and belonging are not interchangeable concepts. Understanding the difference between the two is important to understanding students' experiences in higher education. This poster focuses on three areas: the differences between loneliness and belonging; the social and structural conditions that shape loneliness; and the relationship between loneliness, trust, connectedness, and political polarization on college campuses. The first area highlights how students can feel lonely even when they participate in campus activities or have social connections. The second examines how transitions, social identities, and institutional environments can influence students' opportunities to build meaningful relationships. The third considers how political polarization may affect students' sense of connection and trust in their peers, particularly when they encounter differences in political backgrounds and beliefs. Together, these areas offer a broader perspective on loneliness as an experience shaped by both individual perceptions and the environments in which students live, learn, and grow. Understanding these factors can help higher education institutions look beyond participation and engagement when addressing student loneliness and consider how to foster meaningful connections, social trust, and a stronger sense of belonging across differences.

Department of Elementary and Early Childhood Education

School Segregation and Immigration and Their Connection
Virtual Presentation (Session B)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student(s): Emma Hahn, Selika Hulbert & Liccy Arias
Research Mentor: Sohyun An

In elementary school, we hear all about people like Rosa Parks, Ruby Bridges, and places like Ellis Island, which are all great historical figures to learn from. However, recently in our college education course about social studies, we've talked about people like Mamie Tape, Sylvia Mendez, and Mabel Ping-Hua Lee, along with the experiences of immigrants at Angel Island. This lit a passion in us to want to share and spread more awareness about these historical figures and their perspectives that we have never heard about previously. We want to focus on school segregation, immigration, the diversity in them, and how we can teach them in the classroom. The hope is to encourage and inspire other educators or future educators to share about the perspectives that may not see the spotlight so often but can help bring understanding to students about different cultures, themselves, their classmates, and the world around them. Our goal is not to replace the stories already being taught, but to add to them so students can see a more complete picture of history.

Department of Inclusive Education

A Qualitative Study of Four Multilingual Students' Language Histories and Literacy Practices in the Southeastern United States
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 9:00am - 9:45am

Undergraduate Student(s): Neha Prabakaran, Rumana Ghaniwala, Camila Gracey Kisner & Stephanie Herrera-Jimenez
Research Mentor: Jayoung Choi

The growing population of immigrant and bilingual students in U.S. higher education face linguistic, cultural, and educational challenges which often contribute to heritage language attrition, obscure the relationship between language and ethnicity in educational contexts, and undervalue the students' experiences despite their rich cross-linguistic and cross-cultural resources. Insights provided by these students can benefit educators and institutions seeking to support them. This study asks how bilingual college students from immigrant families experience and use their languages across their lives, focusing on motivation, emotion, literacy, self-perception, and time. It examines links between literacy practices and self-reported literacy, and how pride or shame relates to heritage language attrition. This presentation is a qualitative analysis conducted on a demographic survey and two interviews on each respondent's history, experiences within the education system, relevant artifacts, and heritage literacy trajectory. Four young adults, aged 21-24, who speak Farsi, Romanian, Spanish, and Tamil as heritage speakers were recruited. An analysis table was used to identify themes and subthemes to create a coding manual for each language. The researchers debriefed to identify connections and overarching themes to compile the data into a single coding manual. These themes were used to interpret the literacy trajectories and impact of context and cultural identity on language usage in the participants. Findings show that multilingual young adults' language and literacy trajectories are shaped by family, education, community, and social experiences. Participants' language use varied across contexts and relationships, with language mixing and translanguaging appearing in communication. Their experiences reflected changes in language proficiency, literacy development, and heritage language use over time. Family and community supported multilingual practices. These findings highlight the importance of recognizing multilingual young adults' linguistic resources and experiences. Supportive educational and community spaces can value multilingual identities, encourage heritage language use, and promote inclusive approaches to multilingual learners.

Coles College of Business

Department of Information Systems and Security

Using Design Science to Develop a Contextual Cyber Risk Scoring Artifact for AI-Enabled Remote Patient Monitoring
Virtual Presentation (Session B)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting
Graduate Student: Candice Lee
Research Mentor: Mia Plachkinova

AI-enabled remote patient monitoring (RPM) is expanding rapidly through cloud computing and creating hyperconnected care ecosystems that are increasingly exposed to cyberattacks. Traditional cyber risk scoring methods such as CVE/CVSS are static and technical: they treat identical vulnerabilities as equally dangerous regardless of clinical context, and they cannot capture AI-specific threats such as adversarial inputs, data poisoning, and model inversion. This project uses a Design Science Research approach, structured on Hevner's three-cycle view, to develop and evaluate a Contextual Cyber Risk Scoring artifact for AI-enabled RPM. Grounded in affordance theory, the framework comprises four weighted layers (Threat Intelligence, Operational Context, Human Factor, and Regulatory Compliance), each adding more situated context to a technical finding. A companion audit questionnaire translates each layer into observable indicators that auditors can assess through document review, configuration inspection, and structured interviews.

Michael A. Leven School of Management, Entrepreneurship and Hospitality

Continuity, Geographic Dispersion, and Profitability in U.S. Restaurant Franchise Systems
Virtual Presentation (Session B)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Kana Lewis
Research Mentor: Melih Madanoglu

The success of franchise systems depends on having stable relationships with franchisees. Yet, relatively little is known about whether franchise unit-level continuity translates into stronger financial performance at the chain level and how other system characteristics are associated with profitability. This study examines the relationships between franchise unit-level continuity, geographic dispersion, multi-unit franchise ownership, and profitability. Using longitudinal data from 73 U.S. restaurant franchise systems from 2016 to 2019, we analyze 271 system-year observations with complete data. Franchise continuity is measured by the percentage of franchise units that remain in the system from one year to the next. Profitability is measured by earnings before interest, taxes, depreciation, and amortization (EBITDA) margin, geographic dispersion by the number of U.S. states in which the franchise system operates, and multi-unit ownership by the percentage of outlets owned by multi-unit franchisees. Ordinary Least Squares (OLS) regression models with robust standard errors show that franchise continuity and geographic dispersion are positively related to profitability. In contrast, multi-unit franchise ownership is not significantly associated with profitability. The findings suggest that franchise continuity and geographic reach are important factors associated with financial performance in restaurant franchise systems. The study extends franchise governance research by showing that franchise unit-level continuity has financial implications beyond outlet survival, linking the stability of the franchise network to profitability at the chain level.

College of Architecture and Construction Management

Department of Architecture

Architecture of Escape: Fantasy and the Theme Park
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 11:00am - 11:50am
Undergraduate Student: Trenton Slack
Research Mentor: Ehsan Sheikholharam Mashhadi

As everyday life becomes increasingly tied to screens, the desire to physically step into another world may become more powerful than ever. From Bakken, a small 16th-century gathering place that developed into an amusement park, to Universal Epic Universe, a contemporary model of immersive theme park design, these spaces have reflected generations of cultural change. As technologies and social behaviors changed, new entertainment typologies emerged in response, including pleasure gardens, world's fairs, drive-in theaters, amusement parks, and theme parks. Some have evolved and endured, while others have declined. Over time, theme parks have transformed into immersive worlds that millions of people escape to every year. This thesis investigates how shifts in technology, culture, and everyday life have influenced entertainment architecture. It argues that the future of theme park design lies in how immersive physical environments can continue to evolve and push the boundaries of fantasy, escape, and emotion. Research will combine interpretive-historical, case-study, and correlational methodologies. Interpretive-historical research traces the evolution of entertainment architecture along with its relationship to cultural and technological change. Using Six Flags, Universal, Disney, and other independently owned parks as case studies, it will compare their design, construction, immersion, and world-building methods. Correlational research examines how older and newer films depict fantasy and fabricated realities to identify changing cultural interpretations and compare them to entertainment architecture. The environments humans create are a reflection of the cultures, technologies, desires, and fears of their time. Theme parks are a grand form of expression that transforms contemporary ideas of entertainment, escape, and fantasy into physical space. Where will fantasy lead the next era of society? This thesis frames the theme park as an evolving architectural response to changing ideas of fantasy, escape, and emotion, and explores how physical immersion can remain meaningful in an increasingly digital world.

Brutalism Lightened: Exploring the Concept of Lightness
In-Person Visual Display (Event Center, Poster #22)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Sarah Martin
Research Mentor: Ehsan Sheikholharam Mashhadi

Architecture is rarely experienced as a passive backdrop; rather, its heavy masses, shadows, and openings actively influence human emotion and sensory perception long before a building's functional purpose is ever understood. In architecture, phenomenology is the frame for examining how physical materials, light, and spatial sequences shape human experience and emotional response. Brutalism as a style is often associated with massive-scale, block-like geometric forms from heavy, exposed materials. Tatiana Bilbao and Tadao Ando reimagine heavy materials into mediums for delicate sensory experiences. Comparing the work of Tadao Ando, who uses smooth concrete forms and daylighting strategies to evoke stillness and introspection, with Tatiana Bilbao, who used porous concrete, and focuses on social integration to create interaction, reveals distinct strategies for humanizing heavy architecture. This paper investigates how Tadao Ando and Tatiana Bilbao utilize raw materiality, natural light, and spatial programming to lighten the perceptual weight of Brutalist forms and shape distinct emotional environments. Through a comparative analysis, this study examines how contrasting approaches to material texture and daylight manipulation transform monolithic structures into phenomenological spaces. This paper employs a comparative case study analyzing Ando's Church of the Light alongside Bilbao's Funeraria Tangassi. The analysis evaluates

both works through three key design parameters: massing, material, and lighting. This study contrasts Ando's smooth, precision-cast concrete volumes, rigid geometric massing, and dramatic daylight strategies against Bilbao's porous rammed-earth and rough concrete forms, tactile surface textures, and nuanced, organic light filtering that softens spatial sequences. This paper argues that while Ando lightens mass through precise, inward-focused illumination that isolates the individual in spiritual introspection, Bilbao humanizes mass through contextual, tactile sensory environments that anchor users in collective memory and emotional warmth. Ultimately, this research demonstrates that Brutalist materiality can overcome structural mass, serving as a dynamic vessel for lightness, human connection, and spatial emotion.

Building For or building With? Redefining Critical Regionalism through Shigeru Ban and Yasmeen Lari
In-Person Visual Display (Event Center, Poster #20)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Avery Hou
Research Mentor: Ehsan Sheikholharam Mashhadi

Do people make space or does space make people? Are we serving humanity, as architects, by building for people or with people? Discourse about modern architecture raises many questions. At the beginning of the 20th century, critique of the Renaissance led to theories of what architecture should be doing formally and socially. Do people make the space or does the space shape the people. It is also important to explore the themes of regionalism and how one might approach the physical representation of zeitgeists. It is pertinent to explore these themes and how they might play a role in architecture today. This paper explores modern regionalism and how it represents cultures through a comparative analysis of the architectural works of Shigeru Ban and Yasmeen Lari. Architects are faced with the question of purpose through every job they choose or do not choose to take, Ban and Lari have a timeline of works that have explored what it means to be an architect in the modern world. This research will explore themes of Critical Regionalism, Soviet constructivism, and how architecture represents identities in the modern world. This paper draws on William J.R. Curtis's ideals on Russian Constructivism in "Architecture and Revolution in Russia," Kenneth Frampton's points from "Towards a Critical Regionalism: Six Points for an Architecture of Resistance," and Duangang Lu's study on modernism in Third World Modernism: Architecture, Development and Identity.

Designing Beyond the Classroom to Enhance Embodied Student Experiences Through Phenomenology
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 11:00am - 11:50am
Undergraduate Student: David Castillo
Research Mentor: Ehsan Sheikholharam Mashhadi

Higher education is often organized around the classroom; learning environments engineered to foster efficient learning. However, much of the student experience happens beyond these traditional settings, within the everyday spaces that connect them. Corridors, transitional spaces, gathering areas, and informal learning environments often become overlooked parts of the educational experience. As universities continue to prioritize academic functionality, we remind ourselves; how can the built environment contribute to a student's self-discovery, sense of place, and relationship with their university? This thesis investigates how architecture can rethink familiar university spaces to encourage self-discovery, exploration, and social connection. Rather than viewing educational environments solely as places for formal instruction, this research considers how everyday spaces can become opportunities for students to develop relationships with their campus environment and with one another. This thesis draws from core pieces of literature to examine how the built environment influences one's perception and attachment to place. It also acknowledges education as a formative experience that extends beyond academic achievement and encourages personal discovery. Lastly, it explores how architectural environments can support learning through spatial organization, interaction, and informal occupation. Through qualitative research, cognitive mapping and

comparative architectural case studies, this thesis investigates how students occupy and experience everyday university spaces. Attention will be given to the relationship between ordinary and extraordinary spatial experiences and the architectural methods that can encourage a balance between familiar spaces and unexpected interactions. Ultimately, this research aims to establish an architectural design framework that reimagines overlooked campus environments as meaningful places for discovery, connection, and personal growth. By reconsidering how students experience the spaces beyond the classroom, this thesis argues that architecture has the potential to make the everyday university experience a more meaningful part of a student's education.

Form Follows Fear: Mapping How Architectural Spaces Influence Typologies of Thrill
In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Aiyani Johnson
Research Mentor: Ehsan Sheikholharam Mashhadi

Did you know that the first ever horror movie was seen as a comedy by its audience? Le Manoir du Diable, or The House of the Devil, is a short film created in 1896 by illusionist Georges Méliès. Méliès made the film to entertain his audience in a new and exciting way, but not to scare them. It is classified as a horror film because it introduced themes found in the horror genre today: supernatural elements and special effects. The biggest identifier, however, is the Gothic architecture shown in the film's background. Architecture has always played an important role in horror films, yet it is often overlooked due to discussions of plot, characters, monsters, and special effects. While horror films are commonly analyzed through cinematic or psychological perspectives, fewer studies examine the role that architecture and the built environment play in shaping these films. My thesis explores how architecture contributes to the creation of horror and how different types of spaces help define the genre. Using a qualitative analytical case study approach, this research examines nine films spanning more than a century of horror cinema: Nosferatu, Psycho, The Haunting, The Shining, The Descent, Shutter Island, Hereditary, The Platform, and Backrooms. These films explore a range of architectural environments. By examining spatial organization, the research investigates how architecture contributes to horror beyond simply providing a setting. This thesis argues that architecture does more than house horror; it helps create it. Through comparative analysis, this research investigates how recurring spatial elements generate distinct typologies of thrill. Whether through confinement, isolation, disorientation, or distorted scale, architectural spaces repeatedly act as catalysts for fear. By mapping these relationships between architectural characteristics and forms of fear, this study reveals how the evolution of horror cinema can also be understood as an evolution of horror architecture.

From Carbon Emissions to Urban Investment: AI-Driven Analysis of Transportation in Westside Atlanta
Virtual Presentation (Session A)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Eniola Olaoye
Research Mentor(s): Pegah Zamani & Mahyar Amirgholy

As downtown Atlanta continues to develop, transportation emissions and the need for sustainable infrastructure present environmental challenges and investment opportunities. Artificial intelligence (AI)-driven carbon accounting enables organizations to measure greenhouse gas emissions, identify inefficiencies, and evaluate environmental performance, providing insights that can inform financial decision-making. This research examines how enterprises can leverage AI-driven carbon accounting to optimize urban transit emissions, inform wealth management and sustainable investment strategies, and accelerate economic growth across downtown Atlanta. It explores how emissions data can support investment risk assessment and sustainable infrastructure financing. The study will employ a mixed-methods approach, combining quantitative analysis of publicly available transportation, emissions, and economic data with qualitative analysis of corporate sustainability reports and sustainable investment strategies. AI-driven carbon accounting applications will be evaluated for

their ability to identify emissions hotspots, forecast potential reductions, and inform infrastructure investment decisions. Downtown Atlanta will serve as the primary case study. The study is expected to demonstrate that AI-driven carbon accounting can improve emissions transparency and provide financial professionals with additional insights for evaluating sustainability-related risks and investment opportunities. These insights may help enterprises identify promising infrastructure projects, attract sustainable investment capital, and make more informed financial decisions. Resulting transportation improvements could support business productivity and regional economic growth. This research highlights the intersection of artificial intelligence, wealth management, and environmental sustainability. Integrating emissions data into financial analysis may help investment professionals align financial objectives with sustainable infrastructure development. The findings could inform corporate investment strategies, portfolio risk assessment, and public-private partnerships, supporting a more sustainable and economically competitive downtown Atlanta.

From Suburban Isolation to Eco-Community: Rethinking Robinson Elementary School as an Ecological Resilience Hub
In-Person Poster Presentation (Event Center, Poster #24)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Shelby Ball
Research Mentor: Ehsan Sheikholharam Mashhadi

Suburban landscapes not only lead to social isolation, but also contribute to ecological degradation. In Down to Earth: Politics in the New Climate Regime, Bruno Latour argues that present ecological mutation has organized the whole political dynamics of exploding inequalities, massive deregulation, and conversion of the dream of globalization into a nightmare for the majority of the world population including the non-human people. This thesis-research focuses on the lived experiences of a marginalized community in Valdosta, South Georgia to address the intersection of community, ecology, and identity. Racial disparities heavily influence how the built environment has been shaped and how systems of development have been funded. Robinson Elementary School in Valdosta was a failed effort to delay desegregation after Brown v. Board of Education was put into place. The aim of this research action is to explore how adaptively reusing Robinson Elementary School can serve as an ecological resilience hub for self-organizing regenerative practices and a collective community identity. Through assessing the community's needs and aspirations, as well as a close analysis of the ecologies of the Southern Georgia region, this community resilience hub offers not only affordable housing that is ecologically responsible. This paper investigates how the community of Valdosta can become a center for self-organizing regenerative practices as an ecological resilience hub to break away from the dichotomous structure that disconnects us from creating a collective identity. Drawing on Arturo Escobar's Designs for the Pluriverse implores a system for regeneration by self-organizing through the potential of natural and social systems. "Living-systems theory is seen by many as the basis for design competence for conservation, regeneration, and stewardship." My thesis research will explore how Robinson Elementary School located in Valdosta, South Georgia can become an ecological self-organizing resilience hub that offers affordable housing to serve marginalized communities.

From Suburbs to No-Stop City: Modalities of Free Organization in the Levittowns and Archizoom
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Alexa Fajardo-Guzman
Research Mentor: Ehsan Sheikholharam Mashhadi

The internet's "Backrooms" phenomenon evokes an eerie unease: an endless, empty, yellow-tinted loop of repeating space. Could that same uncanny repetition exist physically in William Levitt's cookie-cutter suburbs and in Archizoom's No-Stop City, which imagined the world as a boundless grid of consumer production? Whether walking down a street of identical houses or studying Archizoom's drawings of endless interiors, the observer enters a hypnotic landscape where space extends forever, with no hierarchy and no exit. Historically, this homogenization took root in post-World War II America, where a housing crisis and economic boom produced mass-produced

developments like Levittown, built through Fordist efficiency to house the expanding nuclear family. By the late 1960s, Italy faced a different crisis: rapid industrialization, student uprisings, and the commodification of society under advanced capitalism. From this context emerged Radical Architecture groups like Archizoom Associati, who envisioned a hyper-rationalized alternative future. This paper compares Levittown and No-Stop City through their spatial organization, consumerist underpinnings, and cultural contexts. It examines how Levittown's sprawling, decentralized layout and Archizoom's endless, non-hierarchical grid dismantle traditional urban boundaries. It then analyzes how mass production drove Levittown's commodification of the home, while Archizoom pushed consumer capitalism to a satirical, hyper-industrial extreme. Finally, it considers how each reacted to its environment: Levittown embraced postwar domesticity and optimism, while Archizoom critiqued Italy's alienating productivity culture. Ultimately, the paper argues that although both share an open, uniform spatial framework, they use it toward opposite aims: Levitt standardized consumer life under the American Dream, whereas Archizoom exaggerated it as a critical weapon to mock that same consumerism.

Frozen Motion: Redefining Experience by Embodying Sport through Form and Performance
In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: James Kravis
Research Mentor: Ehsan Sheikholharam Mashhadi

"Great moments are born from great opportunity." In 1980, Team USA faced the Soviet Union in Lake Placid, New York, in what would become the "Miracle on Ice." The American team entered as overwhelming underdogs, yet a 4 - 3 victory became something far greater than a hockey game. It created anticipation, tension, identity, and collective memory for those inside the rink and millions beyond it. As captain of the Kennesaw State University hockey team, I have experienced firsthand how sport can unite athletes, spectators, families, and communities through shared moments of competition. Sport has existed across cultures for thousands of years, evolving from play, ritual, physical competition, and gathering into the highly organized sporting environments of today. As these environments have developed, modern arenas have become increasingly sophisticated in their ability to accommodate athletes, spectators, entertainment, technology, and commerce. Yet this raises a question: what makes sport compelling, and how can architecture amplify that experience? This paper investigates this question through two strategies of research: historical and conceptual studies. Historical research examines the development of sport and hockey and the evolving relationship between sport, body, equipment, and environment. Conceptual research draws on Émile Durkheim's collective effervescence, Marcel Mauss's Techniques of the Body, Tim Edensor's work on sporting atmospheres, and Gernot Böhme's theories of atmosphere and bodily presence. Artistic and architectural precedents, including Marcel Duchamp and Santiago Calatrava, further explore how movement can be represented and translated into form.

Heavy Earth or Light Wood? Exploring Two Solutions for Displacement in the Work of Nader Khalili and Shigeru Ban
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Dina Elemam
Research Mentor: Ehsan Sheikholharam Mashhadi

In 2023, I was among thousands of people forced to flee their homes when war broke out in Khartoum, Sudan. After an eighteen-hour evacuation journey, my family and I arrived in Port Sudan, a city overwhelmed by people seeking safety. Hotels and available accommodations were full, while schools and other spaces became temporary shelters for those with nowhere else to go. Experiencing this sudden need for shelter firsthand changed the way I understood displacement and raised a question: How can materials and construction provide emergency shelter when it's needed? Nader Khalili and Shigeru Ban both approached this issue through the use of unusual materials. Khalili developed SuperAdobe in the 1990s as a low-cost building system that uses earth-filled sandbags and barbed wire to create heavy, grounded structures. Shigeru Ban took a different approach with the

Onagawa Container Temporary Housing project in 2011, built for people displaced by the earthquake and tsunami in Japan. Ban reused shipping containers to create a modular housing system that could be transported, stacked, and assembled where housing was urgently needed. This paper compares both approaches to investigate how materiality influences architectural form in housing for displaced people. The research looks at how material choices affect form, structure, construction, and the relationship to the site. It also explores how each approach relates to ecology through the use of local, reused, or available materials. Drawings, photos, and research about both projects will be used to compare their differences and understand what they have in common. This research argues that material choice plays an important role in shaping architectural form. Although their approaches are different, both show how materials can be used to respond to the same urgent need for shelter.

Living Memory, Living Ecology: Architectural Advocacy in the Okefenokee Swamp
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Olivia Bledsoe
Research Mentor: Ehsan Sheikholharam Mashhadi

The Okefenokee Swamp is one of the most culturally, ecologically, and politically significant landscapes in the United States. In the summer of 2026, the swamp made national news as it became a battleground between a mining company and preservationists who campaigned to save this endangered ecology. Spanning over 438,000 acres, it's the largest blackwater swamp in North America, and one of the world's largest intact freshwater ecosystems. It preserves ecological conditions that have been lost across more than 90% of the Southeastern Coastal plain. The significance of the swamp goes beyond ecology alone: marginalization of its ecology is parallel to the marginalization of the communities that have long been part of its history (indigenous, African Americans, and "Swampers"). In recent years, these communities have faced multilateral pressures from developers to climate-driven droughts. Federal agencies warn that these disturbances can cause "permanent" damage to the state of Georgia, which in turn impairs rural economies that rely on the swamp. This research examines how architecture creates opportunities for rootedness, understanding, and support of the swamp's ecological integrity. Through an analysis of literature and history, this thesis will examine the swamp's ecological and cultural significance. Through case studies, it will identify precedents for architecture in sensitive landscapes. Through data collection, it will gather site-specific and community-based knowledge. It will explore cultural heritage as a living, evolving relationship shaped by those who inhabited the swamp before, those who live alongside it now, and those who will carry it forward. With the swamp's protection now largely secured, this thesis reconsiders architecture's role - not through advocacy - but through awareness. This research culminates into a public facility near the Okefenokee Swamp: a place for communities, visitors, and future generations where experience might translate into opportunities for community-led interpretation, intergenerational learning, and habitat monitoring.

Mapping AI Data Center Impacts on Communities: Social and Environmental Dimensions
Virtual Presentation (Session B)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Keith Greene
Research Mentor: Pegah Zamani

This research will map the social and environmental impacts of data centers on communities. Data centers are an integral part of the modern world, storing thousands of gigabytes of digital information and supporting global interconnectivity. Data centers created specifically for AI have emerged as well, requiring more upkeep than traditional centers. Despite the necessity of these centers as we continue further into a digital age, data centers' impacts on the communities they are built in should be monitored. Residents and regions of the environment have a complex relationship with these projects. This study aims to highlight issues, such as increasing climate vulnerabilities and higher taxes for nearby residents, as well as benefits, such as increased job opportunities due to data

center construction, of these facilities. Through comparative analysis, this study reviews multiple relevant articles detailing energy requirements and the general locations of data centers to evaluate their social and environmental impacts.

Materializing Identity: Cultural Expression in Sustainable Architecture
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Jailonni Scott
Research Mentor: Ehsan Sheikholharam Mashhadi

Sustainability in architecture is often discussed through strategies such as using materials efficiently, conserving resources, and reusing existing buildings. The materials architects choose, and the ways they design buildings can also reflect cultural identity, history, and the surrounding community. This raises the question of how cultural identity influences the way sustainability is expressed through architecture. This research explores this relationship by comparing the work of Tatiana Bilbao and Shigeru Ban, focusing on how their material choices connect sustainability, culture, and architectural representation. To investigate this relationship, the research will use a comparative approach, studying selected projects by both architects. The research will include a review of academic works, architectural drawings, photographs, and project documentation. Each project will be analyzed based on its material choices, environmental strategies, relationship to its cultural context, and the way its design represents identity. These projects will then be compared to identify similarities and differences in how each architect approaches sustainable design. Research on critical regionalism and cultural sustainability will also be used to better understand how architecture responds to local conditions and cultural values. Although both architects explore alternative materials and resource-conscious design, they approach sustainability in diverse ways. Bilbao's work can be examined through its connections to local materials, vernacular influences, and community, while Ban's work highlights the use of materials such as paper tubes and timber, including their applications in humanitarian architecture. By comparing their approaches, this research aims to understand how material choices can serve both environmental and cultural purposes. This study argues that sustainable architecture does not have to follow one specific style or use the same materials to communicate sustainability. Instead, the way sustainability is expressed depends on the relationship between materials, cultural identity, environmental goals, and the context in which a building is designed.

Mud and Paper: When Humble Materials Become Architecture's Boldest Answer to Human Need in the Work of Yasmeen Lari and Shigeru Ban
Virtual Presentation (Session C)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Jack Traugh
Research Mentor: Ehsan Sheikholharam Mashhadi

On opposite sides of Asia, two earthquakes redirected two careers, and both architects turned to materials readily available in their environments. After the 2005 Kashmir earthquake, Yasmeen Lari abandoned her modernist language for community construction in mud, lime, and bamboo. Through the Heritage Foundation of Pakistan, she teaches flood- and quake-affected communities to build zero-carbon shelters, stoves, and toilets themselves, a practice known as "barefoot social architecture." After the 1995 Kobe earthquake, Shigeru Ban used paper tubes for refugee shelters, the Paper Log Houses, and later the Cardboard Cathedral in Christchurch, before expanding into large-scale commercial mass timber. Both are often labeled "humanitarian architects," but that label obscures how their material thinking operates as a design method. Their work is rarely read through tectonics, meaning how material, joint, and structure produce meaning. This paper compares Lari's mud and bamboo practice with Ban's paper tube and mass timber work, asking how material choice becomes both a technical strategy and an ethical position. It examines how cultural identity shapes tectonic expression, from Lari's community-built vernacular craft to Ban's engineered, prototyped systems, which serve commercial clients as much as communities. Drawing on Kenneth Frampton's

writing on tectonics, the paper reads construction as meaning, with Hassan Fathy and Bernard Rudofsky situating Lari's earth-based vernacular approach and Victor Papanek framing design for need. Primary sources include project documentation, interviews, and the architects' writings. Each practice is examined, then compared through material logic, scale, and authorship. Despite differences in cultural context, construction methods, and tectonic expression, Lari and Ban share a commitment to lightweight, low-carbon materials that redefine how architecture responds to human need. Both suggest that a building's obligation to the people it serves is best met by materials that are accessible, low-impact, and impermanent without being disposable.

Noahs Ark Reconsidered: Living with the Rio Grande in the time of a Climate Crisis
In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Gabe Small
Research Mentor: Ehsan Sheikholharam Mashhadi

The Rio Grande is no more, what lies there is a landscape of extremes. It is a dry, drought heavy river cutting through the American Southwest, nearly 2000 miles long, from the San Juan Mountains in Colorado flowing all the way down to the Gulf. At the Middle section of the river lies Albuquerque, New Mexico, where the river is the heart of the city. Over the course of the city's history, floods would overwhelm the downtown area, causing people to move to higher ground, closer to the Sandias. Levees and dams were then placed in the mid-1900s, to prevent further disastrous flooding. This has left the river more often than not dry and in long stretches of drought, lacking its native ecological life that once made it thrive. With global warming acting as a major factor in climate change, it leaves the river more vulnerable to numerous extreme climate crises stretching from droughts to floods. This paper explores fiction of cinema and themes of ecological disaster as primary vehicles of awareness for an architecture along the river. In order to achieve an understanding of these themes it is necessary to include, Julia Watson's Lo—TEK: Design by Radical Indigenism provides examples of how different methods of architecture can come about living with nature in different climates and environments instead of resisting it. Regarding fiction, Italo Calvino's Invisible Cities will be used to explore fictional landscapes and the possibilities of imagining a different future along the river. Films including Dune, Interstellar, and Furiosa: A Mad Max Saga are especially key for their representations of environmental collapse, survival, and adaptation. Together, this material will contribute to developing a set of parameters for an architecture that is ready to endure and inhabit a southwestern apocalypse.

Poetry of Shadow & Poetics of a Slow-Paced Life.
Virtual Presentation (Session B)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Maria Ocando Serrano
Research Mentor: Ehsan Sheikholharam Mashhadi

Plato pushed us to get out of the cave but he warned us to be careful, he said we should take light in carefully, gradually letting it in easy so as not to blind us. Today our spaces are over lit! Too bright and oversaturated, artificial lighting in every available surface, its relentless presence makes us feel like life should move as fast as the speed of light. Everything is numerated, time is currency and there is none to waste but why don't we just stop for a second, let the shadows back in little by little and take control of our time back. Some architects' primary material is not brick or stone, not concrete nor wood, is light. As simple as that, is the use of light in a space, the intentional control of brightness and creation of shadow. Tadao Ando and Steven Holl are masters of the shadows, they control the diffusion and movement of light based on design moves, their work evokes contemplation and the phenomenology of slowing down, in comparison with contemporary architecture where light is free to reach any surface and it's a material that became rarely utilized. Maybe we should let shadows dance around us and envelope us into a poetic rhythm. This research is based on perception of the human experience from a sensory level based on architectural movements of light from Tadao Ando and Steven Holl compared to contemporary architecture, typical of the 21st century. With supporting

documentation in the writings of Juhani Pallasma's The Eyes of the Skin: Architecture and the senses, Tadao Ando's essay on light and Henry Plummer's The Architecture of Natural Light. How does shadow become that poetic design element to convey contemplation, human feelings and most importantly, can help us slow down?

The Extent of AI-Integrated Traffic Control Systems Impact on Transportation Emissions in Downtown Atlanta
Virtual Presentation (Session B)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Jaylaraine Johnson
Research Mentor(s): Pegah Zamani & Mahyar Amirgholy

In 2025, it was reported that Atlanta drivers ended up losing 70-87 hours per year to congestion. Technology like adaptive traffic control systems (ATCS) have been in emergence following the spread of Artificial Intelligence with hopes of aiding in reducing congestion, as well as transportation emissions. It seems Atlanta as well as other cities have another potential way to aid in the United Nation's global goal towards sustainable cities. However, this research evaluates the extent to which AI-integrated traffic control systems can lessen transportation emissions with a focus on the downtown Atlanta area. A comprehensive search of databases was conducted analyzing articles, collected research, and studies done within the last 6 years. Findings suggest that Artificial Intelligence is indeed a complementary tool in cutting congestion rates, though the magnitude of its impact on transportation emission rates is modest. AI-integrated traffic control systems can only provide an immediate solution to transportation emissions. This calls for ways in which AI can address emissions long-term in areas such as public transit, MARTA, infrastructure decision-making, electric vehicles, and urban planning. More value can be found in AI by shifting the focus and applying it to broader transit optimization strategies.

The In-Between: Spatial Justice and Cultural Empowerment for Valdosta's Communities of Color
In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Mia Roxbury
Research Mentor: Ehsan Sheikholharam Mashhadi

Have you ever entered a space and felt empowered by the collective vision behind its creation and the future it seeks to foster? Although we may experience spaces that inspire us through shared vision, we rarely see the progress behind their development or have a voice/decision in shaping what best serves a community. Across the South, equalization schools were built to preserve racial segregation after the 1954 Brown v. Board ruling, attempting to argue that separate facilities were "equal." Though politically negative, they provided rural Black communities with improved facilities becoming cultural and economic hubs. Following the 1964 Civil Rights Act, Georgia school districts integrated, leading to the closure of most of these historical schools. When a community's resources are limited, how can architecture establish a framework that empowers residents to adapt, shape, and cultivate their own living spaces? My thesis proposes a participatory, community driven, reconstructive approach centered on the abandoned Weatherington-Robinson Elementary School in Valdosta, Georgia. Originally established to provide substandard education to Black students, the site currently stands vandalized and neglected. Through adaptive reuse, my thesis creates a cultural resilience center allowing Valdosta's communities of color to shape their future. Building on Alejandro Aravena's firm "ELEMENTAL's" principles of architecture becoming a tool for social equity rather than monumentality, this thesis allows the community to identify their needs and provide them a space that allows them to foster growth and agency. Through the methodology of 'modern white architecture' as a blank canvas, and the hybridity of spaces from Homi Bhabha and Aldo Van Eyck, the architecture steps back so the community can step forward. Though the site currently stands neglected, it is far from finished; it is an open armature waiting for the vibrant layers of community individualism to paint a resilient, self-determined future.

The No-Stop City of Pakistan: Yasmeen Lari's Take on Archizoom's Utopian Ideas

In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Annabelle Fisher
Research Mentor: Ehsan Sheikholharam Mashhadi

What characterizes a no-stop city? The vast structure, or the people who curate it? In 1964, Archizoom created drawings and photos of their unbuilt project called the "no-stop city." The idea was to create a never-ending space with artificial scenery used to imitate nature. Inside the gridded structure, people could live freely and work together to create their city. Yasmeen Lari is a Pakistani architect who famously created "barefoot social architecture," projects that were co-created by the users. The structures are mainly symmetrical, making it easily adaptable to the community's needs. This paper explores the connection Yasmeen Lari's barefoot social architecture has to the principles of Archizoom's no-stop-city. The two projects will be compared against their form/structure and their representation of an identity. This will be done by reading articles and watching interviews about the two projects to get an understanding of what their thought processes were. Archizoom's "no-stop city" is a utopian idea that does not have an identity that is personal to people. Yasmeen Lari's architecture uses similar ideas while being representative of the community it's built for.

The Ribbon of Hope: A Village Sanctuary for Mothers Facing Breast Cancer, Pregnancy Loss, and Postpartum Depression
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 11:00am - 11:50am
Undergraduate Student: Lauryn Lowe
Research Mentor: Ehsan Sheikholharam Mashhadi

In the United States 1 in 8 women will be diagnosed with breast cancer, 1 in 8 women will be diagnosed with post-partum Depression and roughly 1 in 10 known in pregnancies have ended in miscarriages. Experiences such as breast cancer, post-partum depression and miscarriages can dull a woman's sense of identity and belonging. Most spaces don't provide the moments or rarely make room for the emotional and social side of healing. Mothers in these moments are often scared and need a focal point to mentally, physically and emotionally release and gives them something to fight for. This thesis investigates how architecture can bring these women together and keep them connected to the children and caregivers who face these transitions alongside them, by offering space for reflection, privacy, connection, and play. After researching interviews with women and families who have lived these experiences and looking up case studies such as City of Hope, there is an understanding of what support and positive people they need around them. Literature studies such as Atmospheric Architecture by Gernot Bohme showed the types of spaces needed to understand how light, sound, material, and temperature shape how a room feels before anyone has time to think about it. Ecological Architecture by James Steele showed how biophilic design and healing landscapes can be restorative and regenerative. Palaces for the People by Eric Klinenberg talks about how social infrastructure shows how shared space builds connection. Architecture of Hope by Charles Jencks argued how architecture and art can make a difference in people's lives. This thesis argues how architecture can take an active part in healing by letting not just mothers, but caregivers and children choose to either have a moment of release, a moment to be, and a moment to exist.

Tokyo the City of Tomorrow: Urban Growth and Transformation in Tange's and Isozaki's Metabolist Visions
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Nicolle Munoz-Ramirez
Research Mentor: Ehsan Sheikholharam Mashhadi

Social, cultural, and economic changes in society require redevelopment of urban spaces to meet emerging global and local realities and demands. Architectural design plays a critical role in this process, as architects interpret those needs and translate them into projects that envision a better built environment. In the last century, Tokyo has shifted its economy from primary to tertiary industries what implies a restructuration of its urbanistic design. As a response, architects associated

with the Metabolist movement proposed innovative solutions for addressing urban growth, mobility, and modernization. It attempts to position the city as a dynamic organism capable of growth and adaptation. This paper compares two urban redevelopment proposals by Kenzo Tange and Arata Isozaki, examining their shared commitment to integrating architecture, infrastructure, and transportation into a unified urban system. Using a comparative analysis of drawings and design concepts, the study identifies both commonalities and differences in their approaches to urban expansion and change. It argues that although both architects embraced Metabolist principles, their contrasting visions reveal different interpretations of how cities should evolve to address the challenges

Two Sides of the Same Coin: A Study on the Monumentality of I.M. Pei and Mario Botta.
In-Person Poster Presentation (Event Center, Poster #22)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Graduate Student: Richard Walker
Research Mentor: Ehsan Sheikholharam Mashhadi

The National Gallery of Art, East Building a monument crammed in a triangular lot. With thin, sharp masonry walls that create a point at each end. When you walk in, you are greeted by a massive lobby with large windows in the ceiling and walls of the building that make sure light touches every point of this space. Or take the Church of San Giovanni Battista, by Mario Botta, a very personal church with only 2 rooms to pray and to give offerings; as you walk in this tube-like building, your eyes can stop moving. Everything is so symmetrical, yet cause of the alternating masonry, the building turns into a painting that reacts to the daylight from the main window at the top of the structure. How can two students of the same movement create such vastly different buildings? Both rely on simple geometry and the basic principles of modernism to create their art; however, they feel completely separate. This Paper compares the upbringing of both Mario Botta and I. M. Pei and how this influenced their styles, how they implement windows, bend light, and use materials to help paint this picture. Despite Mario Botta and I.M. Pei's similar titles as modernist architects because of their upbringing, their ideas of architecture, approach, and end result are drastically different. An early peek at how they talk about architecture is a great way to understand their approach to the subject.

Walking Metal, Frozen Glass: Archigram, Richard Meier, and the Interpretation of Movement in Architecture
Virtual Presentation (Session C)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Kaila Hudson
Research Mentor: Ehsan Sheikholharam Mashhadi

In 1963, Harold Wilson promised that Britain would be forged anew in the "white heat" of technological revolution. The phrase borrows from metalworking, where metal heated past red glows white and becomes workable. Within a year, the London architects of Archigram had drawn that promise as cities that walk, plug in, and rearrange themselves. Meanwhile in Connecticut, Richard Meier's white houses of glass and wood, such as the Smith House (1967), were celebrated as light, open, and fluid. One architecture proposes movement; the other evokes it. How did the same technological moment produce both? Archigram's projects, from Walking City to Plug-In City, were drawn in the bright graphics of pop art. Meier's work, shaped by the "New York Five" and Corbusian Purism, is often described through transparency and lightness, though the houses are fixed, hand-built structures. This paper examines how Archigram takes technology literally, making movement the purpose of the building, while Meier stages the appearance of movement through glass, white surfaces, and choreographed circulation. Each responds to its setting. In Britain, imperial decline, a struggling economy, and Wilson's modernization met a youthful pop culture that celebrated the disposable. In the United States, prosperity and private clients supported house commissions, while the failures of urban renewal and the unrest of the civil rights and Vietnam years encouraged a turn toward form and abstraction. Pairing visual analysis of Walking City, Plug-In City, and the Smith House with historical study, the paper draws on Reyner Banham, the Five Architects framing, and

Rowe and Slutzky's literal and phenomenal transparency. It argues that Archigram treats movement as a literal technological goal, while Meier produces its impression in a building that stays still, and that neither is more honest: each translates technology's promise into the form its context allowed.

Where to Learn? Architecture for Learning Beyond Information
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 11:00am - 11:50am
Undergraduate Student: Mylie Vance
Research Mentor: Ehsan Sheikholharam Mashhadi

A teacher used AI to make the exam, students use AI to make the answer. Axis Intelligence's reported that 13% of students use AI compared to the 96% in 2026. Students are given unprecedented access and can find answers to a question without ever having to actually read the question. There is a shift in student learning that is challenging the purpose of a "space for learning," Traditionally, a space for learning, was represented in a physical library, known as a building for accessing information and supporting education. As information is more accessible outside the library, the role of the contemporary university library must be reconsidered to support modern educational methods. This thesis investigates how the introduction of artificial intelligence has changed the library as a space for learning and argues for a reimagined collegiate library that supports critical thinking through learning, experimentation, collaboration, and the application of knowledge. Finding an understanding of how students interact with the current library typology, how students interact with digital resources, and the use of technology within libraries. The research utilizes qualitative methods, correlational analysis, and logical argumentation to examine student-library relationships, learning behaviors, and architectural experience. Questionnaires across majors and universities to understand the relationship of students, colligate libraries, and digital usage. Hands-on investigation at Georgia Institute of Technology Georgia State University, and Kennesaw State University will compare learning spaces across STEM and humanities and urban and suburban landscapes. Findings from the observations and questionnaire responses will identify current conditions that can be remodeled into an updated library typology. The future of libraries should not need to compete with technological advancements as a method in inform students, rather, they should work together to create an inclusive learning environment. Designing a space not just for finding an answer, but a space to discover it.

Who is Being Served? Zaha Hadid's Monumental Architecture and Yasmeen Lari's Community Empowerment
In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Olivia Gaskins
Research Mentor: Ehsan Sheikholharam Mashhadi

Once one outgrows their clothes, they must get new ones. When a salamander outgrows its skin, it sheds and is reborn into a new cast. This is exactly what the avant-garde pioneers of the early 20th century demanded of architecture. Against the revivalist sentiments of the 19th century, which found novelty in the return to previous styles, whether neogothic or neoclassicism, the avant-gardes demanded a total reinvention of architecture. How could architecture correspond to the spirit of the time or Zeitgeist? Out of this demand emerged radial forms of architectural creation. This paper explores the question of temporal relevance in the work of two contemporary women architects: Zaha Hadid and Yasmeen Lari. Hadid is a formalist, more of an artist who sculpts buildings and spaces. For Lari, form and formalism are not the primary preoccupation. Her architecture is a vehicle to empower marginal communities. While Hadid caters to rich, clientele, at time to totalitarian regimes, Lari dedicates her tectonic inventions to the marginalized communities. Their distinct design processes and ethics are evident in their tectonics, use of materials and technologies, and their relationship with their clients. Lari's projects are tailored to be built by bare hands and with local material, while to build Hadid's buildings, one needs the most advanced machinery. This paper draws on William J.R. Curtis's ideals about the machine age in "Responses to Mechanization: The Deutscher Werkbund and Futurism," Duanfang Lu's notion about modernism in third world

countries in Third World Modernism: Architecture, Development and Identity, and Vladimir Kulic, Timothy Parker, and Monica Penick's explanation of the emergence of modernism in Sanctioning Modernism: Architecture and the Making of Postwar Identities to further emphasize that modernism equates to a conceptual way of thinking that transforms architecture over time; This transformation being a rebirth of a new architecture.

Zooming in and out of a Wasting Society: Critique of Consumerism in Ai Weiwei's "Monumental Junkyard"
Virtual Presentation (Session A)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting
Undergraduate Student: Satta Dauda
Research Mentor: Ehsan Sheikholharam Mashhadi

The day began at the Warehouse, an art gallery founded by Georgia architect John Wieland and his late wife, Sue, with a focus on Southern domesticity. Although the Warehouse showcases a wide range of works from international artists such as Ai Weiwei, the gallery's connection to domestic architecture creates an interesting setting for examining how everyday objects can be transformed through art and materiality. Within the main gallery space, Vito Acconci's Bad Dream House Poster #2 leads toward a carved marble contemporary-style door. Put bluntly, the form of the door is generic and could be purchased from an everyday construction supplier, such as Home Depot. However, its transformation into marble completely changes its meaning and perceived value. The door is part of a larger collection by artist Ai Weiwei titled Junkyard Memorial. The work plays into a recurring theme within Weiwei's practice: confronting consumerism and society's race toward modernization. His work often asks, "If everything can be consumed, what is valuable?" and, more importantly, who gets to decide the degree of that value. Rem Koolhaas considers similar questions in his essay, Junkspace, which confronts the influence of consumerist culture on architecture and the built environment. The race toward modernization has made consumerism an increasingly embedded part of everyday life, where objects and spaces are valued based on their ability to be consumed, rather than transformed. This paper shows how Ai Weiwei and Rem Koolhaas approach this issue from two different scales. Monumental Junkyard reveals how ordinary architectural objects can become symbols of excessive consumption and modernization, while Junkspace demonstrates how the same consumer culture expands into the larger spaces people occupy. Together, these works show that the effects of consumerism extend beyond individual purchases, becoming physically present in both the objects people use and the environments they inhabit.

Department of Construction Management

Psychological Impacts of Human-Robot Co-Working Environments: Assessing Mental Stress and Anxiety Among Bystanding Workers
Virtual Presentation (Session B)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Blessing Onyekachi
Research Mentor: Srijeet Halder

We are conducting this research study to better understand the psychological stressors experienced by individuals working in environments where humans and robots collaborate. The goal was to identify common stressors, assess their prevalence, and develop strategies to improve workplace conditions and worker well-being in such environments. In our research, we reviewed 25 different papers to find common ground in what methods were used, what limitations they had, what objectives they had, and their future directions. From that we created a survey from the similarities and sent it out to over 150 people and counting. We are preparing to review what we found from the survey to show results in our final presentation to hopefully improve workplace conditions for employees.

College of Computing and Software Engineering

Department of Computer Science

Do Adversarial Attacks Survive the Jump from CNNs to Vision-Language Models?
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Sanjay Ravikumar
Research Mentor: Kazi Aminul Islam

Deep learning models for remote sensing scene classification are vulnerable to small, carefully crafted changes to their input images. In our prior work, presented at ICMLA 2025, we tested a ResNet-50 classifier on the UC Merced Land Use dataset (21 classes). We attacked it with white-box methods (FGSM, I-FGSM, PGD), an ensemble transfer attack, and a zeroth-order black-box attack using adaptive momentum (ZO-AdaMM). We then compared how well several defenses recovered accuracy: Gaussian and median filtering, input noise, gradient masking, ensemble prediction, statistical detection, and PGD adversarial training. In this work, we ask whether those findings hold for vision-language models (VLMs). VLMs are increasingly used for Earth observation, but they classify by generating text rather than by producing class scores. We fine-tuned Qwen3.5-0.8B with LoRA to name the land-use class of each UC Merced image. We then ported our full attack and defense suite to this generative setting, using a perturbation budget matched to the original study (about 2.3/255). We crafted black-box attacks two ways: with ZO-AdaMM directly against the VLM, and by transfer from four CNN surrogate models (ResNet-18, VGG-16, EfficientNet-B0, MobileNet-V2).Preliminary results on a pilot subset of 42 test images show that fine-tuning raised accuracy from 40.5% to 76.2%, while a single-step FGSM attack reduced it to 35.7%. Filtering defenses partially restored accuracy. Transfer attacks from the CNN surrogates had little effect, which suggests the VLM's decision boundaries differ from those of conventional CNNs. PGD adversarial training degraded the model at this small scale. These results are early, and a full evaluation on the complete 420-image test set is in progress. This work aims to give a direct comparison of adversarial robustness between conventional CNNs and fine-tuned VLMs on remote sensing imagery, and to show where defenses built for CNNs fall short.

ExecRetrieval: Measuring the Functional-Correctness Gap in Code-Embedding Retrieval
Virtual Presentation (Session A)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Aaryan Kapoor
Research Mentor: Md Abdullah Al Hafiz Khan

This paper argues that while anti-popish rhetoric was extremely common in colonial America, the reasons for it differed considerably between each level of society. The American elite, while concerned of the theological implications, viewed the emancipation of Quebecois Catholics as more of a geopolitical and social issue. While an ordinary Protestant colonist would have viewed the Quebec Act more as an existential threat both to Protestantism and their patrimony. This is not to say that these worries did not largely overlap, but that different concerns were prioritized over others between different classes, and Anti-Catholic rhetoric permeated all levels of American society but manifested in different ways due to the communication of the American elite to the ordinary colonial Americans who viewed the 1774 Quebec Act largely through a different lens.

Latent Cross-Modal Completion for Alzheimer's Disease Diagnosis with Incomplete Multimodal Data
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Dina Xu Callaway

Graduate Student: Yehong Huang
Research Mentor: Chen Zhao

Multimodal data provide complementary information for Alzheimer's disease (AD) diagnosis, but complete acquisition of all modalities is often impractical due to examination cost, accessibility, and patient burden. Moreover, real-world datasets frequently contain incomplete observations, limiting the applicability of multimodal models that require all modalities to be available. To address this challenge, we propose a cross-modal representation learning framework for AD diagnosis with incomplete multimodal data, integrating MRI, PET, and clinical information. Instead of reconstructing a missing modality in its original feature space, the proposed Latent cross-modal Completion for AD diagnosis (LaCo-AD) learns cross-modal mappings in a shared latent space, allowing available modalities to estimate representations of unavailable modalities. Contrastive learning is further introduced to preserve shared information across modalities, while feature- and modality-level attention mechanisms adaptively integrate complementary information for diagnosis. We evaluate the framework on three independent datasets, including ADNI, AIBL, and OASIS, across three binary classification tasks and one three-class classification task, with simulated missing-modality rates ranging from 0% to 50%. Experimental results show that the LaCo-AD maintains diagnostic performance across a range of incomplete-modality conditions, although the degree of robustness varies across datasets and diagnostic tasks. These findings demonstrate the potential of latent cross-modal completion for AD diagnosis when complete multimodal observations are unavailable.

Department of Information Technology

HAR-IQ: Training-Data Integrity Assessment and Selective Recovery for Robust Wearable Human Activity Recognition
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Rabia Rabia
Research Mentor: Amelia Estwick

Wearable human activity recognition uses sensor data to identify everyday activities such as walking, running, and standing. Incorrect training labels can reduce model reliability. However, automated repair can introduce additional errors by changing labels that were already correct. This research investigates whether selective label repair can correct errors while preserving correctly labeled samples and improving activity recognition. We propose HAR-IQ, a framework for assessing training-data integrity and making corrections when sufficient evidence is available. An initial experiment used the KU-HAR dataset, containing 20,750 sensor windows across 18 activities. We deliberately replaced 20% of the training labels with randomly selected incorrect activity labels and retained the original labels to evaluate correction quality. Each window was checked using predictions from a model trained without that window. Repairs required support for the same replacement activity from model predictions and similar sensor windows, together with confidence thresholds. Using a Random Forest classifier with 300 decision trees, we compared training without repair with three repair settings: strict, moderate, and broad. The broad setting used the least restrictive thresholds, requiring at least 60% model confidence and 70% agreement among 15 similar training windows, alongside the other repair checks. It correctly repaired 389 of 390 changed labels, correcting 13.39% of corrupted training labels while mistakenly changing one originally correct label. However, training without repair achieved the highest validation Macro-F1. These preliminary findings show that selective repair can accurately correct some labels, but accurate corrections do not necessarily improve activity recognition. The experiment used one random seed and a random window split. Further work will test performance on separate participants, repeat experiments, and address missing measurements and corrupted sensor values.

Machine Learning-Enabled Olfactory Sensing for Spoilage-Level Prediction in Dairy Products
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 3:00pm - 3:45pm

Undergraduate Student: Subeen Choi
Research Mentor: Taeyeong Choi

This paper aims to determine whether it is feasible for Electronic Nose (E-nose) technology to classify different stages of food spoilage by collecting odor sensor data emitted by milk samples. Although E-nose technology has wide applications in quality control, gas and allergen detection, and disease diagnosis, diverse olfactory datasets for fine-grained stage classification in food remain scarce. Using Volatile Organic Compounds (VOCs) collected from three milk samples, which were incubated for 1, 3, and 5 days respectively, we trained machine learning models to classify 130 time-sliced odor samples into three categories: Day 1, Day 3, and Day 5. A support vector machine (SVM), the best performer among five models, achieved a classification accuracy of 53%, which is notably higher than random guessing (33%). To address baseline drift, a gradual deviation in sensor responses that is a common challenge for E-nose sensors, we applied PCA feature extraction and baseline subtraction and improved its cross-validated accuracy from 41% to 53%. This study suggests the feasibility of classifying food spoilage progression using E-nose technology. Future work will mitigate baseline drift and distinguish finer stages of food spoilage, building toward automated food quality monitoring systems.

Tiny AI for Sustainable Agriculture: Energy-Aware and Adaptive Edge Intelligence for Plant Disease and Stress Detection
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Brendan Miller
Research Mentor: Xu Tao

Agriculture is becoming increasingly unstable, farmers globally suffer crop yield losses from disease and pest, harming farmers abilities to support themselves and supply communities. Attempting to mitigate these issues, the Intelligent Cyber-Physical Systems Lab has been combining sensing technologies with intelligence in order to fabricate intelligent sensing and monitoring technologies. This research sets itself apart by creating a solution that doesn't require expensive network infrastructure, designed for low-power environments while keeping the intelligence aspect of pricier solutions. This research entailed designing an intelligent agriculture system to collect data on intervals, process data using edge AI technologies, use lightweight machine learning algorithms to recognize and predict possible issues, and then inform farmers about possible issues before these issues destroy crop yield. Specifically, the segment of research I'm covering is the hardware design, sensory fusion, and implementation of edge AI onto two data collection nodes, environmental and water solution. The aforementioned nodes were tested in hydroponic environments for data collection and computing performance under various environmental stressors. Initial testing has demonstrated successful data collection using sensory fusion in real-world agriculture settings as well as effective integration of tiny models utilizing edge-computing. Further research and experimentation will focus on increasing accuracy, better optimizing, and validating the ML model. The implications of this research is a scalable, cost-effective, intelligent sensing system designed to run in resource-limited environments for prolonged periods of time, providing farmers regardless of their technical infrastructure with the ability to monitor crops, reduce labor needs, and the ability to prevent crop loss which could save not only the crops but also prevent financial burdens caused by crop loss.

Department of Software Engineering and Game Development

Exploring Deliberative Reasoning for Agentic AR Navigation
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Robert Hoeh
Graduate Student: Jalal Uddin
Research Mentor: Yu Zhao

As conversational AI becomes increasingly integrated into heads-up computing, understanding how intelligent agents should support users during on-the-move interaction is becoming an important

research challenge. In this paper, we present an agentic framework for conversational Augmented Reality (AR) navigation that supports intent classification, spatial retrieval, clarification, and action generation through a multi-agent architecture. We conducted a preliminary evaluation using 75 navigation queries with varying ambiguity and complexity to investigate the role of deliberative reasoning. Our results show that enabling thinking mode does not significantly improve response correctness but significantly increases latency for the evaluated tasks, suggesting that lightweight reasoning may be sufficient for routine conversational navigation. This work informs agentic AI design choice and motivates future research on human-AI interaction within AR.

School of Data Science and Analytics

Mapping the Marrow: Bone Tumor Characteristics and Patient Outcomes
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Denisse Hernandez-Zuniga
Research Mentor(s): Susan Hardy & Gene Ray

Bone tumors are abnormal growths of tissue that can develop in or around the bones. Some are benign, while others are malignant. Other studies have used comorbidities and cell mutations to predict how well treatments will work. This study investigates whether sex, tumor grade, histological tumor type, Memorial Sloan Kettering Cancer Center (MSKCC) tumor type, tumor location, and treatment received predict a patient's disease status: No Evidence of Disease (NED), Alive with Disease, or Dead over ten years. Understanding these relationships with a patient's disease status may help identify patterns to prolong life. Using data collected from 500 patients at MSKCC in New York City between 2010 and 2020, Chi-Square Tests of Independence were used to determine relationships between tumor grade, histological tumor type, MSKCC tumor type, tumor location, treatment, and disease status. In addition, Multinomial Logistic Regression was used to identify which of these variables predict disease status. Many relationships were found. Patients with Intermediate Grade tumors were more likely to be NED than patients with High Grade tumors. Patients who had Leiomyosarcoma were more likely to be classified NED, while patients with tumors in the right buttock were more likely to have died. Patients who received Radiotherapy and Surgery had the highest percentage of being classified NED. The Multinomial Logistic Regression shows that sex, age, MSKCC tumor type, and treatment received predict the patient's disease status. The model correctly predicted the status of NED in 90.24% of the cases, Alive with Disease in 81.08% of the cases, but was less successful at predicting Dead in 39.13% of the cases. The results of this study can help practitioners better predict disease outcomes from these variables studied and possibly prolong the life of their patients. In addition, informed patients can make better decisions about whether treatment is worth the outcome.

Millennials VS Gen Z: Priced Out & Paycheck Stretched
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Bailey Spyker
Research Mentor: Susan Mathews Hardy

This project compares the financial wellbeing of Millennials and Generation Zs in Georgia, in particular the housing costs and income. Past research focuses on everyday expenses, for example gas and groceries. Literature shows that everyday expenses have increased by 44% between 2010 and 2024. The effect of housing costs and income also affect young adults' ability to live independently. Using the United States Census data in 2010 for Millennial adults and 2024 for Generation Z adults, the differences in earnings, housing costs, and household circumstances were studied. The samples included 6,810 Millennials and 7,612 Generation Z adults, representing 5,109 and 5,414 eligible households, respectively. Person demographics and housing data were cleaned and linked for each year. Each household was included once in housing comparisons, whereas there may be more than one Generation Z or Millennial in that household. Personal earnings and housing characteristics were summarized. Two-sample t-tests, Wilcoxon tests, and chi-square tests compared housing costs,

household income, time in current household, and whether the person is spending more than 30% of their monthly income on rent. Dollar amounts were adjusted to 2024 dollars in both data sets. Findings included that average salary, average monthly rent, average property value, average household income, and the proportion of people owning homes all increased from 2010 to 2024. However, people with a positive monthly income, who were spending 30% or more on rent, decreased. Generation Z adults are more likely to live in a household with a parent, other family, roommate, etc. These research findings promote supporting multi-generational living and continuing to support younger generations during the transition to adulthood with first time home buyer programs.

Plurality and Infant Mortality Among U.S. Infants Born in 2023
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Savannah Stafford
Research Mentor: Kevin Gittner

Introduction: Infant mortality remains a serious public health concern in the United States, particularly among multiple births. This study examines the relationship between plurality and infant mortality among infants born in the United States in 2023, hypothesizing that infant mortality increases with plurality. Methods: Data were obtained from the National Center for Health Statistics Period Linked Birth/Infant Death Data Files. The 2023 birth file was linked with infant death records from 2023 and 2024 to identify deaths occurring before one year of age among the 2023 birth cohort. The final analytic sample included 3,605,081 infants, including 19,772 infant deaths. Plurality is the primary explanatory variable, and infant death before one year of age is the response variable. Data were analyzed in IBM SPSS Statistics using descriptive statistics; further analyses are planned. Results: Preliminary descriptive analyses showed that infant mortality increased as plurality increased. Infant death occurred among 0.5% of single births, 2.0% of twins, 4.9% of triplets, and 10.1% of quadruplet or higher births. Mean gestational age also decreased as plurality increased, from 38.61 weeks among single births to 28.67 weeks among quadruplet or higher births. Infants who died before one year of age had a lower mean gestational age than infants who survived through one year. Further analysis will examine the relationship between plurality and infant mortality while considering gestational age and maternal age as additional factors. It is expected that multiple births will have a greater risk of infant mortality than single births, and that gestational age may contribute to observed differences in mortality. Conclusions: Understanding these relationships may help identify infants from multiple pregnancies at greater risk and support prenatal care and preterm birth prevention. Improving outcomes for multiple births may also reduce the emotional burden on families experiencing infant loss.

Predicting Generalized Anxiety Disorder Using Machine Learning
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Kaniya McLaughlin
Research Mentor: Nzubechukwu Ohalete

Generalized Anxiety Disorder (GAD) is a mental health condition characterized by persistent and difficult-to-control worry that can interfere with daily functioning. Identifying characteristics associated with GAD can advance our knowledge of underlying patterns associated with the condition and support data-informed approaches to mental health research. The goal of this study was to develop and evaluate supervised machine-learning models for classifying self-reported professional diagnosis of GAD using demographic, trauma, personality, socioeconomic, lifestyle, physical health, and social characteristics. Data from 9,810 participants in the SHARE-MH mental health survey were analyzed. From the original dataset of 315 variables, 25 variables were selected for analysis based on relevance to GAD, data quality, and suitability for predictive modeling. The performance of Logistic Regression, Random Forest, Support Vector Machines (SVM), and XGBoost models was compared using accuracy, precision, recall, and F1 score, while feature-importance analyses identified characteristics contributing most strongly to classification. Preliminary results show that Logistic

Regression achieved the highest accuracy (0.8216) and F1 score (0.5125). Random Forest achieved an accuracy of 0.8211 and the highest precision (0.6573); SVM achieved an accuracy of 0.8145, and XGBoost had the lowest accuracy (0.8078). Feature importance analyses indicate that experiencing anxiety for a month or longer was the strongest predictor in Logistic Regression, the participants' total score on the Eysenck Personality Questionnaire was the strongest contributor in the SVM and Random Forest models, whereas age was the most influential feature in XGBoost. The results indicate that self-reported GAD diagnosis can be classified with strong predictive performance using characteristics available in a large mental health survey. Demographic, personality, and anxiety-related characteristics contributed prominently to classification, supporting the use of supervised machine-learning methods to identify informative patterns associated with self-reported GAD.

Sleep and BMI: Exploring the Connection Between Sleep Duration and Body Mass Index Among NHANES Participants

In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Mia Gutierrez
Research Mentor: Kevin Gittner

Introduction: Sleep duration is an important public health concern because sleep habits may be connected to body weight and long-term health. Understanding this relationship could help public health professionals consider sleep alongside diet and physical activity when developing obesity prevention programs. Previous research suggests that shorter sleep may be associated with higher body mass index (BMI), but examining more recent data can provide additional insight. This study will investigate whether usual weekday or workday sleep duration is associated with BMI among National Health and Nutrition Examination Survey (NHANES) participants ages 16–79. It is hypothesized that sleep duration and BMI will have a statistically significant association. Methods: Data from the August 2021–August 2023 NHANES Sleep Disorders, Body Measures, and Demographics files were imported into SPSS and merged using SEQN, the participant identification number. The cleaned dataset included 7,816 participants ages 16–79 reporting sleep durations from 3 hours to less than 14 hours. Sleep duration is the explanatory variable, BMI is the response variable, and age and gender describe the sample. Results: Exploratory data analysis showed an average sleep duration of 7.71 hours and an average age of 48.63 years. Participants were 44.9% male and 55.1% female. BMI had 6,084 valid observations, with an average of 29.55 kg/m². These descriptive findings summarize the sample but do not establish a relationship between sleep and BMI. Further statistical analysis will test whether the association is significant. Conclusions: A significant association is expected based on previous research, although the direction and strength remain unknown for this sample. Findings may help public health professionals better understand whether sleep should receive greater attention in weight-related health education. Because this observational study cannot establish causation, future research could explore how physical activity, diet, age, and other health behaviors affect the relationship between sleep and BMI.

The Caloric Cost of Protein

In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Colby Cochran
Research Mentor: Kevin Gittner

The relationship between caloric energy and macronutrient composition is foundational in nutritional science. Consumers increasingly prioritize eating high-protein diets to stay healthy and build muscle. However, it's important to note exactly how many calories come with that protein. This study aims to explore the USDA National Nutrient Database to see how different types of food groups compare. The research question asks: Is there a noticeable difference in average protein levels across official USDA food groups, and does the protein level affect energy? To investigate this, the USDA National Nutrition database was imported into SPSS, cleaned to remove missing entries, and narrowed down to only focus on the primary food categories. Nutritional data including protein, total fat, and carbohydrates were left as variables. Additionally, new categorical variables such as total macros

and protein category were created to rank the foods into low, moderate, and high protein tiers. Descriptive statistics indicate the beef, poultry, and legumes food groups have a significantly higher average protein level per 100 gram serving. However, a simple linear regression model demonstrated that protein level alone is a poor predictor for overall energy. The relationship is positive but very scattered. Protein alone can only explain about one percent of the variation in total calories. Therefore, targeting high-protein foods alone is not enough for managing daily caloric intake, since other macronutrient groups heavily influence total calories. Future research should use multiple regression models to test the combined effects of fats and carbohydrates as well as protein on total energy.

The Pain That Keeps on Taking: The Relationship Between Separation and Fetal Loss
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Lauryn Ward
Research Mentor: Kevin Gittner

Introduction: According to the Massachusetts General Hospital, facing a stressful life event the year before delivery increases fetal death by 40%. According to the Holmes-Rahe Stress Inventory Scale, divorce and becoming widowed are the top 2 most stressful life events. 40% of divorced individuals have clinical levels of anxiety within the first year of divorce. The purpose of this study is to test if there are higher rates of fetal death with women who are separated from their partners. Methods: The primary variables are the outcome of birth and marital status of the participant. These birth outcomes could be live birth, ectopic pregnancy, miscarriage, or still birth. The marital status can be divorce, separation, or becoming widowed. The data was collected from participants with under 18 excluded (n=5280) from the National Survey of Family Growth. Fetal failure was collected along with maternal characteristics including respondents' age, education levels, timing of pregnancy, use of prenatal care, and feelings around becoming pregnant. Inferential and descriptive analyses were estimated using SPSS. Results: The mean age of the data is 27.14 with a minimum of 18 and a maximum of 48. The expected results are that there will be a relationship between fetal deaths and partner separation. Conclusions: Results could help improve the relationship between fetal deaths and marital separation. Broadening the scope of how public health professionals see women's social and mental health in relation to the health of their fetus. Knowing how stress, social life, and mental health affect these women can allow them to have more knowledge and access to the appropriate care that they need. Giving them resources to help with these issues can help prevent avoidable fetal deaths.

College of Science and Mathematics

Department of Chemistry and Biochemistry

AI-Guided Development of NAPVSIPQ Analogs Targeting Amyloid-β Fibril Formation
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Juwairiyah Hafsah
Research Mentor: Mohammad Abdul Halim

Alzheimer's disease is the most prevalent neurodegenerative disorder, affecting millions of patients and their families worldwide. One of the hallmarks of Alzheimer's disease is the formation of amyloid-β (Aβ) plaques, which arise from the aggregation of misfolded proteins in the brain. Peptide therapeutics, which occupy a therapeutic space between large biologics and small molecules, have attracted increasing interest; however, their full therapeutic potential remains largely unexplored. Peptide analogs of the parent sequence NAPVSIPQ were designed using AI-assisted approaches, modeled with AlphaFold, and evaluated for their ability to inhibit amyloid-β fibril formation. Twenty analogs were generated and docked against Aβ using HDOCK. Based on docking scores, four lead candidates were selected: NAP-3 (NAPVSIPR, docking score −119.4), NAP-7 (KAPVSIPQ, docking score −125.07), NAP-9 (NAPVTIPQ, docking score −132.6), and NAP-16 (NAPVHIPQ, docking score −129.15). All peptide analogs were synthesized by solid-phase peptide synthesis using Rink amide resin. Following synthesis, the peptides were dried with ethyl ether, and cleavage from the resin was carried out using a solution containing 95% trifluoroacetic acid (TFA). After filtration, TFA was removed under a stream of nitrogen, and peptide precipitation was induced with cold ethyl ether. The precipitated peptides were then dissolved in glacial acetic acid and water, frozen, and lyophilized to obtain peptide powders. Liquid chromatography-mass spectrometry confirmed the expected masses and purity of the synthesized peptides. Thioflavin T (ThT) fluorescence assays showed that NAP-16 reduced amyloid-β fibril formation by 86%, compared with a 70% reduction observed for the parent NAP peptide. Binding studies revealed comparable dissociation constants for NAP-16 and NAP, indicating that the enhanced inhibitory activity of NAP-16 was achieved without compromising its affinity for amyloid-β.

Amino Acid-Based Deep Eutectic Solvents as Green Media for Enhancing α-Amylase Activity
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Jiselle Jackson
Graduate Student: William Bryant
Research Mentor: Mohammad Abdul Halim

Deep eutectic solvents (DESs) are a class of multi-component solvents comprised of intermolecular networks from their combination of hydrogen bond donors and acceptors with distinctive physiochemical properties. These hydrogen-bonding interactions allow for tunability of DESs for compatibility with many biomolecules. Amino acid-based DESs are a specific class of DES that include an amino acid as one of its components and have been shown to stabilize enzyme structure and enhance catalytic activity. These have emerged as a promising and non-toxic alternative for industries that utilize enzymes such as α-amylase in commercial applications. This study seeks to evaluate whether amino acid-based DESs can increase activation and stability of α-amylase activity using a colorimetric assay. DESs containing proline, arginine, histidine, lysine, and serine were synthesized by combining each amino acid with either urea or glycerol and characterized by IR. Solutions of α-amylase in 5mM DES were tested in the kinetic assay to investigate how different compositions affect enzymatic product formation. Preliminary Michaelis-Menten analysis indicates that Proline: Urea produced the greatest increase in catalytic activity relative to other DESs and the control. Proline: Glycerol also substantially increased maltose production, followed by Serine: Glycerol. Lysine: Glycerol and Histidine: Glycerol produced less maltose than the control, while

Arginine: Glycerol exhibited the lowest activity. These results suggest that amino acid-based DES composition plays an important role in modulating α-amylase activity, with proline-based DESs providing favorable conditions for α-amylase starch hydrolysis. Further analysis will quantify the effects of these solvents on α-amylase kinetics and investigate how their physiochemical properties influence enzymatic stability and structure to demonstrate their potential use in industrial applications.

Application of Hydrophobic Deep Eutectic Solvents and the Removal of Emerging Antibiotic Contaminants from Water

In-Person Poster Presentation (Event Center, Poster #24)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Saxxyun Soberanis
Graduate Student: Shibam Mondal
Research Mentor: Mohammad Abdul Halim

Application of Hydrophobic Deep Eutectic Solvents for the Removal of Emerging Antibiotic Contaminants from Water Saxxyun Soberanis, Shibam Mondal, Mohammad A. Halim Correspondents: mhalim1@kennesaw.edu, smondal1@students.kennesaw.edu Improper disposal of pharmaceutical antibiotics is a global environmental and public health crisis. Water treatment plants are designed to purify water; however, they do not completely remove pharmaceutical waste, leading to antibiotic-resistant bacterial infections. This can cause health challenges in humans and animals and damage the environment. This project aims to determine which Deep eutectic solvent-, Menthol: Thymol (1:1), Thymol: Acetic Acid (1:1), Thymol: Decanoic Acid (1:1 and 1:2), Thymol: Lactic Acid (1:1), and Thymol: Octanoic Acid (1:1) is the most efficient in removing antibiotic pollutants from water. Deep eutectic solvents are green solvents composed of a hydrogen-bond donor and a hydrogen-bond acceptor. Deep eutectic solvents may have the ability to interact with contaminants and remove them from water. Ciprofloxacin, a widely used antibiotic for treating bacterial infections, was selected as the model contaminant in this study. Each Deep Eutectic Solvent was weighed out in either a (1:1) ratio or a (1:2) ratio and placed on a hot plate for 45-60 minutes at 70˚C until a homogeneous liquid was formed. Calibration standards were prepared using different ciprofloxacin concentrations to generate a calibration curve, while a ciprofloxacin concentration of 100 μM was used for all extraction experiments. The ciprofloxacin solution and each DES were mixed separately and centrifuged to achieve phase separation. Generated calibration curve was used to determine aqueous-phase ciprofloxacin concentrations and extraction efficiency. Thymol: Lactic Acid (1:1) demonstrated excellent performance, removing 96.4% of CIP from water. Complete removal was achieved using Thymol: Decanoic Acid (1:1),Thymol: Decanoic Acid (1:2), and Thymol: Octanoic Acid (1:1), resulting in non-detectable ciprofloxacin concentrations in the aqueous phase. Based on the results, Deep Eutectic solvents can remove antibiotic pollutants from water.

Boron Nitrogen-Substituted Heteroarenes as a Platform for Next-Generation Voltage-Sensitive Fluorophores

In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Malaurie Georges
Graduate Student: Ngubui Mukeh Cafarina
Research Mentor: Carl Jacky Saint Louis

Monitoring membrane potential with high spatial and temporal resolution is essential for understanding electrical signaling in biological systems. Although voltage-sensitive dyes (VSDs) provide a powerful optical approach for tracking neuronal and cardiac activity, many current probes are limited by poor photostability, modest sensitivity, and challenging synthetic routes. To address these limitations, we are developing pyrrolidinone-fused 1,2-boron-nitrogen heteroarenes (PBNHs) as a new class of voltage-sensitive fluorophores. These BN-substituted heteroarenes exhibit favorable photophysical properties, including high fluorescence quantum yields, large Stokes shifts, substantial excited-state dipole moments, and enhanced photostability. A library of PBNH derivatives is being prepared through systematic modification of pyridinium substitution patterns and membrane-

targeting groups to tune charge-transfer characteristics and membrane interactions. Their photophysical behavior is evaluated using steady-state and time-resolved spectroscopy, solvatochromic studies, and time-dependent density functional theory (TD-DFT) calculations. By establishing fundamental structure-property relationships, this work seeks to provide molecular design principles for the development of brighter, more sensitive, and more photostable voltage-sensitive dyes. These studies position BN-based fluorophores as promising candidates for next-generation optical electrophysiology and bioimaging applications.

Chromatography-Free Purification of Sequence-Defined Amphiphilic Peptoids: A Sustainable and Green Strategy

In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Edhereveno Crown & James Henriques
Graduate Student: Kyle Whitaker
Research Mentor: Progyateg Chakma

This research aims to develop green and sustainable methods for the purification of amphiphilic peptoids (AMPs), a class of sequence-defined polymers of growing scientific and industrial interest. Conventional purification of AMPs relies heavily on preparative chromatography and large volumes of hazardous, petroleum-based organic solvent, generating substantial solvent waste and limiting scalability and sustainability of peptoid production. Here, we seek to develop an integrated, sustainable platform for AMPs by establishing a chromatography-free purification method based on molecular principles governing the phase behavior and precipitation of sequence-defined peptoids. We hypothesize that sequence molecular weight, side-chain chemistry, hydrophobicity, and intermolecular interactions can be systematically exploited to control solubility, aggregation, and precipitation, enabling chromatography-free purification. While AMPs serve as the model system, the principles and strategies developed here are broadly applicable to sequence-defined polymers and will open the door to innovative, sustainable frameworks for peptide and peptoid manufacturing in both academic and industrial contexts.

Colorimetric Detection Through Extended Viologen-Based Photochemical Sensing

In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student(s): Lilianna Kocai & Joy McLeod
Research Mentor: Tyler Adams

Chemical detection often relies on specialized analytical instruments which provide highly detailed chemical information, however, they can be very expensive and require specialized equipment and training. This is often needed for crime scene investigation and law enforcement to test for illegal drugs like cocaine, methamphetamine, and fentanyl. A color-changing sensor could provide a simpler, portable, and more accessible method for preliminary chemical detection, rather than requiring complex instrumentation. In this project, viologen-based organic dyes are investigated as sensors for a variety of chemically and biologically relevant analytes. Extended viologens are a class of molecules with unique color-changing and light-responsive properties. These properties result from the ability of viologens to reversibly gain and lose electrons, which changes their optical properties. Viologens are also highly tunable, meaning that changes to their chemical structure can affect their color, fluorescence, and ability to participate in electron transfer. These characteristics make viologens promising candidates for chemical sensing applications. When exposed to an analyte and activated with ultraviolet (UV) light, the viologen may undergo a visible color change. These changes are observed and compared between different analytes to determine which compounds produce distinct and reproducible responses. By studying these responses, we aim to better understand how interactions between viologens and analytes influence electron transfer and the resulting color change. This work may also help identify chemical features that contribute to stronger or more selective sensing responses.

Comparison of Conventional Solvents and Deep Eutectic Solvents in Extracting 2-Phenoxyethanol from Pen Inks

In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Saxxyun Soberanis & Alexyis Ray
Research Mentor: Wei Zhou

Comparison of Conventional Solvents and Deep Eutectic Solvents in Extracting 2-Phenoxyethanol from Pen Inks Saxxyun Soberanis and Wei Zhou Department of Chemistry and Biochemistry, Kennesaw State University, Kennesaw, GA, 30144Correspondents: wzhou2@kennesaw.eduForensic ink analysis is an important area of forensic analytical chemistry, particularly in the examination of questioned documents. One compound of interest is 2-phenoxyethanol (PE), a solvent commonly found in ballpoint pen inks. Because the amount of PE in deposited ink changes over time, its analysis by gas chromatography-mass spectrometry (GC/MS) has potential applications in forensic ink-aging studies. In this study, conventional organic solvents, including methanol and n-hexane, are compared with selected hydrophobic deep eutectic solvents (HDESs), including thymol: heptanoic acid (1:1) and thymol: camphor (1:1), for the extraction of PE from ballpoint ink on paper. HDESs are tunable solvent systems formed by mixing two or more components at appropriate molar ratios to produce a liquid mixture with a melting point lower than those of the individual components. Selected HDESs are prepared under controlled conditions to obtain homogeneous liquid mixtures. PE standard solutions are used to establish GC/MS conditions, confirm qualitative identification, and construct calibration curves. Ink-on-paper samples are then extracted using conventional solvents and selected HDESs, and their GC/MS responses are compared to evaluating the feasibility of HDES-based extraction. This research explores whether HDESs can provide a practical alternative to conventional volatile organic solvents for sample preparation in forensic ink analysis. The results will also provide a foundation for continued investigation of PE extraction, ink aging, and questioned-document analysis.

Computational Investigation of Isotopic Substitution in Protonated Water Trimer, H7O3 +: Stationary Points and Vibrational Spectra
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Maria Chaudhary
Research Mentor: Martina Kaledin

Proton transfer through hydrogen-bonded networks is a fundamental process in chemistry and biology, governing mechanisms from cellular respiration to fuel cell performance. To better understand these proton dynamics at a molecular level, protonated water clusters serve as ideal model systems. This study investigates the protonated water trimer, $H_7O_3^+$, its fully deuterated counterparts, $D_7O_3^+$, and partially deuterated species, $D_nH_{7-n}O_3^+$ (n=0-7), to examine how replacing hydrogen with deuterium (isotopic substitution) affects clusters' vibrational properties. Using density functional theory (DFT) and second-order many-body perturbation theory (MP2), we mapped the potential energy surface to identify stationary points, including stable equilibrium geometries and transition states corresponding to proton movement. We performed structural optimizations and harmonic frequency calculations using normal mode analysis with the Gaussian and MOLPRO programs. From these stationary points, we simulated both Infrared (IR) and Raman spectra for $H_7O_3^+$ and its deuterium-substituted complexes. Low-lying transition states were analyzed in earlier studies, and this work focuses on transition states that correspond to high-energy transition states with a single shared proton among two waters and a "water wire complex", H_3O^+-H_2O-H_2O. Relative to the global minimum, the energy barriers and the zero-point energy (ZPE) corrected values were calculated and analyzed. Our results reveal spectral shifts directly resulting from the mass difference between hydrogen (H) and deuterium (D). The characteristic stretch modes associated with shared protons show significant red-shifting upon deuteration, along with changes in both IR and Raman activities. Comparing the vibrational signatures of $H_7O_3^+$ and $D_7O_3^+$ provides insights into zero-point energy effects and structural fluctuations in hydrogen-bonded trimers. Ultimately, these computational results provide benchmark vibrational spectra to help interpret experimental spectroscopic data and deepen our understanding of charge-transport mechanisms in aqueous environments.

Confirmation of Isoform Specific Interactions Between Mitogen-Activated Protein Kinase-Activated Protein Kinase-2 (MK2) and Zinc Finger Protein 302 (ZNF302) Using a Pull-Down Assay

In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student(s): Nylah Carter & Emilio Caro Del Castillo
Research Mentor: Rajnish Singh

MK2 is a specialized kinase that belongs to the MAPK family. MK2 moves to the cytoplasm where it regulates numerous cellular processes such as apoptosis, the cell cycle, movement, and responses to oxidative stress. MK2 has been found to play a crucial role in the activation and deactivation of RNA-binding proteins (RBPs). MK2 is a kinase of interest because of its ability to regulate RBPs, making it a promising subject for cancer therapeutics. MK2 has two isoforms, MK2S (splice variant) and MK2L (canonical). MK2 research is focused on the canonical isoform (MK2L). We conducted research to investigate the purpose of MK2S through a Course Based Undergraduate Research Experience (CURE). The goal was to confirm the protein-protein interactions between MK2 isoforms and ZNF302. A previous CURE found a novel interaction between MK2S and RS03, a portion of the ZNF302, using a yeast two hybrid assay. To confirm previous results, we will perform a pull-down assay between MK2 isoforms and ZNF302 and RS03. The MK2 proteins will be synthesized with GST affinity tags, and the ZNF302/RS03 proteins will be given His tags. The results of this assay are pending. We predicted that MK2S can bind specifically with ZNF302, this would be the first step in characterizing the short isoform and its function.

Confirming Interactions Between MK2 Isoforms and Zinc Finger Protein 302 via Pull Down Assays

In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Jacob Erasmus & Skylar Hamric
Research Mentor: Rajnish Singh

The p38 mitogen-activated protein kinase (p38MAPK) signaling pathway is a stress-activated pathway that regulates many cellular processes such as apoptosis, cell division and invasion, and inflammatory responses. Upon activation of the signaling pathway, p38MAPK phosphorylates MK2, a serine/threonine kinase which protects cells via regulation of DNA damage response, transcriptional stability, and mRNA motility. MK2 has two isoform derivations, a short (MK2S) and a long (MK2L). Previously, the interaction between MK2S and RSO3 was confirmed using a Yeast Two-Hybrid (Y2H) assay but has not yet been established in different systems. Furthermore, the Y2H confirmed that MK2L does not interact with RSO3 in the yeast system, yielding isoform specificity. In the present, this study aims to further characterize the interactions between MK2 isoforms and zinc finger protein 302 (ZnF302) and its fragment, RSO3 using a Pull Down Assay. pGEX and pET28a+ plasmids containing glutathione S-transferase (GST) tagged MK2S/L and His-tagged RSO3 and ZnF302 were expressed in BL21(DE3) cells and purification is ongoing. An affinity pull-down assay will be performed and will be the first non-yeast biochemical evidence that MK2S binds with RSO3. As the project takes place within a Course-based Undergraduate Research Experience (CURE), data collection and analysis are ongoing. Confirming the interaction of binding between MK2S and RSO3, or more broadly, ZnF302 and MK2 (both isoforms), would expand our knowledge of the p38MAPK signaling pathway and provide insight for future drug therapeutics.

Design, Synthesis, and Characterization of p53 Peptide Analogs as Competitive Inhibitors of MDM2

In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: William Copeland
Research Mentor: Mohammad Abdul Halim

Mouse Double Minute 2 (MDM2) is a proto-oncogene that facilitates cell growth by inhibiting tumor suppression activity of p53 proteins. p53 proteins, which are generated from the TP53 gene, regulate

the cell cycle by directly binding with DNA sequences to monitor cell activity. It halts the cell cycle and attempts to repair the cell when anomalies are detected; apoptosis is induced if cell function cannot be restored. MDM2 binds to the N-terminus of p53 and attaches ubiquitin to lysine residues which degrades the p53 protein. Overexpression of MDM2 causes rapid loss of p53 proteins, resulting in unregulated cell growth in cancer. To circumvent this issue, we are investigating which analogs of a p53 peptide have high binding affinity for MDM2 and competitively inhibit it so that it does not interact with p53. Two analogs of the peptide and the original strain have been synthesized using solid-phase peptide synthesis with a high-swelling resin. After drying, the resin was cleaved from the peptide followed by filtration and precipitation. It was lyophilized overnight to obtain peptide powder, and this peptide was injected into LCMS (liquid chromatography-mass spectrometry) for characterization. The original p53 peptide (sequence: ETFSDLWKLLP) mass spectrum showed charge states [M+H]+1 at m/z 1347.75 and [M+H]+2 at m/z 674.38 which matched the theoretical mass of 1348.71 Da. The 1st analog (sequence: ETFSDLFKLLP) showed charge states [M+H]+1 at 1308.74 m/z and [M+H]+2 at 654.87 m/z which also matched the theoretical mass of 1309.70 Da. Peptide therapy for cancer enables direct delivery of these peptides to surface receptors of target molecules via a specialized pathway. The enhanced specificity of the molecular pathway provides far less-invasive treatment than chemotherapy. Selectively delivering p53 analogs that antagonize MDM2 activity via peptide therapeutics can terminate positive feedback loops of cancer cells.

Detection and Quantification of 6-PPD-q in Water Samples in Metro Atlanta Georgia
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student(s): Khalil Cassimally & Avery Morlot
Research Mentor: Christopher Sumner

6-PPD is a chemical additive used in tire manufacturing that prevents tires from cracking extending the tires lifetime. As the tire deteriorates 6-PPD migrates to the exterior of the tire where ambient ozone oxidizes 6-PPD creating the ecotoxic byproduct 6-PPD-q. The EPA has listed 6-PPD-q as a chemical of environmental concern but due to internal budget constraints, it is not currently regulated. This project measured concentrations of 6-PPD-q in water samples from Noonday Creek near high traffic roadways versus low traffic roadways. The results showed higher concentrations in higher traffic roadways compared to lower concentration roadways.

Effects of Boron and Nitrogen Doping on the Structural and Electronic Properties of Carbon Clusters: A Density Functional Theory Study
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Daniel Farris
Research Mentor: Martina Kaledin

Heteroatom doping tunes the structural and electronic properties of carbon-based materials by replacing carbon atoms with elements having different electronic configurations. This research investigates the effects of doping and co-doping boron (B) and nitrogen (N) atoms at different positions in six- to twenty-carbon clusters ($C_{6\text{-}20}$). Doping a carbon cluster with B or N may alter properties such as molecular stability, electronic energy levels, and the highest occupied molecular orbital- lowest unoccupied molecular orbital (HOMO-LUMO) gap by adding electron-deficient or electron-rich species. Changes in this gap can affect the modified structure's chemical, electronic, and optical properties. Using Density Functional Theory (DFT), we model structures at a fundamental level and further predict physical or chemical changes. We optimize geometries and calculate their electronic properties, such as vibrational frequencies, to compare undoped, boron-doped, nitrogen-doped, and boron–nitrogen co-doped clusters. We expect that dopant identity, placement, and cluster size will influence the resulting geometries and HOMO–LUMO gaps, revealing trends in how heteroatom incorporation tunes carbon-cluster electronic structure. The findings will provide fundamental insights into designing carbon-based materials with tunable electronic and optical properties, potentially informing the development of future nanoscale electronic and optoelectronic devices.

Engineering Sequence-Defined Amphiphilic Peptoid Nanomaterials for Antimicrobial Applications
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Graduate Student: Salwa Mahfuz Noha
Research Mentor: Progyateg Chakma

Peptoids, sequence-defined peptidomimetics that originated in the 1980s through combinatorial chemistry, are N-substituted glycine oligomers that have the side chains attached to the backbone amide nitrogen rather than to the α-carbon in peptides. They are highly tunable and resistant to proteolytic degradation. Amphiphilic lipid bilayer-mimicking diblock peptoids have hydrophilic and hydrophobic side-chain domains that can self-assemble into supramolecular nanostructures, offering an opportunity to investigate how diverse morphology influences biological function. However, the effect of self-assembly and side-chain chemistry on antibacterial activity remains poorly understood. In this study, we explored the effect of peptoids and their self-assembly on antibacterial activity. All peptoids were synthesized using a solid-phase submonomer synthesis method and characterized by HPLC and LC-MS. Evaporation-induced self-assembly into highly crystalline nanostructures was characterized using AFM and SEM. Antibacterial activity of the peptoids was assessed using the broth microdilution assay against Gram-negative E.coli (AW3110). The self-assembled peptoids showed greater inhibition of bacterial growth compared to non-assembled peptoids. The goal of this work is to provide design principles for developing sequence-defined peptoid nanomaterials with tunable structures to improve the potential for antimicrobial applications with reduced cytotoxicity.

Engineering Tunable Extended Viologens for Sustainable Photo-Redox Catalysis
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student(s): Skylor Seetaram & Chelsea Pate
Research Mentor: Tyler Adams

The synthesis of complex compounds and materials is essential in modern society for applications including adhesives, plastics, surfactants, pesticides, and pharmaceuticals. However, conventional methods often rely on energy-intensive processing and hazardous reagents, creating a need for more sustainable methods of molecular synthesis. Photocatalysts and photoinitiators provide promising alternatives by using light to drive chemical transformations under relatively mild conditions. While many effective systems rely on expensive iridium- and ruthenium-based materials, organic photocatalysts offer an opportunity to reduce costs and improve sustainability. We report the development of extended viologens as tunable organic photocatalysts and photoinitiators with strong and adjustable redox properties. Viologens are a class of compounds that have the ability to accept and release electrons. This property makes viologens ideal for conducting reactions using light energy. Viologens consist of two pyridinium rings joined together through a conjugated core system, which can be changed to alter the electronic and photochemical properties of the viologens. A collection of extended viologens with charged side chains was prepared to increase the solubility of viologens in water and change the structure and size of the conjugated core. The relationship between molecular structure and function was investigated using electrochemical and photochemical techniques before evaluating the performance of these compounds in photocatalysis and photoinitiated polymerization. Together, these results demonstrate the potential of extended viologens as tunable organic catalysts for photochemistry and sustainable catalysis.

Enzyme Kinetics and Inhibition of the Rhinovirus Main Protease Using LC-MS: Evaluating the Efficacy of Various Temporin L Analogs
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Shubh Patel
Research Mentor: Mohammad Abdul Halim

Disrupting viral enzyme pathways through targeted inhibition represents a promising therapeutic approach. While Fluorescence Resonance Energy Transfer (FRET) assays are widely used for kinetics measurements, they are prone to optical interference and false positives from fluorogenic

substrates. Selected ion monitoring coupled with liquid chromatography-mass spectrometry (SIM-LC-MS) overcomes these challenges by monitoring product mass-to-charge (m/z) ratios directly, offering superior reliability without the need for costly fluorescent labels. By directly monitoring the mass-to-charge (m/z) ratios of enzymatic product ions rather than relying on fluorescent tags, this mass spectrometry-based approach delivers exceptional analytical sensitivity and eliminates optical interference. Enzymatic reactions were performed across a range of substrate concentrations for 90 minutes in the presence of varying inhibitor concentrations. Reaction velocities were quantified via the SIM-LC-MS assay using a standard calibration curve. Michaelis-Menten kinetics and Lineweaver-Burk analyses were performed to evaluate and compare the inhibitory efficacy of the parent peptide against various Temporin L analogs. With previous findings showing that increasing concentrations of the TLP1 analog led to a marked reduction in product formation velocity. Furthermore, Lineweaver-Burk evaluations indicated a progressive decrease in maximum velocity (Vmax) with rising TLP1 levels, reflecting the inhibitor's concentration-dependent impact on enzyme kinetics.

Evaluation of Joro Spider Webs for Traffic Related PAHs Using GCMS
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student(s): James Smith, Ayden Weldon & Adam Horn
Research Mentor: Christopher Sumner

Polycyclic aromatic hydrocarbons (PAHs) are byproducts from burning fuel, and are commonly found in engine exhaust fumes. Research into prolonged exposure to PAH's have found increased rates of cancer, cardiovascular diseases, and fetal abnormalities. Traditional air quality monitoring systems do not measure PAH concentration, and specialized instruments are needed to do so. This project investigates if spider silk can serve as a low-cost, high-resolution bio monitor for PAHs. Spider silk has electrostatic properties that trap particulate matter, including different pollutants. While there are studies done that analyze different pollutants in spider webs, no study has looked specifically at Joro spider silk or used this species to characterize pollution levels across a major metropolitan area. Silk samples were collected from locations with different levels of traffic density within the Atlanta metro area, and pyrene, benzo(a) pyrene, and fluoranthene concentrations were quantified using GC-MS and fluorescence. These fast and cheap techniques were evaluated for whether they can reliably screen for PAHs in a specific biological matrix and looked to create an inexpensive framework for community air monitoring and taking advantage of an abundant biological resource to fill in gaps left by traditional air pollutant monitoring systems. Our results of the project will be presented at the symposium.

Examining the Isoform-Specific Interaction of MAPKAPK2 with Zinc Finger Protein 302 via Pulldown Assays
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Alexander Irwin & Israel Oduyebo
Research Mentor: Rajnish Singh

Mitogen-activated protein kinase-activated protein kinase 2 (MK2) is a protein kinase involved in the p38 MAPK signaling pathway, which mediates a cellular stress response via downstream phosphorylation of proteins. Its two isoforms, MK2S and MK2L may play different biological roles despite having similar sequences. Previous research used yeast two-hybrid experiments to identify RS03 (a fragment of ZNF302) as a candidate interaction partner for MK2S only, indicating isoform differences in protein-protein interactions. A limitation of that work is that the interaction was identified in yeast, and so it needs to be confirmed by other methods. This course-based undergraduate research project will build on the previous yeast two-hybrid results by examining the interactions with a pull-down assay. This work uses recombinant protein expression to investigate MK2S, MK2L, RS03,and full-length ZNF302. pGEX-6P1 is used to express MK2S and MK2L, whereas pET-28a(+)is used to express RS03 and full-length ZNF302. Recombinant proteins will be expressed and purified, then a pull-down assay will test whether ZNF302 binds to MK2S or

MK2L.GST-tagged MK2 will be pulled through a glutathione affinity column where they'll bind to the media, then RS03 or ZNF302 will be pulled through to determine if either protein remains associated with either isoform. Data collection and analysis are ongoing. The discovery that ZNF302 binds to MK2S would demonstrate a novel protein-protein interaction and help explain the functional distinctions between the MK2S and MK2Lisoforms. Additionally, this discovery would expand earlier KSU Course-Based Undergraduate Research Experience studies and advance knowledge of the unique biological function of MK2S in cellular signaling.

Flexible ZnO Nanorod-Supported Ag/Au Nanostructured SERS Substrates for Toxin Detection
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Graduate Student: Emily Plank
Undergraduate Student(s): Rhianna Allen, Samya Doggett & Joshua Lee
Research Mentor: Bharat Baruah

Flexible surface-enhanced Raman scattering (SERS) substrates were fabricated by functionalizing silicon-carbon rubber (SCR) with zinc oxide nanorods (ZnO-NRs) decorated with silver nanoparticles (AgNPs) and bimetallic silver-gold nanoparticles (AgNP@Au). The hierarchical GR/ZnO-NR@AgNP and GR/ZnO-NR@AgNP@Au architectures were designed to generate abundant plasmonic nanogaps that serve as SERS hot spots for enhanced analyte adsorption and signal amplification. The sensing platforms are intended for the sensitive detection of toxins and explosive compounds. Structural, morphological, and optical properties were characterized using Fourier transform infrared (FTIR), Raman, and UV-visible spectroscopy, as well as X-ray diffraction (XRD), thermogravimetric analysis (TGA), transmission electron microscopy (TEM), and scanning electron microscopy coupled with energy-dispersive X-ray spectroscopy (SEM-EDX). The combination of flexible substrates, ZnO nanorods, and plasmonic Ag/Au nanostructures provides a promising strategy for developing high-performance SERS sensors for environmental and security applications.

From Plastic Waste to Functional Materials: Direct Photocatalytic Installation of Polycyclic 1,2-BN Heteroarene Fluorophores onto Polyethylene
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Genevieve Insalaca
Graduate Student: Blaise Williams
Research Mentor: Carl Jacky Saint-Louis

Synthesis of boron(B)-nitrogen(N)-substituted fluorophores have attracted considerable interest because of their unique optoelectronic properties. The polarized nature of the BN-containing aromatic systems enables manipulate of frontier molecular orbital energies, charge-transfer (CT) processes, and emissive behavior. Although significant advances have been made in the synthesis and study of BN-containing fluorophores, their direct incorporation into covalently fluorescent polymers derived from nonpolar polyolefins, such polyethylene (PE), remains largely unexplored. Polyethylene (PE) is the most widely produced synthetic polymer; however, its chemical inertness limits pot-polymerization modification and contributes to challenges associated with recycling and plastic waste management. Direct C-H bond functionalization offers a promising route for transforming commodity plastics into value-added materials. Herein, we report the synthesis of polycyclic BN-heteroarene (PBNH) fluorophore and its direct installation onto commercial PE through iron-catalyzed photocatalytic C-H functionalization. The photophysical properties of the resulting materials will be examined in both solution and the solid state. In addition to providing a new route for the functionalization of commodity waste, this approach may enable the development of fluorescent PE materials that facilitate polymer identification and sorting during recycling and waste-processing operations.

Investigating Affinity Purification of Untagged MNK1 Using Histidine-p38 MAP Kinase as the Column
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 9:00am - 9:45am

Undergraduate Student(s): Paula Ruiz Villalobos & Michael Brian
Research Mentor: Carol Chrestensen

MAP kinase-interacting protein kinase 1 (MNK1) is a downstream target of the MAP kinases p38 and ERK and phosphorylates eukaryotic initiation factor eIF4E. Recombinant proteins are commonly purified using affinity tags such as GST or His. However, these tags may interfere with protein interactions and metal ion binding, potentially affecting later biochemical studies. This study aims to develop an affinity-based purification strategy for untagged MNK1 using His-tagged p38. Wild-type p38 and two docking-site p38 variants, D316N and Y258A, are being evaluated to determine how the common docking (CD) region and DEF pocket contribute to MNK1 binding and ultimately purification. We hypothesized that the Y258A variant would have the cleanest on-off interaction and started our analysis with that variant. Affinity purification of untagged MNK1 from E. coli lysates was attempted using His-tagged p38 on a cobalt column with fast protein liquid chromatography (FPLC). Crude lysates of His-p38 were captured on an IMAC column, washed, and kept bound to the column. MNK1 crude lysates were then added to the column, and NaCl gradients were used to elute MNK1, followed by p38 elution with an imidazole gradient. Elution fractions were analyzed by SDS-PAGE and Western blotting. Both D316N and Y258A allowed recovery of some MNK1, which was detectable by Western blotting but not visible on the SDS-PAGE gel. Small amounts of MNK1 co-eluted with p38, but the majority of MNK1 did not bind to the p38 variants. Our intermediate results suggest that both binding pockets might be necessary for efficient binding of MNK1 to p38, or that a different buffer composition may be needed to enhance initial binding.

Investigating Interactions Between MK2 Isoforms and ZNF302
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): April Cole & Jessica Teutle
Research Mentor: Rajnish Singh

MAPK-activated protein kinase 2 (MAPKAPK2/MK2) is an important enzyme in the p38 MAPK pathway and functions in cellular stress response signaling. MK2 is expressed in a variety of human tissues including the kidney, spleen, liver, lung, and skeletal muscle. MK2 phosphorylates downstream substrates that are involved in inflammation signaling, cell growth, apoptosis, and activation or deactivation of RNA-binding proteins (RBPs). MK2 activity is also linked to the biosynthesis of pro-inflammatory cytokines. Dysfunctions in the p38 MAPK pathway are linked to cancer, cardiovascular disease, neurodegenerative diseases, and chronic inflammation. MK2 has two isoforms: MK2S (short) and MK2L (long). Because MK2L has been more extensively characterized, this research project aims to expand the experimental characterization of MK2S. During the Fall 2025 CURE research course at Kennesaw State University (KSU), MK2S showed a protein-protein interaction (PPI) with RS03 through a yeast two-hybrid (Y2H) assay, while MK2L showed no interaction with RS03. BLAST analysis revealed that RS03 is a truncated fragment of zinc finger protein 302 (ZNF302). The PPI between MK2S and RS03 introduced a new direction for research in the KSU Fall 2026 weekly CURE-based 3512L lab. The goal of this research is to investigate potential PPIs between the two MK2 isoforms and the prey proteins, RS03 and ZNF302 using a GST affinity pull-down assay. GST-tagged MK2 isoforms, acting as bait, are loaded onto glutathione agarose beads. The GST tag serves as an affinity tag, allowing the MK2 fusion proteins to bind immobilized glutathione. Prey proteins, RS03 and ZNF302, are added to the agarose beads. Following washing, the GST-tagged MK2 isoforms are eluted from glutathione resin, along with any prey proteins that remain associated with the bait. Results from the 2026 CURE-based 3512L are currently pending. Characterizing these PPIs could provide insight into isoform-specific functions of MK2S within the p38 MAPK signaling pathway.

Investigating Protein-Protein Interactions Between MAPKAPK2 Isoforms and ZNF302 by Pull Down Assay
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Caroline Rakestraw & Olivia Onwuzulike

Research Mentor: Rajnish Singh

MAP kinase activated protein kinase 2 (MAPKAP2), also known as MK2, is a serine and threonine-activated protein kinase, regulated by p38, a mitogen-activated protein kinase. The p38 MAP kinase plays an important role in cell signaling and cellular response to different types of stress. MK2 is also important in inflammatory responses, helping regulate the stability and translation of cytokine mRNA. The two M2K isoforms, MK2L (long isoform) and MK2S (short isoform), are fairly similar but differ toward the C-terminal end, which suggests that they may interact differently with other proteins. Furthermore, MK2S is vastly understudied in comparison to MK2L. Previously, students in the Kennesaw State University Fall 2025 Course-Based Undergraduate Research (CURE) lab used a Yeast Two-Hybrid (Y2H) assay to examine protein-protein interactions. The results showed that RS03, a fragment of Zinc Finger Protein ZNF302, interacted with MK2S but not MK2L. Although the previous Y2H assay showed a possible interaction, there were limitations to the experiment. The Kennesaw State University Fall 2026 CURE lab is further investigating the interactions between RS03 and MK2 isoforms using a bait and prey pull-down assay. In the pull-down assay, tagged baits (MK2 isoforms) are used to capture a binding prey protein (RS03). Data collection and analysis are ongoing. The confirmation of this interaction would provide insight into how the two isoforms interact in a cell.

Mechanochemistry as a Sustainable Route to NHC Metal Complexes and Catalytic C-C Bond Formation
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Chase House, Nguyen Khang Tran & Selina Huynh
Research Mentor: Daniela Tapu

Catalysts play a key role in green and sustainable chemistry, fulfilling multiple of the twelve principles of green chemistry by speeding up reactions without being consumed, enabling the production of medicines, fuels, plastics, fertilizers, and more. N-heterocyclic carbenes (NHCs) have proven to be an excellent ligand for a variety of transition metal catalysts. However, some NHC precursors have poor solubility in reaction medium, making them difficult to produce with traditional reactions involving solvents. To overcome this, our project explores a novel approach to producing NHC-transition metal-based catalysts through mechanochemical methods. Mechanochemistry offers a solvent free or solvent reduced alternative to traditional reactions, reducing environmental impact while often enhancing reaction efficiency, selectivity, and scalability. Our results demonstrate that mechanochemistry is a suitable green method for the synthesis of a variety of catalytically active NHC transition-metal complexes that are not readily accessible through traditional solution-based methods. Moreover, these complexes are effective catalysts for C-C coupling reactions, which can also be performed under mechanochemical conditions.

Modulation of Enzyme Activity and Kinetics by Amino Acid-Based Deep Eutectic Solvents
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 12:00pm - 12:50pm
Graduate Student(s): William Bryant & Gabbi Mills
Research Mentor: Mohammad Abdul Halim

Deep Eutectic Solvents (DESs) have established themselves as highlighted alternatives to traditional solvents in many fields. Traditional solvents contain one component that cannot be readily tailored as multicomponent, interchangeable solvents such as DESs. DESs are composed of hydrogen bond donors and acceptors that create an intermolecular network that can be modified for specific physical properties. Amino acid-based DESs contain one amino acid among its components, increasing the array of potential effects on enzymes. Traditional solvents primarily present as a detriment to enzyme structure and function. We hypothesize that amino acid-based DESs can promote enzyme activation while stabilizing the enzyme to prevent unfolding and denaturation. In this investigation, various amino acids such as arginine, histidine, lysine, proline, and serine were used in combination with glycerol and urea were synthesized to test our hypothesis. The results were also compared with various hydrophobic DESs. Overall, amino acid-based DESs significantly enhanced trypsin activity

relative to aqueous media, whereas hydrophobic DESs markedly inhibited catalysis. Among all systems investigated, Pro:Urea exhibited the best overall performance, yielding the highest product formation (5.6-fold greater) together with a promising kinetic profile (low Km and high Vmax). Serine: Glycerol DES provided the strongest substrate affinity (lowest Km value), while Arginine: Glycerol DES exhibited the highest catalytic capacity but poor substrate binding. However, hydrophobic DESs including Menthol: Octanoic Acid, Thymol: Octanoic Acid, Menthol: Thymol suppressed enzymatic activity and likely disrupt substrate accessibility and trypsin conformational dynamics. ANS fluorescence revealed that Pro:Urea DES reduced hydrophobic surface exposure of trypsin compared to buffer and free urea, indicating increased structural stabilization and preservation of native structure. Moreover, these results demonstrate that tuning DES components, one can substantially modulate enzyme efficiency, highlighting amino acid-based DESs as promising media for biocatalytic applications.

Multi-Model AI-Guided Design and Experimental Validation of Nanomolar Peptide Binders Targeting α-Synuclein Aggregation in Parkinson's Disease

In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Abdullah Al Noman
Research Mentor: Mohammad Abdul Halim

Parkinson's disease is the second most common neurodegenerative disorder in the world. Mostly due to population aging. A pathogenic feature of several neurodegenerative illnesses, including Parkinson's disease (PD), is the aggregation of α-synuclein (αSyn) into proteinaceous deposits. Several lines of evidence suggest that cellular toxicity and the transmission of pathology between cells may be caused by the accumulation of toxic oligomeric and prefibrillar αSyn species. Since aggregation inhibitors are anticipated to lessen αSyn toxicity and function as therapeutic agents, αSyn aggregation is therefore regarded as a priority target for drug development. In this study, we employed a multi-model artificial intelligence (AI)-guided peptide engineering strategy to optimize previously reported anti-aggregation peptide scaffolds for enhanced interaction with α-synuclein. We employed a multi-model artificial intelligence (AI)-guided peptide engineering strategy to optimize three previously reported anti-aggregation peptides, RTKSGVYLVG, WFQNRRMKWRK, and RGAVVTGR. Using ChatGPT, Gemini, Grok, and DeepSeek, peptide analogs were generated and evaluated through AlphaFold2 structure prediction, structural refinement by molecular dynamics, and molecular docking against α-synuclein using HADDOCK and HDOCK. Several redesigned peptides demonstrated substantially improved binding relative to their parent sequences. RT-A8 exhibited a HADDOCK score of −57.6 ± 1.3, while WF-A7 and RGAIKDFYGR achieved HADDOCK scores of −80.4 ± 3.7 and −33.5 ± 2.3, respectively. Experimental LC-MS binding assays confirmed high-affinity interactions with α-synuclein, with RT-A2, WF-A7, and RG-A7 displaying equilibrium dissociation constants (Kd) of 1.74 nM, 10.04 nM, and 9.8 nM, respectively. Together, these results suggest that AI-guided peptide optimization can be used to rapidly identify high-affinity α-synuclein-binding peptides, and identify RTKSGVFLVG, WFQNRRMKWKR, and RGIVVTGR as promising candidates for further development as therapeutic agents targeting α-synuclein aggregation in Parkinson's disease.

Native-State Preservation and Aggregation Inhibition of Insulin in Amino Acid-Based Deep Eutectic Solvents

In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Nataly Barahona
Research Mentor: Mohammad Abdul Halim

The preservation of therapeutic proteins remains a significant challenge, instability due to chemical degradation, partial unfolding, and aggregation occurring during storage and transportation. Deep eutectic solvents (DESs) have emerged as a promising class of biocompatible solvents; however, their application in protein stabilization and native mass spectrometry has yet to be discovered. Unlike conventional stabilizers; salts, buffers, sugars, and glycerol, DESs form extensive hydrogen-bonding

networks that can help reduce conformational fluctuations, maintain protein structure and preserve the hydration shell surrounding biomolecules. Moreover, DESs can lower water molecular interactions which could suppress hydrolytic degradation and aggregation pathways that contribute to protein activity loss. To explore the capability of amino acid-based DESs for therapeutic protein preservation, insulin was used as a model peptide and examined using electrospray ionization mass spectrometry (ESI-MS) and thioflavin T (ThT) aggregation assays. ESI-MS data uncovered a clear shift toward lower charge-state distributions in the solutions of Proline: Urea and Histidine: Glycerol DESs compared with aqueous solution. Insulin in water displayed primarily higher charge states (4+ to 6+), whereas DES-treated insulin showed mainly 2+ and 3+ ions, suggesting a more compact and native-like configuration. The reduction in charge states suggests a diminished solvent-available surface area and advanced structural conservation in the DES environment. The conformational equilibrium observed by ESI-MS was further supported by ThT fluorescence measurements. All amino acid-based DES formulations reduced insulin aggregation relative to untreated controls, with Histidine:Glycerol and Arginine:Glycerol producing the most significant decreases in ThT fluorescence intensity. This outcome signals efficient inhibition of aggregation-prone intermediates and lowered formation of amyloid-like structures during incubation. DES formulations remained compatible with solution-phase protein analysis while providing significant protection against aggregation. These results verify potential for the use of amino acid-based DESs in protein preservation and provide a basis for their expansive application in biopharmaceutical storage and transport.

New U-Shaped Ligands and Their Corresponding Metal Complexes
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Landry King & Aidan Heeman
Research Mentor: 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.

p-Xylylene-bridged Bis(difluoroborylamidinates) as Near-UV Emitters
In-Person Poster Presentation (Event Center, Poster #22)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Austin Salehi
Research Mentor: Michael Stollenz

Boron-based so-called 4,4-Difluoro-4-bora-3a,4a-diaza-s-indacenes (BODIPYs) and aza-BODIPYs, one of the most prominent classes of fluorescent emitters, are widely used in protein and DNA labeling, as luminescent tags, sensors, laser dyes, paint and ink compositions, and for electroluminescent devices. They are wildly used because of their photochemical stability, polarity, and pH changes of their environment. This project aims for new robust boron-based fluorescent compounds for the near-ultraviolet (NUV) region between 300 and 400 nm. NUV light emitters have several important industrial (lighting and photolithography) and biomedical applications (e.g., photodynamic therapy). Many boron-based photoluminescent compounds suffer from aggregation-caused quenching (ACQ) that results from π–π stacking. Another limitation is that BODIPYs and aza-BODIPYs show extended π conjugation, which makes them suitable for long emission wavelengths towards the red region, but not for shorter wavelengths in the NUV region. Triaza-BF_2 heterocycles

that resemble aza-BODIPY chromophores have shown to be better alternatives, given that they have bulky substituents to avoid π-stacking. In general, the development of efficient NUV) emitter remains challenging, as large optical band gaps typically lead to reduced oscillator strength, lower photoluminescence quantum yields, and decreased stability. This project focuses on the concept of combining two N-heteroaromatic-coordinated BF2 centers to be connected internally by a non-conjugating bridge. These molecules resemble aza-BODIPYs but have limited conjugation, and they carry bulky substituents preventing them from π-stacking. Previous results show that these bis(difluoroborylamidinates) are thermally robust and photostable NUV emitters in the solid state. Herein, a more rigid bridge, p-xylylene, will be introduced, which is expected to limit nonradiative decay pathways and therefore to increase fluorescence quantum yields

Peptide-Based Inhibition of Human Rhinovirus 3C Protease Through AI-Guided Design and Experimental Validation
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Graduate Student: Peter Singh
Undergraduate Student: Ito Osayi
Research Mentor: Mohammad Abdul Halim

Rhinoviruses (RVs) are the most frequently encountered respiratory pathogens worldwide and play an important role in upper and lower respiratory illnesses in. There is still no approved antiviral treatment as HRV has more than 160 serotypes. The viral 3C protease ($3C^{pro}$) is a potential target for broad-spectrum targeted treatment as it cleaves the viral polyprotein into activity. Based on previous success of our group showing the antiviral potential of Temporin L and on the natural substrate recognition motif of HRV 3C, we developed an AI-guided pipeline to design high-affinity peptide inhibitors of 3C protease. More than 50 peptide analogs were rationally designed across seven parent scaffolds, four from HRV 3CPro substrate recognition motifs (LEVLFQGP, PESTLQGP, IVFLDG, YLQYAVLFQGP) and three from non-substrate templates (Indolicidin, Temporin L, Pro-Temporin L). The sequences were generated rationally through utilizing Five LLMs. Three-dimensional structures of peptides were predicted using AlphaFold and energy-minimized in YASARA before submission to HADDOCK and HDOCK for binding pose scoring against the 3C protease active site. 13 top-ranked leads were made by microwave-assisted Fmoc solid-phase peptide synthesis and confirmed by high-resolution LC-MS. In vitro inhibition, assays showed strong protease suppression across multiple candidates. Kinetic characterization of Temporin L2 (TL2; SAYWQWFSKFLGRIL) established near-complete inhibition at 100 µM and an IC_{50} of 14.22 µM. Multi-dose screening in triplicate demonstrated a IC_{50} values of 4.7 µM for D2 (PESTFGAP), 10.2 µM for G4 (FFPWQFGFLLILL), 17.38 µM for TL3 (Temporin Analogue), 22.07 µM for G6 (FVPWFSKFGRIL), and 39.4 µM for TL (Parent Temporin). This work proves that an AI-to bench reality is effective and can identify powerful peptide inhibitors of rhinovirus protease.

Programmable Reinforcement of Biomimetic Peptoid Nanomaterials through Dynamic Catechol–Iron(III) Crosslinking
Virtual Presentation (Session C)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Graduate Student: Kyle Whitaker
Undergraduate Student(s): Lily Schwartz, Joel Samuels, Edhereveno Crown, Aideh Nintin & Makayla Youmans
Research Mentor: Progyateg Chakma

Peptoids are a novel class of biomimetic sequence-defined polymers that are as diverse and robust as synthetic polymers but possess the complex self-assembly and functionality of biopolymers. Peptoids differ from peptides by their side chains affixed to the backbone nitrogen. The complex hierarchical self-assembly of peptoids into nanomaterials is governed by side chain chemistry rather than backbone hydrogen bonding in peptides. Recently, amphiphilic peptoids have been extensively explored due to their propensity to self-assemble into nanomaterials with diverse morphologies and

biomimetic functionalities. However, strategies for dynamically tuning the mechanical properties and stability of self-assembled peptoid nanostructures remain underdeveloped. To investigate the effect of reversible crosslinking on self-assembled amphiphilic peptoid nanomaterials, we incorporated a nature-inspired catechol-based side chain that employs stimuli-responsive, reversible post-assembly crosslinking via metal-ligand coordination. Amphiphilic peptoids were synthesized using a solid-phase, sub-monomer sequence-defined approach and assembled into nanomaterials through a facile evaporation-induced assembly strategy. Then, Fe3+ was introduced for post-assembly crosslinking via supramolecular catechol-Fe3+ coordination. Because the catechol-Fe3+ complex is pH-sensitive and reversible, we can tune nanomaterial properties such as assembly morphology, stability, and mechanical properties without introducing any permanent covalent crosslinks. The influence of crosslink density and coordination conditions on nanomaterial morphology, stability, and mechanical properties is investigated by atomic force microscopy (AFM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), nanoindentation, differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA). In summary, this work establishes dynamic metal–ligand coordination as a post-assembly strategy for controlling the structure and mechanical behavior of sequence-defined peptoid nanomaterials. This approach will provide new directions for developing stimuli-responsive, reinforced hierarchical biomimetic materials for potential biomedical applications including tissue engineering, coating, and interfaces.

Pull Down Assay to Determine the Binding of Zinc Finger Protein 302 and Mapkap Kinase-2 (MK2)

In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Henry Stone & Favio Castillo
Research Mentor: Rajnish Singh

Mitogen-activated protein kinase-activated protein kinase 2 (MK2) is a key regulatory protein in the p38-MAPK pathway. MK2 regulates cellular stress responses and inflammation. Previous research indicates that MK2 exists in two isoforms: a long isoform (MK2L) and a short isoform (MK2S). A Fall 2025 study at KSU used a yeast two-hybrid assay to detect an interaction between RS03 and MK2S but found no interaction with MK2L. RS03 is a fragment of zinc finger protein 302 (ZNF302) which also bound with MK2S. This is a novel protein-protein interaction showing isoform specific binding. This research aims to determine whether the interaction between ZNF302 and MK2S can be reproduced in an independent protein assay. Recombinant plasmids containing GST-tagged MK2L, MK2S, and ZNF302 sequences will be introduced into an appropriate bacterial expression system. Interaction between purified proteins will be assessed using pull down assays, with MK2L and MK2S as the bait protein and RS03 and full-length ZNF302 as the prey proteins. Since this is a CURE, data collection and analysis is ongoing, and results will be presented at the symposium. Identifying an interaction between MK2 and ZNF302 could reveal an uncharacterized connection between MK2-mediated signaling and ZNF302 function.

Supramolecular Peptoid Nanoassemblies as Metal-Free Carbonic Anhydrase Mimics for Carbon Dioxide Hydration and Precipitation

In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 12:00pm - 12:50pm
Undergraduate Student(s): Maria Casco Hidalgo & Jonathan Gil
Research Mentor: Progyateg Chakma

Carbonic Anhydrases (CA), natural enzymes found within the blood, exhibit remarkable catalytic activity for capturing and sequestering Carbon Dioxide (CO2), one of the most common greenhouse gases. However, due to their costly preparation and susceptibility to environmental variation, their practical applicability is limited. Recently, extensive research has been conducted to developing artificial materials capable of mimicking the activity shown in CA. Among these, a new enticing class of sequence-defined synthetic polymers, called peptoids, have gained increasing interest in their ability to self-assemble into highly crystalline nanomaterials capable of mimic the properties of polypeptides such as enzymes through the incorporation of N-substituted glycines. These features

allow peptoid-based supramolecular assemblies to achieve structural and functional capabilities similar to CA with the added benefit of increased thermal and chemical stability. Herein, we report a series of rationally designed amphiphilic peptoids with varying hydrophobic and hydrophilic side chains capable of catalyzing the hydrolysis of CO2 facilitated by a co-factor free general acid-based catalyzed proton-transfer mechanism. All synthesized peptoids were purified and characterized by High-Performance Liquid Chromatogram (HPLC) and Liquid Chromatogram-Mass Spectrometry (LC-MS), then self-assembled into hierarchical nanomaterials with tunable morphology. The quality of these nanomaterials was then evaluated using Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM). The catalytic activity of these supramolecular peptoid materials was measured by monitoring the hydrolysis of 4-nitrophenyl acetate (4-NPA), a model reaction commonly used to evaluate the catalytic activity of CA mimics. Overall, we demonstrated how rational design and synthesis of sequence-defined peptoid assemblies enable co-factor free, enzyme-mimetic catalytic activity, providing a promising platform for the development of robust artificial enzymes.

Sustainable Protein Recovery via Deep Eutectic Solvent-Based Aqueous Two-Phase Systems
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 9:00am - 9:45am
Graduate Student: Shibam Mondal
Research Mentor: Mohammad Abdul Halim

The demand for sustainable bioseparation techniques as alternatives to conventional protein extraction methods based on organic solvents is growing. Aqueous two-phase systems (ATPS) based on DES have been attracted as promising protein separation techniques due to their low toxicity, biodegradability, and tunable properties. In this work, the extraction efficiency of different DES-based ATPS were evaluated with bovine serum albumin (BSA) as model protein. The aqueous two-phase systems (ATPS) were prepared by mixing salt solutions of potassium phosphate with several formulations of DESs (Choline Chloride:Urea (1:2), Betaine:Urea (1:2), Choline Bromide:Urea (1:2), Menthol:Octanoic Acid (1:1), Menthol:Thymol (1:1), Choline Chloride:Glucose (1:1), Choline Chloride:Glycerol (1:2), Choline Chloride:PEG-400 (1:2), Choline Chloride:Ethylene Glycol (1:2). The protein concentrations in the aqueous phase were determined using UV-Vis spectrophotometer at 278 nm. Quantitative analysis was performed with the calibration curve of BSA standards. The extraction efficiencies were calculated from protein concentrations and phase volumes using mass balance equations. Among the systems studied, the DES system of Choline Chloride:Urea (1:2) was found to have the best extraction efficiency with a BSA recovery of about 99%. Betaine: Urea (1:2) and Choline Bromide: Urea (1:2) also showed excellent extraction efficiencies of about 97% and 96% respectively. The results showed that hydrophilic DESs based on urea were more effective than hydrophobic DESs in the potassium phosphate ATPS for protein extraction. The strong hydrogen-bonding interactions and aqueous compatibility of urea-containing DESs might cause the enhancement of BSA partitioning and recovery.

Sustainable Transparent Smart Materials with Enhanced Thermal Insulation for Smart Building and Wearable Applications
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Emily Plank
Research Mentor: Bharat Baruah

Transparent smart materials (TSMs) were fabricated from bio-derived substrates coated with a biodegradable shellac-beeswax composite prepared in alcohol at moderate temperature. The resulting materials exhibited UV resistance, optical transparency, flexibility, mechanical robustness, and ambient stability. Structural, chemical, and morphological properties were characterized by FTIR, UV-Vis DRS, XRD, SEM, and EDX, while thermal and mechanical performances were also evaluated. The TSMs showed enhanced strength relative to the paper substrate and improved thermal insulation compared with glass, reducing temperatures by approximately 7-10 °C. These results demonstrate the potential of biodegradable TSMs for sustainable energy-efficient and optoelectronic

applications. Future work will focus on incorporating silver nanowires (AgNWs) to impart electrical conductivity and on evaluating long-term durability, transparency, and environmental stability.

Synthesis and Characterization of β-Synuclein-Derived Peptide Candidates for Targeting α-Synuclein Aggregation in Parkinson's Disease
In-Person Poster Presentation (Event Center, Poster #24)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Samiha Zubair
Graduate Student: Abdullah Al Noman
Research Mentor: Mohammad Abdul Halim

Parkinson's disease is a progressive neurodegenerative disorder associated with the abnormal aggregation of alpha-synuclein (α-synuclein) into toxic oligomers and fibrils, yet effective strategies to directly inhibit this process remain limited. To address this challenge, this study investigates the peptide sequence RTKSGVYLVG, based on previously studied β-synuclein-derived peptide inhibitors, along with rationally designed analogs incorporating targeted amino acid substitutions, particularly aromatic residues, to explore their potential interactions with α-synuclein. The C-terminally amidated parent peptide was synthesized using solid-phase peptide synthesis (SPPS) on a Liberty Blue automated peptide synthesizer, followed by cleavage, ether precipitation, lyophilization, and characterization using liquid chromatography–mass spectrometry (LC-MS). LC-MS analysis revealed a prominent chromatographic peak at approximately 0.81 minutes and mass spectral signals near m/z 1079 ($[M+H]^+$) and 540 ($[M+2H]^{2+}$), consistent with the expected molecular mass of 1078.26 Da. These findings support the successful synthesis and identification of the parent peptide, establishing a foundation for characterizing additional peptide analogs and evaluating their ability to modulate α-synuclein aggregation in future biological studies. Ultimately, this research seeks to identify promising peptide candidates that may contribute to the development of targeted therapeutic strategies for Parkinson's disease.

Thiophene-Bridged Extended Viologens for Aqueous Organic Redox Flow Batteries
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Yasmeen Williams
Undergraduate Student(s): Amber Newton, Cole Suplee & Josh Fernandez
Research Mentor: Tyler Adams

Viologens, or 4,4'-bipyridinium derivatives, are versatile redox-active molecules with applications in smart windows, sensors, and aqueous organic redox flow batteries (AORFBs). Their optical and electrochemical properties can be tuned through structural modification, making them promising candidates for sustainable energy storage. In this work, we investigate a series of extended viologens containing different thiophene-based conjugated bridges to determine how bridge structure influences molecular and electrochemical properties. By varying the thiophene core and incorporating solubilizing side groups, we examine relationships between molecular structure, water solubility, redox reversibility, stability, and charge-discharge cycling behavior with desirable AORFBS exhibiting low-capacity fade and cell voltages in the 1.2-1.4 V range. For the extended viologens, absorbance, fluorescence, and electrochemical characterization is used to determine how changes in conjugation affect their electronic and redox behavior. Comparing these compounds provides insight into the role of conjugated bridge design in controlling material properties and electrochemical performance. Ultimately, this work aims to establish structure-property relationships that can guide the molecular design of water-soluble, stable, and reversible viologen-based materials for next-generation AORFBs and other electroactive applications.

Visible-Light-Activated Self-Reporting Photocages for Controlled Hydroxamic Acid Release
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Graduate Student(s): Ngubui Mukeh Cafarina & Lingaraju Gorla
Research Mentor: Carl Jacky Saint-Louis

Photolabile protecting groups (PPGs) provide precise spatiotemporal control over molecular activity, yet most current systems rely on ultraviolet (UV) light and lack a built-in method for monitoring photorelease. To address these limitations, we are developing visible-light-responsive, profluorescent photocages for the controlled release of hydroxamic acids (HAs), a class of biologically important metal-chelating compounds that are often challenging to handle due to their high reactivity. Building on our previously developed nitrophenyl ethynyl thiophene (NPET) platform, we designed ortho-nitrophenyl ethynyl benzo[b]thiophene (o-NPEBT) derivatives with extended π-conjugation to enhance visible-light absorption while maintaining fluorescence generation upon uncaging. The photocages are synthesized and characterized through photophysical and photochemical studies, and their ability to release suberoylanilide hydroxamic acid (SAHA) is being evaluated. These studies aim to establish a next-generation photocage platform that combines visible-light activation with real-time fluorescence reporting, enabling controlled payload release for applications in chemical biology, drug delivery, and precision therapeutics

Department of Ecology, Evolution, and Organismal Biology

Annual Variation in the Frequency of Alternative Reproductive Tactics in an Appalachian Salamander
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Kamill Thompson
Research Mentor: Todd Pierson

Understanding how genetic and phenotypic variation are maintained across generations is a key goal in evolutionary biology. One possible mechanism is temporal heterogeneity, which includes changes ecosystems experience over time, such as weather and food availability. Another mechanism is negative frequency-dependent selection, where a trait becomes more beneficial when it is rare. Alternative reproductive tactics, different ways males of the same species reproduce, are traits influenced by these factors, and we can study them more closely by examining the frequency of each tactic in a population. Our research focuses on the population of Blue Ridge Two-lined Salamanders (Eurycea wilderae) in Highlands, North Carolina. This species exhibits two alternative reproductive tactics: searching and guarding males. "Searching" males look for mates in terrestrial environments, while "guarding" males defend mates at aquatic nesting sites. Previous research shows that the difference in phenotypes is genetic; a Y-linked genetic polymorphism determines whether a male is searching or guarding. For the past five years, we have collected data on the number of guarding and searching males by sampling salamander tail tips and extracting DNA. We then tested for a relationship between the amount of rainfall in the previous year and the percentage of each male type present in the current year's population; we hypothesize that temporal heterogeneity impacts the fitness of each phenotype and thus the frequency of these genotypes among offspring. Because searching males seek mates on wet nights, we predict that increased rainfall during the mating season will lead to a higher frequency of searching male larvae the following year. This study will help us understand whether the genotypic frequency of each male changes over time, and which mechanisms influence the maintenance of genetic polymorphisms.

Ants Within Soils and The Microbes Among Them
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Brandon Cabarcas, Czarina Barlaan, Mario Ortiz & Josephine Storey
Research Mentor: Thomas McElroy

Tissue samples were prepared by total tissue homogenization and synaptosome isolation to isolate both total homogenates and crude synaptosome fractions. We then implemented a fast Western blotting protocol utilizing accelerated capillary electrophoresis and shortened antibody incubation steps to detect and quantify AMPA receptor subunit levels (GluA1 and GluA2) efficiently. By comparing receptor localization in synaptosomes relative to total homogenates, this rapid method tracks the movement and synaptic insertion of AMPA receptors. The resulting data will provide a

clearer view of how early-life adversity reshapes the glutamatergic system and alters synaptic response during fear conditioning.

Bacterial Communities between Different Species of Mammals and Reptiles
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student(s): Jaylynn Grant, Calvon Kennedy, Ricky Deleon-Bartolon, Jillian Guye, Charlotte Painter, Kaylan Parkes & Jada Abraham
Research Mentor: Thomas McElroy

This study compared the bacterial communities present in the oral cavities of different domesticated reptiles and mammals. Two Crested Geckos, two Ball Pythons, two Dachshunds, and two Domestic Short Hair Cats' oral cavity bacterial communities were sampled by standard oral cavity swab techniques. We also considered factors such as age, sex, diet, captive history, and environment that may have influenced the bacterial community found in each animal. Oral samples were collected by swabbing the inside of each animal's cheek, followed by DNA extraction, PCR, and 16S Metabarcoding to identify the bacteria present. We compared the bacterial communities between reptiles and mammals to identify the similarities and differences among these species and how their lifestyles and environments may influence their oral microbiomes. Understanding these bacterial communities may also provide useful information for pet owners and veterinarians when considering animal health and the possible transmission of bacteria between pets and their environments.

Comparing Bacterial Communities in Store-Bought vs. Home-Grown Vegetables
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Aiman Hussaini, Julya Drummond, De'Angelo Labudiong, Jaliah Jelks, Davey Figueroa, Zamira Johnson, Asheana Moodie, Emariana Lewis, Ariana Nava, Kay Tarantine Hill & Michael Oftedahl
Research Mentor: Thomas McElroy

Fresh vegetables naturally have diverse bacterial communities on their outer surfaces that can be influenced by their growing environment, handling, washing, transportation, and storage. Because of soil composition and how crops are grown, home-grown crops are more likely to have a larger bacterial community than store-bought crops. This study compared the bacterial communities on home-grown vegetables and store-bought vegetables. We predicted that home-grown vegetables would have more diverse bacterial communities than those found on store-bought vegetables. To test our hypothesis, we collected 8 samples from three store-bought crops: lettuce, potato, and squash. We also collected 5 samples from home-grown crops. Vegetables were swabbed to sample bacterial communities. We used the PureLink Microbiome DNA Purification Kit to isolate genomic DNA. The gDNA was sent to LC Sciences LLC in Texas for 16S DNA barcoding to identify the bacterial DNA present, which we can use to analyze bacterial communities. We will compare the fresh vegetables vs. store-bought vegetables and identify similarities and differences in bacterial communities. Studying bacterial communities on home-grown vs. Store-bought vegetables matters because understanding the diversity and presence or absence of important microbes on produce reinforces the importance of washing vegetables, even if they were grown at home.

Evaluating the Effect of Urban Heat Islands on the Frequency of Alternative Reproductive Tactics in Eurycea cirrigera in Metro Atlanta
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Hunter Challis, Algae Gudorf & Samantha McKay
Research Mentor: Todd Pierson

Genetic polymorphism is the presence of multiple heritable variants within a population and can be maintained through a variety of evolutionary mechanisms, including spatial heterogeneity in fitness. In some populations, two distinct mating behaviors coexist within the same sex (i.e., alternative reproductive tactics; ARTs). Unlike typical amphibian ART presentation, Southern two-lined

salamanders (Eurycea cirrigera) exhibit ARTs that are genetic, morphologically distinct, and fixed: "searching" males seek mates in terrestrial habitats, while "guarding" males defend mates at aquatic nesting sites. In this study, we aimed to find the frequency of these tactics within the Metro Atlanta area and evaluate the effects of environmental temperatures and urbanization on fitness. To do this, we are sampling juvenile two-lined salamanders in >50 streams by removing the tips of their tail, genotyping them with qPCR analysis, and determining searching and guarding male frequencies. We are also collecting qualitative and quantitative stream environmental data, such as average annual temperatures within 250 meters of the sampling site using ArcGIS online and fitting linear models to test the relationship between these variables and tactic frequency. We expect to find a higher-than-average frequency of searching males to guarding males in more urbanized areas based on environmental factors and urban heat islands. Higher temperatures in urbanized areas may indicate less suitable stream habitats for guarding males to thrive in, leading to higher relative frequencies of searching males. Our results should provide valuable information about how alternative reproductive tactics are maintained in wild populations under the influence of human disturbance.

Evaluating the Environmental Effects on Two-Lined Salamander (Eurycea cirrigera) Alternative Reproductive Tactic Frequency Using GIS Data on Road Density and Precipitation
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Kaylla Brooks, Efrain Lima & Ta-Neya Ekunwe
Research Mentor: Todd Pierson

Genetic polymorphism is the presence of multiple heritable variants within a population and can be maintained through a variety of evolutionary mechanisms, including spatial heterogeneity in fitness. In some populations, two distinct mating behaviors coexist within the same sex (i.e., alternative reproductive tactics; ARTs). Typically, ARTs in amphibians are environmentally influenced, morphologically identical, and plastic. However, southern two-lined salamanders (Eurycea cirrigera) exhibit ARTs that are genetic, morphologically distinct, and fixed: "searching" males look for mates in terrestrial habitats, while "guarding" males defend mates at aquatic nesting sites. Searching males have developed a gland on the bottom of their heads that aids in finding potential mates and increasing their odds of reproduction. While their guarding male counterparts lead sedentary lifestyles. They remain in nesting sites within streams competing for mates through male-to-male combat. In this study, we investigated the frequency of these tactics within the Metro Atlanta area to evaluate the effects of roadway construction and environmental precipitation on fitness. To do this, we are sampling juvenile two-lined salamanders in >50 streams by removing the tips of their tail, genotyping them with qPCR analysis, and determining searching and guarding male frequencies. Using GIS, we evaluated road density and environmental precipitation to align with the frequency of guarding and searching males within the streams. Linear models from our data will test the variable and tactic frequency relationship. We expect to find an abundance of searching males in streams with a higher standardized precipitation index because this would increase the activity of searching males in terrestrial vegetation. Also, we predict a higher number of guarding males in areas with more road density due to the lack of terrestrial vegetation needed for searching males to thrive. Our results should provide valuable information about how alternative reproductive tactics are maintained in wild populations.

Evaluation of Urbanization and Substrate Differentiation Effects on the Frequency of Alternative Reproductive Tactics in Eurycea cirrigera in Metro Atlanta
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Parker Scott, Austin Salehi & Katrina Finley
Research Mentor: Todd Pierson

Genetic polymorphism occurs when multiple heritable variants coexist within a population and can be maintained through various evolutionary mechanisms, including spatial heterogeneity in fitness. In some populations, individuals of the same sex exhibit two distinct mating behaviors (i.e., alternative

reproductive tactics; ARTs). ARTs in amphibians are environmentally influenced, morphologically identical, and plastic. However, southern two-lined salamanders (Eurycea cirrigera) exhibit ARTs that are genetically determined, morphologically distinguishable, and fixed: "searching" males look for mates in terrestrial habitats, while "guarding" males defend mates at aquatic nesting sites. In this study, we aim to quantify the frequency of these tactics across the Metro Atlanta area and evaluated how landscape features, such as road abundance act as a measure of urbanizations and fragmentation, influence their relative fitness and spatial distribution. Because searching males rely heavily on terrestrial movements while guarding males remain localized around aquatic sites, varying road density and terrestrial barriers may differentially impact the fitness of each tactic. We also measured the proportion of the substate relative to the frequency of searching vs. guarding males. Specifically, we aimed to evaluate how stream substrate composition (i.e., the availability of suitable substrates) influences the relative proportions of searching versus guarding males. We fit linear models to test whether stream dominated by coarse, stable substrates supported higher frequency of guarding males when compared to streams with fine or degraded substrates. To do this, we sampled juvenile two-lined salamanders in >50 streams by removing their tail tips, genotyping them with qPCR analysis, and determining searching and guarding male frequencies while collecting qualitative and quantitative stream environmental data. We expect to find a higher frequency of guarding males based on environmental factors such as road density and substrate composition. Our results should provide valuable information about how ARTs are maintained in wild populations.

From Canopy to Forest Floor: Characterizing Fuel Loads Across Longleaf Pine Ecosystems
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Graduate Student: Dylan Bennett
Undergraduate Student: Calvon Kennedy
Research Mentor: Matthew Weand

The Longleaf pine (Pinus palustris Mill.) ecosystem (LLP) is a forest ecosystem characterized by open-canopied grassy woodlands maintained by frequent low-intensity fire. Recognized as one of the most biodiverse ecosystems globally, it provides habitat for many endangered species. Although it once dominated the southeastern United States, this ecosystem has been reduced to approximately 3% of its original range due to habitat destruction and fire exclusion. The goal of LLP restoration is to employ the use of prescribed fire to clear the understory, promote pine regeneration, and eliminate fire-intolerant competitor hardwoods. A key aspect of informing LLP restoration practices is understanding how fuel characteristics impact prescribed fire. Fuel characteristics may vary among LLP systems differing in canopy and community structure, but the relative contributions of different fuel types are not well characterized across LLP ecotypes. As part of a larger study examining LLP fuel moisture dynamics, we quantified mass contributions of different overstory and understory fuel types from two LLP sites differing in community composition and stand structure. Composite samples were sorted into overstory- or understory-derived fuels, and into functional categories: grasses, forbs, woody shrubs, leaf litter, woody debris, and reproductive structures (pinecones, mast, and inflorescences). We expect fuel composition to vary with canopy structure, with greater canopy openness associated with increased relative contributions from understory-derived fuels. Consequently, we expect the relative contribution of overstory-derived fuels to decrease as canopy openness increases. In the understory, we expect a greater contribution of grasses and forbs in the coastal plain ecotype than in the montane ecotype, where we expect woody shrubs to contribute more. Characterizing these patterns provides insight into how variation in stand structure and community composition influence fuel availability, which influences fire behavior and fire management practices during prescribed burns.

Impact of Annual Temperature and Stream Width on the Frequency of Alternative Reproductive Tactics in Eurycea cirrigera in Metro Atlanta
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Emily Connell, Antonio Carriedo & Andrea Chavez Espinoza
Research Mentor: Todd Pierson

Genetic polymorphism refers to the coexistence of multiple heritable variants within a population maintained through various evolutionary mechanisms, including spatial heterogeneity in fitness. In certain populations, there are two distinct mating behaviors coexisting within the same sex (i.e., alternative reproductive tactics; ARTs). Typically, ARTs in amphibians are environmentally influenced, morphologically identical, and plastic. However, Southern Two-Lined Salamanders (Eurycea cirrigera) exhibit ARTs that are genetic, morphologically distinct, and fixed. "Searching" males look for mates in terrestrial habitats, while "guarding" males defend mates at aquatic nesting sites. This study aims to identify how stream width and annual temperature impact Alternative Reproductive Strategies (ARTs) of Eurycea cirrigera. Climate conditions of sampled populations are hypothesized to drive the observable polymorphism frequency between the two types of males. To evaluate the frequency of each ART, juvenile two-lined salamanders were sampled in >50 streams by collecting tail tips, genotyping them with qPCR analysis, and determining searching and guarding male frequencies. Qualitative and quantitative stream environmental data were collected, including stream width, and fitting linear models to evaluate the relationship between variables and tactic frequency. GIS databases were used to identify the annual temperatures within 300 meters of a stream. We anticipate identifying a significant difference in the frequency of searching and guarding males based on variations in annual temperature and stream width. We predict that the proportion of "guarding males" increases when annual temperatures are higher and the stream width is larger. The stream width allows for more habitat for "guarding males", leading to a higher population frequency. As annual temperatures rise, "searching males" may desiccate at higher rates whereas "guarding males" may remain in their typical aquatic nesting sites. The analysis of field-collected data along with the preexisting GIS database will provide valuable insight on how alternative reproductive tactics are maintained within wild populations.

Positional Bias in Bright Colorations on Animals
In-Person Poster Presentation (Event Center, Poster #22)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Breanne Williammee
Research Mentor: Todd Pierson

Some animals display bold colors, which may serve as aposematic warnings of toxins, advertisements to mates, or displays for other biological functions. Often, animals have multiple bright colors that are unevenly placed on their bodies. For example, some animals have darker bright colors on their bodies compared to their extremities or the reverse. Research has shown that predators avoid hunting prey with certain colors, and that color band order can be important for recognition. However, few studies have explored if these color orders are consistent among distantly related species. The purpose of this study was to determine if multiple colors are non-randomly distributed in boldly colored species. We compiled records of boldly colored amphibians, reptiles, butterflies, and moths from the primary literature and used ChatGPT to create a Shiny app in RStudio to collect data. For each species, we examined four images derived from iNaturalist. We then recorded data regarding the presence of common warning colors (white, yellow, orange, and red) and where the darkest color appeared on the animal's body. Next, we used chi-square tests to evaluate whether warmer colors were disproportionately common the anterior vs. posterior and in the body vs. extremities. More research should be done to determine the importance of the color placements. Future experiments could examine whether bolder colors indicate higher toxicity levels or glands in that immediate location. Overall, this project provided a valuable preliminary investigation of bold coloration and creates a foundation for future research regarding the evolution of aposematic coloration patterns.

Substrate and Traffic Density Effects on Southern Two-Lined Salamander Reproductive Tactics in Metro Atlanta
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Ulises Garcia, Victoria Sanderson & Courtney Schilling
Research Mentor: Todd Pierson

Genetic polymorphism is the presence of multiple heritable variants within a population. In some populations, two distinct mating behaviors coexist within the same sex (i.e., alternative reproductive tactics; ARTs). Southern two-lined salamanders (Eurycea cirrigera) exhibit ARTs that are genetic, morphologically distinct, and fixed, which is unusual because typically ARTs in amphibians are environmentally influenced, morphologically identical, and plastic. The ARTs in southern two-lined salamanders consist of searching and guarding males. In the searching ART, males look for mates in terrestrial habitats, while guarding ART males defend mates at aquatic nesting sites. In this study, we aimed to analyze the extent to which substrate and traffic density differences affected the frequency of the ARTs in metro Atlanta. To do this, we are sampling juvenile two-lined salamanders in >50 streams by removing tail tips, genotyping them with qPCR, and determining the frequencies of searching and guarding males. Using GIS data, we will collect traffic density data. We are also collecting qualitative and quantitative stream environmental data, such as substrate type, and fitting linear models to test the relationship between these variables and tactic frequency. We expect to find a difference in the frequency of searching vs. guarding males based on the type of substrate in the stream and the traffic density in the area. We expect to find a higher frequency of guarding males in streams with rocky substrate because the rocks provide a more suitable nesting sites. We also expect to have fewer searching males in areas with higher traffic density because of the potential risk. Our results should provide valuable information about how alternative reproductive tactics are maintained in wild populations.

Understanding How Spiny Mice (Acomys cahirinus) Recover Skin Sensation After Whisker Pad Deafferentation
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Sienna Bennett
Research Mentor: Justin Varholick

When humans suffer from peripheral nerve injury, the injury heals through fibrosis (scarring) at the injury site, which contributes to pain, numbness, neuropathy, and overall poor structural and functional recovery. Highly regenerative animals like the African spiny mouse avoid fibrosis and recover structure through regeneration of an array of tissues, but whether they also have functional recovery remains unclear. Our lab recently showed that Acomys can extensively regenerate their nerves with remarkable structural fidelity, regrowing axons, myelin sheathing, and perineural tubing, while standard laboratory mouse (Mus) nerves had fibrosis and sporadic axon elongation (Varholick et al., 2025 npj Regen Med). This study measured the functional recovery of skin sensation in Acomys and Mus. Here we show that following complete infraorbital nerve and facial nerve transections, Acomys restored whisking behavior at a quicker rate and quality compared to Mus' consistently weak whisking. We also found that Acomys restored fully symmetrical whisking in under three weeks whereas Mus remained permanently impaired. This study also utilized immunohistochemistry to identify Merkel Cell, touch receptors, and determined that Mus had fewer Merkel cells 42 days after injury while Acomys did not. We also traced the injured neurons in the Trigeminal Ganglia, a central hub for orofacial somatosensation, through cholera toxin subunit b (CTB) retrograde tracing and found CTB positive cells. These preliminary findings serve as a foundation for future studies in the regenerative abilities of Acomys and showcase not only the physical anti-fibrotic characteristics of Acomys, but also the innervated sensory aspect following a severe neuronal disconnection. Our continued research will further build this model system for testing anti-fibrotic and pro-regenerative nerve therapies to recover skin sensation after skin injury.

Department of Mathematics

A Stiff Systems Application of Operator Splitting
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Jordan Agan
Research Mentor: Andrew McMorran

Applications in a number of important areas, including chemical reactions, control systems, and electronic networks, lead to systems of differential equations which are especially difficult to solve because different processes in the system behave with significantly different time scales. Such problems are classified as being stiff. The device of operator splitting can be used to substantially broaden the range of stability of standard numerical integration schemes when applied to a particular quasi-linear stiff system of ordinary differential equations. Using the symbolic capabilities of MATLAB, minimal generating sets of equations have been derived when applying the method of undetermined fractional steps [Cooke and McMorran] to find operator splittings. For a particular non-linear system of ODE's, a pattern in the minimal generating set of equations that arises in seeking n+1 factor, n'th order splittings, as well as a previously undiscovered 7 factor, 6'th order splitting, have been identified. Numerical experiments involving the 7 factor, 6'th order splitting have been conducted in MATLAB to confirm its accuracy when employed to broaden the range of stability in solving a quasi-linear stiff system of ODE's.

Investigating Partial Symmetrization Flows in the Pólya–Szegő Conjecture
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Abdallah Saad
Research Mentor: Emanuel Indrei

The relationship between symmetry and optimization is of particular importance in many fields. For example, the Pólya–Szegő conjecture states that regular polygons possess an advantageous relationship with principal frequencies. This demonstrates the general relationship between symmetry and optimization. Irregular polygons were created and MATLAB code was written in order to create the flow for these polygons. By doing so, the effects of partial symmetrization on the shapes of the polygons could be observed. Multiple applications of symmetrization were carried out and the resulting changes to the shapes of the polygons were examined. Patterns in the evolution of the geometry of these shapes were also found. It was observed that after symmetrization, the resulting shapes were more equilateral and geometrically balanced than the original irregular shapes. This information can be used to gain further understanding regarding the effect increasing symmetry may have on principal frequency.

Nonlinear Atmospheric Models for Power Beaming
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 12:00pm - 12:50pm
Undergraduate Student: Emma Brumbley
Research Mentor: Eric Stachura

This research project examines how nonlinear changes in the atmosphere's refractive index affect laser power beaming. We particularly focus on beam stability, shape, and the amount of power reaching a distant receiver. Building on recent power-beaming research, including Jaffe et al. (2024) and the steady-state model developed by Spencer (2020), we aim to develop a mathematical model that better accounts for nonlinear atmospheric effects. We will begin with a simplified nonlinear equation describing laser propagation through the atmosphere, which will include intensity-dependent refractive index and absorption. Numerical simulations will compare linear and nonlinear propagation while using varying laser power, beam width, wavelength, and distance. The goal is to identify conditions that cause effects such as beam spreading, self-focusing, and thermal blooming. We will then determine how these effects change the beam profile, peak intensity, power captured by the receiver, and overall power transfer efficiency.

Department of Molecular and Cellular Biology

Biosynthetic Profile of Novel Arsenic Metabolites in Anoxybacillus calidus
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Margaret Rainwater

Graduate Student: Leanna McKenzie
Research Mentor: Masafumi Yoshinaga

Background: Select bacteria metabolize arsenic into antibiotics. One novel broad-spectrum antibiotic, arsinothricin (AST), is an arsenic-containing non-proteinogenic amino acid biosynthesized by ArsL, a noncanonical radical S-adenosylmethionine (SAM) enzyme and ArsM, a SAM-dependent methyltransferase. Using genome mining, we found that many bacteria possess arsL-containing biosynthetic gene clusters (BGCs) distinct from the AST BGC, indicating their capability to produce novel organoarsenicals. One such BGC from Anoxybacillus calidus includes two additional genes named ars1 and ars2, which are annotated to encode 4-carboxymuconolactone decarboxylase and biotin carboxylase, respectively. As ArsL converts arsenite (AsIII) to hydroxyarsinothricin (AST-OH), the unmethylated AST, we hypothesize that Ars1 decarboxylates AST-OH, while Ars2 carboxylates the amine group of the decarboxylated intermediate, producing a novel organoarsenical, 3-(carboxyamino) propylarsounous acid) (3-CAPAsV). Liquid chromatography coupled with inductively coupled mass spectrometry (LC-ICP-MS) analysis suggests that A. calidus metabolites AsIII to AST-OH and two additional novel arsenic species. Questions: The project aims to address the following questions: 1) Among the novel arsenic metabolites produced by A. calidus, which is the intermediate and final product? 2) What is the optimal culture condition for A. calidus to produce 3-CAPAsV? Methods: We conducted time-course experiments, where A. calidus was cultured with AsIII or AST-OH and the arsenic biotransformation was monitored hourly by LC-ICP-MS. Results: We found that A. calidus first converts AsIII into AST-OH, which is immediately transformed into one of the novel species with small production of another novel species. Conclusions and impact: This project will aid in elucidating the biosynthetic pathway of CAPAsV and optimizing the production.

Does ceh-27/Nkx2.1 Repress T25E4.1 Gene Expression during C. elegans embryonic Development?
In-Person Poster Presentation (Event Center, Poster #22)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student(s): Ansley Ramon & Tania Menchaca
Research Mentor: Martin Hudson

Previous work in the Hudson lab revealed that embryogenesis in the nematode Caenorhabditis elegans is regulated by a homeobox transcription factor known as ceh-27/Nkx2.1. Transcription factors act as on/off/attenuation switches during gene transcription, controlling when, where, and by how much a gene is transcribed. In humans, Nkx2.1 mutations lead to neurodevelopmental disorders such as Attention Deficit Hyperactivity and Benign Hereditary Chorea. Homozygous loss-of-function mutations in C. elegans ceh-27, such as the ok1655 deletion allele, lead to embryonic lethality. As a self-fertilizing hermaphrodite, we can balance the ceh-27(ok1655) allele over an inversion balancer chromosome (tmC12) to examine its role in embryonic development. This means that one-in-four embryos present as homozygous progeny, allowing us to examine the role of ceh-27 in embryonic lethality. Single cell RNA sequencing revealed that the T25E4.1 gene is significantly upregulated in ceh-27 mutants. The control transcript coverage of T25E4.1 was log2 0.016 in wild type compared to the mutant average which was found to be log2 1.97. To investigate this, we generated a T25E4.1::GFP transgene that is being crossed into the ceh-27(ok1655)/tmC12 background to investigate its role in neuron development. Based on our single cell RNA sequencing data, we hypothesize that the T25E4.1::GFP transgene will be over-expressed in ceh-27 mutants. Confocal imaging assays are ongoing to evaluate T25E4.1::GFP expression in ceh-27 mutant embryos.

Ecdysone Receptor AF1 Isoform-Specific Roles in Adipose Tissue Remodeling and Migration in Drosophila melanogaster
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Frances Conkle
Research Mentor: Joanna Wardwell-Ozgo

To regulate insect development, the steroid hormone Ecdysone binds to the Type-II nuclear hormone receptor, the Ecdysone Receptor (EcR). Type-II nuclear hormone receptors are a special class of

transcription factors that can both activate and repress transcription of their targets. The transcriptional activity of EcR governs the development of all tissues and organs, with Ecdysone pulses synchronize the timing of these processes to ensure the formation of a healthy adult. During Drosophila melanogaster larval development, three EcR isoforms are expressed: EcR-A, EcR-B1, and EcR-B2. These isoforms differ only in their N-terminal Activation Function 1 (AF1) domain. It is believed that coregulator proteins bind to the AF1 domain of EcR and modulate EcR-dependent transcriptional repression or activation of transcriptional targets. One of the tissues EcR regulates is the larval fat body, which undergoes remodeling and migration during the transition from the larval to the pupal stage. Prior work in the Wardwell-Ozgo lab has demonstrated that migration of the fat body into the pupal head is regulated by the shared AF2/ligand binding domain of EcR. To test whether a specific isoform was responsible for remodeling fat body tissue, the Wardwell-Ozgo lab developed tools to disrupt the function of individual isoforms via competitive binding. Our novel approach overexpresses the AF1 domain of each EcR isoform, which we hypothesize will disrupt endogenous EcR-cofactor binding, thereby disrupting EcR transcriptional activity. Expression of the three AF1 domains with the fat body specific Gal4, cg-gal4, showed that the fat body was able to remodel and migrate, though there was less migration when compared to control. Our results suggest that fat body remodeling is independent of the AF1 domain while migration might be influenced by the EcR-B1 isoform. Future work will explore which isoform is expressed in the fat body during the tissue remodeling.

Effects of Nutrient Composition on β-glucan Production in Saccharomyces cerevisiae
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Graduate Student: Sarah Price
Research Mentor: Chris Cornelison

Saccharomyces cerevisiae, also known as brewer's yeast, is widely used in the food, beverage, and biotechnology industries. It is also a valued source of β-glucan, a structural cell-wall polysaccharide composed of β-linked D-glucose units and studied for its immunomodulatory properties. However, extracting and purifying β-glucan can be labor-intensive and expensive, motivating researchers to improve its production during cultivation. Nutrient composition can influence growth, metabolism, and macromolecular synthesis. Differences in nutrient source and ratios may alter metabolic balance, potentially activating stress-response pathways involved in cell-wall remodeling, including the Cell Wall Integrity Pathway. These responses, including changes in fermentation, respiration, and carbon allocation, give researchers opportunities to determine whether specific nutrient conditions favor β-glucan accumulation. This study investigates two S. cerevisiae strains, NRRL-5997 and NRRL-954, and carbon: nitrogen (C: N) composition as strategies to improve β-glucan production within S. Cerevisiae during the upstream process. A 96-well plate screening approach evaluated these strains across four carbon sources (glucose, glycerol, maltose, and potassium acetate), three nitrogen sources (ammonium sulfate, urea, and glutamine), and five ratios (10:0.3, 10:1, 10:1.5, 10:2, 10:2.5). Growth was monitored using optical density at 600 nm. Cells were collected and pelleted, and β-glucan was extracted and analyzed using methyl blue fluorescence, providing a relative measure of β-glucan-associated signal. Strategic manipulation of nutrient stoichiometry and source may play critical roles in β-glucan production in S. cerevisiae. These factors may guide future scale-up efforts to enhance β-glucan yield for biotechnological applications.

Evaluating IDRs and RRMs as Determinants for Protein Localization Inside of the Cell
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 10:00am - 10:45am
Graduate Student: Tatiana Sidorova
Research Mentor: Anton Bryantsev

Alternative RNA processing greatly expands protein diversity, yet the extent to which protein isoforms produced by the same gene can acquire distinct cellular functions remains poorly understood. In this study, we will use the RNA-binding protein Bruno (Bru) in Drosophila melanogaster as a model to investigate how protein sequence differences contribute to isoform-specific intracellular localization.

Bru is expressed in several tissues and displays strikingly different localization patterns, accumulating in nuclear B-bodies in developing flight muscles and in cytoplasmic or perinuclear structures in the gonads. Bru produces multiple protein isoforms that differ primarily in their N-terminal regions, including the length of an intrinsically disordered region (IDR1) and the presence of RNA-recognition motifs (RRMs). We hypothesize that these sequence differences help determine where individual Bru isoforms localize within the cell. Preliminary experiments show that an IDR-containing Bru isoform formed cytoplasmic granules when expressed in developing flight muscles, whereas a shorter isoform lacking IDR1 showed predominantly nuclear localization. Expression of IDR1 alone also promoted formation of cytoplasmic foci. Together, they support the proposed model. To determine the molecular basis of these differences, we evaluate whether specific RRMs are required for Bru accumulation in nuclear B-bodies and determine whether the N-terminal IDR is sufficient to promote cytoplasmic localization. Together, these experiments help test how intrinsic protein sequence and interactions with cellular partners contribute to the distinct intracellular behaviors of single-gene protein isoforms.

Evaluating Salt Tolerance of a Bacteriophage Infecting Foodborne Bacterial Pathogen Shigella flexneri

In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Victor Gil & Alyssa Baban
Research Mentor: Jean Lu

Shigella flexneri is an important foodborne pathogen causing bacillary dysentery (known as shigellosis) worldwide and remains a significant public health concern. 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. 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. Phages have emerged as novel and promising biocontrol agents against bacterial pathogens. We previously isolated a phage and showed that the phage is highly effective to kill Shigella flexneri in certain foods. However, it is not known how well this phage can tolerate various salinity conditions. Evaluating the salt tolerance of phages is crucial for understanding their stability and effectiveness in various environments, particularly in food safety applications. The objective of this study was to evaluate the salt tolerance of the Shigella phage in varying salinity (1% - 20% NaCl) at 37°C. The results from this study showed that the phage concentration did not decrease under different salt conditions (including 20% NaCl), indicating that the phage has very high salt tolerance, and thus has a potential to be used as a biocontrol agent against Shigella flexneri in foods with varying salinity.

Exploring Extracellular Melanin Production in Pleurotus ostreatus

In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 9:00am - 9:45am
Graduate Student(s): Melissa Ogilvie & Mark Sheehan
Undergraduate Student(s): Allen Jones & Erik Olsen
Research Mentor: Chris Cornelison

Melanins are pigments produced across nearly all domains of life. Their ability to absorb radiation, scavenge and stabilize reactive oxygen species, and chelate heavy metals gives them potential for a wide range of biomedical, environmental, and materials applications. However, melanin remains expensive to produce and difficult to isolate due to its complex supramolecular structure and strong association with biomass. To address these limitations, we are investigating Pleurotus ostreatus, a white-rot fungus capable of extracellular melanin production associated with zone-line formation in wood. Our goal is to develop a reusable fungal biocatalyst system by immobilizing P. ostreatus mycelium within porous beads. These beads retain the fungal biomass while allowing secreted enzymes and metabolites to diffuse into the surrounding medium, facilitating extracellular melanin formation. Following production, the immobilized biomass can be readily separated from the culture broth and reused for subsequent production cycles. We are further optimizing this system by

leveraging the ecological and physiological characteristics of P. ostreatus, including evaluating alternative carbon sources and metal ion supplementation to enhance fungal growth and melanin production prior to immobilization. Development of an efficient, reusable fungal biocatalyst could substantially reduce the cost and complexity of melanin production and expand access to these versatile pigments for applications in materials science, biotechnology, and biomedical research.

Investigating Candidate Cis-Regulatory Elements Within the GRIK Intron in Ciona robusta
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Heather Morales Contreras
Research Mentor: Eduardo Gigante

Precise regulation of gene expression is essential for nervous system development, yet we still need to understand how genomic fragments can be used for our own purposes. The marine chordate Ciona robusta provides a useful model for investigating neural development. Ciona robusta transitions from a larval nervous system to an adult nervous system after metamorphosis. This project investigates candidate cis-regulatory elements within the GRIK intron to establish a foundation for studying their larval precursor populations in gene expression. Cis-regulatory elements are DNA sequences that interact with regulatory proteins to influence transcription. Three GRIK intron fragments are being prepared for molecular cloning using polymerase chain reaction (PCR). Following amplification, the DNA products are analyzed by gel electrophoresis to identify fragments of the expected sizes and isolate them for downstream processing. Subsequent steps will include restriction enzyme digestion, ligation into a plasmid vector, and colony screening to identify candidate constructs. By characterizing candidate regions of the GRIK intron, this research aims to contribute to a better understanding of noncoding DNA and its potential role in neural gene regulation in Ciona robusta. This work may provide a foundation for future studies examining the molecular mechanisms underlying neural development and the formation of the adult nervous system.

Investigating Slime Mold, Physarum polycephalum, as a Biomimetic Model in Urban Planning
In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Caroline Rakestraw
Graduate Student: Saima Shafique
Research Mentor(s): Premila N. Achar & Mine Hashas-Degertekin

In the United States, millions of dollars are annually allotted to address increasing transportation demands across urban transportation and highway networks. Population growth and rising travel demand continue to drive infrastructure capacity constraints, contribute to congestion, elevated accident risks, and increased mitigation costs. Physarum polycephalum demonstrates capacity to act as a biomimetic model for transportation and infrastructure planning through the extension of tube-like tendrils from its plasmodium body, which then develop into complex, interconnected networks; the connections themselves correspond to nutrient distribution. The slime mold's self-organizing networks can be quantitatively analyzed to identify efficient transport pathways, providing a biologically inspired framework for developing cost-effective strategies for urban transportation planning and infrastructure optimization. This study investigates the exposure of P. polycephalum, Daywalker, to eight different scaled mapping environments. In each environment, oat-based nutrient sources served as the major and minor access points within the study area: Atlanta's Beltline and the neighboring Spur trail. Public trails and spaces were later implemented to account for pedestrian connectivity. Daywalker was inoculated outside the study area and allowed to introduce itself to the oats. The cultures were incubated at 26°C for a 48-hour period. Subsequently, Physarum polycephalum developed intricate plasmodial networks, connecting the designated nutrient sites across the mapping environments. The data across all eight experimental map environments, each performed in duplicate, indicated complex network formation between major and minor access points and all public spaces across the study area. The resulting findings exhibit the potential of P. polycephalum as a biomimetic model for investigating efficient network connectivity and transportation planning in urban environments.

Investigating the Functional Role of Cilia in Ciona Through Genetic Manipulation
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Maya Fakhra
Research Mentor: Eduardo Gigante

Cilia are evolutionary ancient cellular structures found in a wide variety of organisms, from single-celled algae to vertebrates. Those structures play a very important role in cellular signaling, development, and also communication. Ciona are a genus of marine invertebrates, known as sea squirts. They belong to a group called tunicates, which are the closest living relatives of vertebrates. Ciona provides a valuable model for investigating the developmental and evolutionary functions of cilia. Other studies have identified and described cilia in developing Ciona embryos, but their functional role has never been completely understood. Especially their role in neural development and regeneration. This research aims to investigate the functional importance of cilia in Ciona through genetic manipulation. By targeting genes involved in cilia function or formation, the aim is to examine how alterations to these structures would affect neural development. These experiments will help show whether cilia contribute to neural development and may also give us insight into how they may potentially be involved in neural regeneration. We predict that disrupting genes associated with cilia will result in alterations in development, which would provide us with evidence showing us how they can be functionally significant. Understanding the role of Cilia in Ciona may provide valuable information about how these structures can function in different species and their potential importance in vertebrate neural development regeneration.

Investigating the Phosphorylation of the Conserved Transcription Factor Phox2 and its Effects in Ciona robusta
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Ogechi Eke & Shanelle Hamilton
Research Mentor: Eduardo Gigante

The transcription factor Phox2 plays a critical role in nervous system development by regulating the maintenance of neural progenitor cells and their differentiation into mature neurons. In Ciona robusta, a simple chordate with a well-characterized nervous system, Phox2 is highly expressed in the "neck", a specialized progenitor cell region that gives rise to neurons of the adult nervous system following metamorphosis. Previous studies have demonstrated that loss of Phox2 disrupts neuroprogenitor maintenance and neuronal differentiation; however, the molecular mechanisms regulating Phox2 activity remain poorly understood. Because phosphorylation is a common mechanism for modulating transcription factor function, this study investigated whether altering the phosphorylation state of Phox2 affects nervous system development in Ciona robusta. Plasmids encoding mutant Phox2 constructs designed to alter its phosphorylation state were amplified, purified, and introduced into fertilized Ciona embryos by electroporation. Embryos were cultured to the larval stage, fixed approximately 19 hours after fertilization, and analyzed using fluorescence microscopy. Neural development was assessed by examining neck neuroprogenitor cell morphology, neck neuron development, and overall organization of the neck region. Control animals and animals overexpressing wild-type Phox2 displayed similar proportions of normal neuroprogenitor cells, whereas expression of phosphorylation-state mutant Phox2 constructs resulted in a substantial reduction in the percentage of larvae exhibiting normal neuroprogenitor cells and neck neurons. In addition to reduced numbers of normal cells, mutant larvae exhibited disrupted neuroprogenitor organization and sometimes complete loss of neck neurons, indicating that alteration of Phox2 phosphorylation is associated with defects in neck development, supporting the hypothesis that phosphorylation contributes to the regulation of Phox2 activity during nervous system development. This work provides evidence that post-translational regulation of Phox2 is important for neuroprogenitor maintenance and neuronal differentiation in Ciona robusta. Understanding how phosphorylation modulates Phox2 function may provide insight into the molecular mechanisms governing nervous system development across chordates.

Molecular Visualization Laboratory (BIOL4450): Functional Characterization of Putative Phosphoethanolamine Methyltransferases from Apicomplexan Parasites
In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Cansu Henry, Everest Partin, Amanda DePoi, Jasmine Larkis & Alyssa Wiggins
Graduate Student(s): Ayyan Paracha & Shu Shanta
Research Mentor: Soon Goo Lee

Apicomplexan parasite Cyclospora cayetanensis causes the diarrheal infection cyclosporiasis and is responsible for foodborne outbreaks throughout the United States. In 2026, approximately 20,000 cases of cyclosporiasis were reported. C. cayetanensis and Plasmodium falciparum, obligate intracellular parasites of the phylum Apicomplexa, both require phospholipids, particularly phosphatidylcholine (PtdCho), to build their cell membranes. Phosphoethanolamine N-methyltransferase (PMT), an essential enzyme involved in phosphatidylcholine (PtdCho) biosynthesis in P. falciparum, has been extensively studied, leading to the identification of several key active-site residues involved in substrate binding and catalysis. However, the functional role of PMT in C. cayetanensis (CcPMT) remains poorly characterized. The purpose of this course-based undergraduate research experience (CURE) project, supported by the NIH Support for Research Excellence (SuRE) Program & KSU CURES Funding Program (PI: Dr. Soon Goo Lee), is to investigate the functional roles of specific amino acid residues in CcPMT enzymatic activity through site-directed mutagenesis and identify key amino acid residues involved in catalysis and phosphatidylcholine biosynthesis. In Fall 2026, we introduced site-specific mutations into CcPMT through site-directed mutagenesis and biochemically evaluated their effects on enzymatic activity. Additionally, virtual reality (VR), 3D printing, homology modeling, and X-ray crystallography have been employed to visualize and analyze the three-dimensional structure of CcPMT. Based on our biochemical and structural analyses of CcPMT, mutations at specific amino acid residues are expected to alter enzymatic activity, highlighting the importance of these residues in maintaining protein structure and function.

Molecular Visualization Laboratory (BIOL4450): Structural and Biochemical Characterization of Apicomplexan Parasite Phosphoethanolamine N-Methyltransferases Through Interdisciplinary Approaches
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Jayla Boutwell, Yasmeen Bisiriyu, Ethan Hendley & Stephen St. Louis
Research Mentor: Soon Goo Lee

Apicomplexan parasites are a diverse group of unicellular eukaryotic pathogens that cause disease in humans worldwide. One of them, Cyclospora cayetanensis, is a microscopic, single-celled parasite that causes cyclosporiasis, a severe intestinal illness affecting people around the globe. Although outbreaks are less common in high-income countries, apicomplexan parasites remain far more prevalent and devastating in low-income settings. The burden is not confined to the latter, however: 19,838 laboratory-confirmed cases were documented in the United States between May and August 2026. These recent outbreaks highlight how much remains unknown about apicomplexan biology and how few treatment options exist for infected individuals. Current therapeutic options remain limited, making it necessary to identify and characterize parasite genes that could serve as novel targets for antiparasitic intervention. Phosphoethanolamine methyltransferase from C. cayetanensis (CcPMT) catalyzes a step essential to the synthesis of phosphatidylcholine (PtdCho), the major membrane phospholipid in apicomplexan parasites. Because humans lack this enzyme and produce PtdCho by a different route, CcPMT is a promising target with little risk of host toxicity. We hypothesize that substituting key amino acid residues in CcPMT will alter its enzymatic activity, potentially affecting phospholipid biosynthesis essential for parasite replication. In Fall 2026, our course-based undergraduate research experience (CURE), supported by the NIH Support for Research Excellence (SuRE) Program & KSU CURES Funding Program (PI: Dr. Soon Goo Lee), is identifying residues essential for the catalytic activity of CcPMT. Students will use site-directed mutagenesis and

biochemical assays to test how specific substitutions affect enzyme function. These results will clarify the functional roles of key CcPMT residues and provide a foundation for developing targeted therapies against cyclosporiasis. In addition, a STEM + Art (STEAM) approach using virtual reality (VR), 3D printing, and student artwork will visualize these mutations and help students understand how they alter enzymatic activity.

NEU6768 Targets Replication Protein A2 to Induce DNA Replication Stress and Cytokinesis Arrest in Trypanosoma brucei

In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Graduate Student(s): Rahama Seidu & Ngubui Mukeh Cafarina
Research Mentor: Kojo Mensa-Wilmot

Human African trypanosomiasis (HAT) is a neglected tropical disease caused by the unicellular eukaryotic Trypanosoma brucei. Curaxin (CBL0137) cures trypanosome infection in a mouse model of HAT and has emerged as a promising lead compound for HAT drug development. CBL0137 inhibits nuclear DNA synthesis, induces replication stress, and arrests mitosis. The compound binds the single-stranded DNA-binding protein complex replication protein A (RPA), linking its activity to DNA replication stress. Property-based drug design coupled with phenotypic screening led to the development of the carbazole derivative NEU6768. Here, we describe the pharmacodynamic effects of NEU6768 at its 6-hour EC_{50} (175 nM). NEU6768 inhibited DNA replication, exacerbated DNA replication stress and arrested cytokinesis. NEU6768 binds purified RPA (KD = 221 nM) and RPA2 (KD = 373 nM). Collectively, these findings indicate that the interaction between NEU6768 and RPA2 causes a response to DNA replication stress, inhibits DNA synthesis and arrests the cell cycle. Thus, RPA2 is a target of NEU6768, supporting further investigation of the carbazole as a lead for anti-trypanosome drug discovery.

Regional and Anterior-Posterior Patterns of α-Synuclein and Phosphorylated Tau in Dementia with Lewy Bodies

In-Person Poster Presentation (Event Center, Poster #23)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Allisa George
Research Mentor(s): David Irwin & Melanie Griffin

Dementia with Lewy bodies (DLB) is a neurodegenerative disease characterized by the abnormal buildup of α-synuclein in the brain. Phosphorylated tau (pTau), a protein linked to Alzheimer's disease pathology, can also be found in patients with DLB. How these two pathological proteins differ in their distribution across the cortical regions remains incompletely understood. In this initial study, we examined regional and anterior-posterior variations in α-synuclein and pTau pathology in postmortem brain tissue from three individuals diagnosed with DLB. We grouped the fourteen cortical areas into three territory types: cingulo-insular/paralimbic, association/prefrontal, and primary cortical. We used QuPath digital pathology software to analyze immunohistochemistry-stained tissue, measuring pathology as the percentage of tissue area showing positive staining. The dataset included 269 regions of interest, 125 associated with α-synuclein and 144 with pTau. We used general linear models to examine differences between regions, anterior-posterior position, and protein distribution patterns, while accounting for between-case variation. α-synuclein levels were significantly higher in the paralimbic cortex than in the association/prefrontal and primary cortical areas. In contrast, pTau levels were significantly lower in the association/prefrontal cortex than in the paralimbic and primary cortical areas ($p < 001$). A significant protein-by-region interaction ($p = .004$) indicated that α-synuclein and pTau have different distributions across the cortex. Although no consistent anterior-posterior gradient was observed among the linked regions, an anterior-predominant pattern was seen throughout the paralimbic cortex. These findings suggest that cortical pathology in DLB is more closely related to anatomical territory than to a uniform anterior-posterior gradient, indicating different patterns of regional vulnerability to α-synuclein and pTau. Because of the small number of cases and the uneven distribution of sampling across regions, these conclusions need confirmation in larger neuropathological cohorts.

Understanding the Roles of Primary Cilia in Ciona robusta Using CRISPR/Cas9 Gene Editing
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Alexi Ford
Research Mentor: Eduardo Gigante

Ciona robusta (Ciona intestinalis type A), commonly known as "sea squirts," is an invertebrate species in the Chordata phylum and Tunicata (Urochordata) subphylum. Ciona have a biphasic life cycle; the first part is a free-swimming larval phase, and the second part is a sessile adult phase. Ciona have distinct central nervous systems at both stages which requires the degeneration of the larval brain and regeneration of their adult CNS. This is accomplished by a unique set-aside neural progenitor cell nicknamed "the neck" cells. The purpose of this project is to understand the downstream effects that signaling cilia have on the development and patterning of these neural progenitor cells. We performed timed fertilizations, dechorionated (removal of zygotic protein coating), electroporated, and imaged under a light microscope after 21 hours of incubation. Most of the viable animals viewed on the IFT88 knockout slide had a wildtype phenotype, but most of the animals viewed on the IFT88 knockout slide were dead in clusters. We observe that the Arl3 KO slide contained many wild type phenotypes as well as abnormal phenotypes. The most common abnormality observed was some sort of organization error. The number of viable animals in the Arl3 knockout slide leads us to believe the role of IFT88 is critical to life. Experiments will evolve to answer more questions about the relationship among Arl3, cilia, and the neck cells/neural tube. Understanding the functions of cilia on Ciona neck cells could spark discussion and further exploration into the regulation, proliferation, and differentiation into the cells of chordates.

Department of Physics

Grazing Geometry and Source Misidentification in Two TESS Eclipsing Binaries
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 12:00pm - 12:50pm
Undergraduate Student: Thi Tran
Research Mentor: David Joffe

The Transiting Exoplanet Survey Satellite (TESS) was launched to search for planets outside of our Solar System. TESS has large pixels that allow it to observe a large area of the sky, but light from multiple sources can blend together within the same pixel. The purpose of this project is to investigate how blending, eclipse geometry, and source misidentification can affect the interpretation of eclipsing signals in TESS data. We analyzed two short-period eclipsing binaries that show two different ways an eclipse signal can be misread. TIC 53847727 was first mistaken for an exoplanet for two reasons. The primary and secondary eclipses have similar depths, so the Box Least Squares (BLS) search detected half of the orbital period, and folded both eclipses into a single dip. The eclipses are also shallow because of the grazing geometry, as only a small part of the disks overlap. TIC 29914747 presented a different problem, as it showed a shallow eclipsing signal with a period of 0.77 days. Roche modeling gave an unrealistic result, which led us to investigate the source of the signal. Data from Gaia showed matching eclipses from a nearby star, TIC 29914740, located 26 arcseconds away. We then combined data from TESS and Gaia to model the system and found that TIC 29914740 contributes only 1% of the light in the TESS aperture, explaining why the eclipses appeared so shallow.

Study of Quantum Oscillations in Rare-Earth Intermetallic Compounds
In-Person Poster Presentation (Event Center, Poster #24)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student(s): Lucas Ruth, Tobias Beyer & Matt Bonvissuto
Research Mentor: Chetan Dhital

When a community's resources are limited, how can architecture establish a framework that empowers residents to adapt, shape, and cultivate their own living spaces? My thesis proposes a participatory, community driven, reconstructive approach centered on the abandoned Weatherington-

Robinson Elementary School in Valdosta, Georgia. Originally established to provide substandard education to Black students, the site currently stands vandalized and neglected. Through adaptive reuse, my thesis creates a cultural resilience center allowing Valdosta's communities of color to shape their future. Building on Alejandro Aravena's firm "ELEMENTAL's" principles of architecture becoming a tool for social equity rather than monumentality, this thesis allows the community to identify their needs and provide them a space that allows them to foster growth and agency.

Geer College of the Arts

Bailey School of Music

Forming Cultural Identity through Music: Andean Music and Música Criolla in Contemporary Peru.
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Nick Mondragon, Briana Castro-Balbi & Camilo Giraldo
Research Mentor: Jesus Castro Balbi

The students of MUSI 1107 S01 Music in Society visited Peru in May 2026 to investigate how different musical styles contribute to forming cultural identity in a modern society. The interdisciplinary study encompassed Peruvian culture and history from pre-Incan societies through modern times through observations in Peru's southern regions of Arequipa, Puno, Lake Titicaca, Cusco, and Sacred Valley. Data on seven musical styles and periods – pre-colonial Andean music, Baroque music, Romantic or Nationalistic music, Música Criolla, Afro-Peruvian music, contemporary Andean music, and contemporary classical music - was collected in lectures in universities, live performances, at churches and other significant cultural sites, and through encounters with musicians. Contemporary Andean Music and Música Criolla rose to be the most meaningful genres because of their popularity in Peruvian society and because they are such clear examples of syncretism between Andean, European, and African music techniques. The presentation will show their influence in music of the Peruvian baroque, romantic, nationalistic and modern periods, illustrating syncretism and reflecting the legacy of indigenous populations and of the Spaniards, and their role in forming Peru's cultural identity.

How Radical German Nationalism led to Broader Individualism in Music History
Virtual Presentation (Session C)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Trey Stannard
Research Mentor: Ryan Fellman

The rise of German nationalism transformed music composition from a (traditional) display of individual artistic expression into a modern tool of cultural and political identity. However, the limitations placed on composers did not completely eliminate individual expression. Instead, they influenced how composers developed their musical language, thus creating a link between nationalist conformity and artistic individuality. This research presentation compares the different effects nationalism had on German composers through multiple political eras (Pre-unification, Nazi Germany, and post-war). Johannes Brahms represents the pre-unification era of Germany. We explore his musical development and political progression against Hugo Distler's propaganda style for Nazi Germany. Finally, we engage with the music of Carl Orff who famously composed during the Nazi Germany era and beyond. His music was a creative rebellion against the strict limitations placed on him by the Nazi Germanic society. While the regime praised his work as a true 'German staple' much of his techniques and characteristics in composition directly contradicted the ideas the third reich mandated. Each of these composers lived through arguably similar pressures and circumstances, however, the way each responded musically to nationalism was drastically different and could serve as a tool on how to recognize musical influenced by nationalism in other historical contexts. This presentation hopes to exemplify illustrate and contextualize decisions and compositional techniques employed by these artists for future educational and professional research.

The Simplistic and Implicit Genius of Hugo Wolf's Lyricism in "Verborgenheit"
Virtual Presentation (Session A)
Friday, November 20, 2026, 1:00pm - 2:00pm

Join the Teams Meeting
Undergraduate Student: Trey Stannard
Research Mentor(s): Todd Wedge & Jihye Song

The art songs of Hugo Wolf are considered to be some of the strongest examples of unity between poetic lyricism in melodic writing. Compared to composers of the time, such as Schubert, Brahms, and Schumann, his works require an elevated level of vocal technique and emotional investment. This research focuses on exemplifying, contextualizing, and applying the techniques of Wolf with dynamic lyricism by analyzing and performing perhaps his most famous lied. "Verborgenheit" (Meaning 'Seclusion') is one of the most prolific lieder in Wolf's oeuvre. Wolf's use of parallel phrases within text and melodic structures, as well as his use of text painting in the accompanying piano, show masterful and previously unthought-of ideas within the German lieder. "Verborgenheit" showcases Wolf's mastery of the relationship between the melody, text, and harmonic structure, but also the emphasis on the musicality and interpretation by the performer(s) in order to preserve the essence of the piece. In this performance, I will apply techniques of polarizing dynamics, contrasting vocal colors, and emotional investment to display these techniques used within Hugo Wolf's German lieder.

Transformation of Eighteenth-Century Topics in Brahms's Cello Sonata No. 1, Op. 38
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 3:00pm - 3:50pm
Undergraduate Student: Tabitha Chang
Research Mentor: Benjamin Wadsworth

Topic theory has provided a valuable framework for understanding musical meaning in eighteenth-century music. However, eighteenth-century topics often acquire new expressive functions in nineteenth-century instrumental music, making their interpretation less straightforward. This study examines how eighteenth-century topics generate expressive meaning within a Romantic sonata-allegro form, which is viewed as a process by which formal functions are perceived by a listener in time(Schmalfeldt 2011). Using the first movement of Brahms's Cello Sonata No. 1 in E minor, Op. 38 as a case study, I ask whether an interaction among two or more topics culminates in an expressive genre (compatible topical interaction) or a trope (incompatible topical interaction). Rather than treating topics as isolated expressive signs, the study examines expressive meaning through interactions among topical signifiers, harmony, formal function, and texture, which are conceptualized together as a process of topic transformation. These interactions reshape topical functions while preserving their eighteenth-century inheritance and transform the expected energy profile of an eighteenth-century sonata. The analytical framework integrates Ratner's Topic Theory (1980), Monelle's theory of musical signification (2000), Frymoyer's hierarchy of topical signifiers (2017), Hatten's concepts of expressive genre and trope (1994, 2004), and Hepokoski and Darcy's Sonata Theory (2006). In the sonata-allegro form, supporting, missing, and contradictory signifiers within each subsection are evaluated, thereby informing expressive interpretation. The study demonstrates that recognizable topics remain identifiable while acquiring new expressive functions. Throughout the movement, the pianto topic functions as a pervasive expressive genre, while tropes emerge strategically at key formal locations and delay expected expressive climaxes beyond eighteenth-century norms, reshaping the movement's energy profile as a series of intensification-climax-abatement shapes. These findings suggest that topic transformation provides an analytical framework for explaining how eighteenth-century topics retain their historical inheritance while acquiring new expressive functions in nineteenth-century instrumental music.

Underrepresented Opera: A Complete Guide to Staging Rimsky-Korsakov's Kaschey the Immortal
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 3:00pm - 3:50pm
Undergraduate Student: Jackson Kodani
Research Mentor: Jeffrey Yunek

Kaschey the Immortal, by Nikolai Rimsky-Korsakov, contributes to the field of opera because of the ways in which it uses special collections, chord association, and leitmotifs to strengthen the understanding of the plot and character relationships. Rimsky-Korsakov assigned chords, and special

collections to each character in the opera, and in doing so was able to show the audience who the speaker was, as well as the character being spoken to, even if there were no singers involved. Despite the many innovations in the work, Kaschey is rarely performed around the world, especially in the United States. In order to promote productions of this work, I created a comprehensive staging guide that includes research on the history of Russian opera, analysis of Wagnerian and Russian leitmotif techniques, descriptions of the required forces and cost estimations for performance, and auxiliary performance/staging materials. In the first part of this guide, the place in Russian opera history of Kaschey is discussed, as well as the techniques Rimsky-Korsakov built upon in order to create this work, and previous performances of Kaschey around the world. In the second part, the forces required to perform this work are provided, as well as suggestions for orchestral setup and staging options. An estimated budget is provided for the two tiers of stagings suggested in the guide. Creating a staging guide for this work has deepened my knowledge of what is required to put on an opera, and this guide will remove a barrier in performing Kaschey. Therefore, performances of this work can be more frequent.

Why Beethoven Would Have Loved Metallica: A Formal Analysis of Metallica's "Master of Puppets"
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: V Markey
Research Mentor: Jeffrey Yunek

Compared to the broader history of music, heavy metal is a relatively recent genre that emerged from a place of social unrest. It was perceived as controversial outside of its main audience due to the loud and subversive nature of the instrumentation and lyrics. One issue that arises from this backlash is that heavy metal can be seen as less cerebral in comparison to the conventional pop music of their era, potentially obscuring the structural complexity of pieces that deviate from common pop-rock form expectations. Metallica's "Master of Puppets," released in 1986, was well received by critics, including Rolling Stone reporter Tim Holmes, who praised the band for finding its own sound and avoiding prototypical expectations for rock music. The piece features multiple distinct deviations from common pop-rock form, with its numerous B-section strategies, thinner texture in the chorus, and 32-bar form A-sections. To properly analyze the myriad of distinct deviations from common pop-rock form, I transcribed "Master of Puppets" and compared its formal organization to sonata-allegro form, with specific correlations to Beethoven's 5th Symphony. When analyzed in sonata-allegro form, the B-section strategies match the motivic structure of a development, and the A-sections match the expectations of an exposition and/or recapitulation. Meanwhile, there are a few important discrepancies, the secondary theme and closing theme do not follow classical harmonic roles, and the piece lacks a definitive medial caesura. I argue that "Master of Puppets" can be understood through sonata-allegro form, as this approach disrupts fewer formal expectations, explains the deviations, and draws parallels between Metallica's compositional complexities and classical formal structures.

Department of Theatre and Performance Studies

An Oral History Study of Biphobia and Bisexual Erasure
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 3:00pm - 3:50pm
Undergraduate Student: Ansley Dolph
Research Mentor: Porntip (Ploy) Israsena Twishime

Bisexual individuals frequently experience biphobia and bisexual erasure through stereotypes, invalidation, and assumptions that their identities are temporary, confused, or determined by their current relationship. These experiences occur in both heterosexual and LGBTQ+ spaces and can negatively affect mental health, belonging, relationships, and self-worth. This oral history project examines how bisexual people experience and understand biphobia and bisexual erasure in their everyday lives. Drawing on preliminary research about bisexuality and identity-based marginalization, I conducted open-ended oral history interviews with different bisexual people from

different backgrounds. The interviews I conducted emphasized interviewee consent, permission, and active listening. The stories reveal a spectrum of biphobia, ranging from jokes and misconceptions to complete invalidation, bullying, and physical violence. Participants also described how being told they were "not queer enough" contributed to feelings of isolation, emotional distress, and pressure to prove their identities. By centering bisexual people's lived experiences, this project illustrates how bisexual erasure operates across different social contexts and documents the personal consequences of these experiences. The findings suggest true inclusion requires treating bisexuality as a valid identity, challenging stereotypes, and creating spaces where bisexual people are believed without having to justify their identity. This project demonstrates the value of listening to bisexual oral histories to challenge erasure, promote understanding, and support a more inclusive world.

Analyzing Level of Subsequent Understanding in Families Education from Immersive Based Theatre about Decomposition

In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student(s): Laila Howard & Alissa Mosley-Brittingham
Research Mentor(s): Emily Kitchens & Nicole Adkins

This research project investigates how immersive-based theatre can be an educational opportunity for teaching families about decomposition and basic ecological properties. Decomposition is the ecological process where deceased animals and plants are broken down into organic or inorganic materials by decomposers. However, for many children, decomposers are seen as "yucky" or "gross." This study aims to debunk that idea and help children and their families understand the true importance of this essential process. The research will test the potential of immersive-based theatre as a teaching strategy for improving families' understanding of decomposition and its importance. Our proposed research will explore the changes in the family's knowledge of decomposition through pre- and post-performance surveys. The surveys will ask the participants questions on different important decomposers, the importance of decomposition and what decomposition is. The research will investigate how participation can influence the family's knowledge on ecological processes. Our data will be comparing the post-show responses in contrast to the pre-show responses to recognize any growth in knowledge. By using an immersive theatrical performance with ecological teaching, our project intends to explore more creative and interesting approaches to ecological education that would engage in children's curiosity and challenge the misinterpretations families have about decomposition and help promote the appreciation for this needed process.

Beauty, Colorism, and the Black Girlhood Experience: A Dramaturgical Exploration of African Mean Girls

In-Person Visual Display (Event Center, Poster #22)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Kia Jie Jacobs
Research Mentor(s): Porntip (Ploy) Israsena Twishime & Thomas Fish

This project examines how colorism and Eurocentric beauty standards shape the representation, value, and remembrance of Black women. It explores the contradiction between the celebration of black women's appearance and the continued marginalization of Black women themselves, asking how historical erasure contributes to this divide and why plays like African Mean Girls by Jocelyn Bioh and stories like it should be told repeatedly. Through historical research of Sarah Baartman's exploitation, the examination of the culture of beauty, and dramaturgical analysis of Jocelyn Bioh's African Mean Girls, this project explores how beauty standards influence identity, belonging, and social power, specifically in a Ghanaian boarding school in the 80's. Bioh's world of the play is that of the pageantry world and the high school world combined. These cultures make up a very toxic space, which is a genius way to incorporate conflict between young teenagers like these characters and demonstrate the supply and demand of beauty and what these girls will do to achieve it. The damage that takes over sheds light on how skin tone and proximity to Eurocentric ideals can affect whose beauty is recognized and whose opportunities are limited. A Ted Talk by Chimamanda Ngozi Adichie discusses the concept of "the danger of a single story" and just how irreparably destructive

in can be. This and African Mean Girls will be referenced in this project because it is important to show art's ability to bring overlooked stories into view. How can we be so optimistic about a country while erasure of all its nuts and bolts are at an all-time high? Rather than centering the African Mean Girls play, or Saraah Bartman's story, or Adichie's Ted Talk, these are only a few examples to display the systems being enforced to shape self-perception and social acceptance.

Living Statues: Mystery in Stillness
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Ethan Goldstein
Research Mentor: James Davis

Living statues are a fascinating facet of modern street performance. Living statue performance is a performance of stillness where the performer embodies a statue. This presentation explores the history and origins of living statue performance. This project aims to further academic inquiry into the living statue performance. The methodology used in this project places existing performance scholarship on tableaux vivant and busking, two different forms of living statue performance in two different historical and cultural contexts, in conversation with one another to uncover a historical lineage. Although the origin of living statue performance remains murky and there are no signature performers that link directly to the performance's origin, this project demonstrates that performance lineages can be uncovered and further scholarship is required to fully grasp the origins of living statue performance.

Nandan: The Cultural Mirror of China
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Lee Bertram
Research Mentor: Thomas Fish

Xiqu ("Theatre of Song," or better known as Chinese Opera) is one of China's most treasured art forms, and one that has many impacts on China's culture as a whole. However, within it lies a role that, though it has been present since Xiqu's ancient beginnings, has not had the privilege of remaining so highly regarded: the Nandan. The Nandan is a male performer who specializes in performing Dan ("Female roles"), and as such, carries with it inherently queer subtexts. The way in which popular Chinese culture has viewed these subtexts has wildly shifted over the years, particularly in the culturally tumultuous time of 1912-1976, from the fall of the Qing Dynasty to the end of the Cultural Revolution. In this time, a "New China" was sought to be quickly established by cultural leaders, and in doing so, many aspects of western culture were absorbed. This project examines the major shifts in popular Chinese opinion regarding the queer subtexts of the Nandan, moving from acceptance, to vilification, to denial, to eradication, and now back to curiosity. It argues that each flux of Chinese opinion is tied to a shift (or anticipated shift) in western opinion. In doing so, this project is able to emphasize the importance China has consistently placed upon western opinion regarding its own development towards a new, post dynastic society, and how this tendency has allowed the cultural tradition of Nandan, and the art of Xiqu as a whole, to be modernized and westernized to negative effect. This project also places importance on the four remaining Nandan in modern day China, and how a contemporary resurgence of the practice may indicate (or be partly cause of) a revitalization not just of Xiqu as an artform, but of reemerging queer acceptance previously found in dynastic China.

Neo-Burlesque: A Feminist Reclamation of a Misogynistic Tradition
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Addison Carter
Research Mentor: James Davis

The purpose of this project is to examine the intersectionality of third wave feminism and neo-burlesque and how the lessons from these movements can be applied to oppose modern day misogyny.

During the early rise of the third wave of feminism, feminists began reclaiming burlesque as a form of feminist entertainment. Now renamed as neo-burlesque, the performance took key ideas from the third wave feminist movement of the nineties. These ideas are intersectionality, individualism, consent, and activism as a part of everyday life. Beginning by researching historical burlesque and modern feminism we can see how neo-burlesque has taken an outdated practice and reclaimed it as a form of feminist activism. Continuing to look at feminist work and neo-burlesque performances gives a further understanding of neo-burlesque's purpose and place in modern activism. In addition to studying feminism, it was also necessary to research the rise of misogyny in social media spaces and how it escapes into real life sociopolitical consequences. The conclusion of this research is that the themes from thirdwave feminism combined with the neo-burlesque art form, helps women combat the harmful ideals of modern misogyny.

Performing Alopecia
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 3:00pm - 3:50pm
Undergraduate Student: Lillian Hovey
Research Mentor: Charles Parrott

"Sometimes When You're 15" is a storytelling piece centering my lived experience with Alopecia Areata Universalis. While current studies extensively define the psychological impact of hair loss on men diagnosed with androgenetic alopecia, there is little research published in the field of performance studies that speaks to hair loss in young women. This performance was created with the intention of bridging that gap in knowledge. Autobiographical solo performance allows the performer a richer connection with a direct audience than written work because it erases the degree of separation that paper or screen provide. Performed originally in December 2024, the story was written through the practice of action-to-text, where the writer/performer speaks elements of the story naturally before attempting to write it down. The two results of this research are the original script which has been edited and rewritten, alongside an accompanying essay titled "Hair Loss in the Great Tragedy of Adolescence" about its construction, including how the story uses anaphora as a valve between pockets of intense pressure and comedic release, second-person perspective to bring the audience closer to the subject matter, and the paradigm of teenage disappointment to view total hair loss.

Steele MacKaye and Nineteenth Century Scenic Technology Developments
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Lauren Volk
Research Mentor: James Davis

James Steele MacKaye (1842-1894) was an American theatre practitioner who, over his two-decade long multi-disciplinary career, created groundbreaking innovations in scenic technology, stage effects, and architecture. This project illuminates MacKaye's early work as an inventor and designer, which lead him to push the boundaries of possibility in late nineteenth century technologies. Furthermore, MacKaye's technological innovations laid the foundation for later advancements, and continue to impact the modern-day entertainment industry and beyond. From his ambitious elevator-stage design and the proscenium adjuster patents for unique and efficient scenery changes to his practical inventions that integrated mechanized natural phenomena into the audience experience, many of Steele MacKaye's patented works can be directly traced to modern theatrical architecture and revelatory staging tricks in the immersive scenic design.

Norman J. Radow College of Humanities and Social Sciences

Department of English

Analyzing State Legislature on AI Policies and Regulations Through State Representatives
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Katherine Norris
Research Mentor: Pete Rorabaugh

Leaders in the AI industry have been calling for governmental regulation of their products for several months, but federal policy makers have, so far, been ineffective. Conversely, state legislators have been more energetic and inventive in proposing regulatory legislation for the last two years. Excerpting data that I am collecting for my capstone research paper, my symposium poster presentation explores lawmakers' attitudes toward AI regulation within several state houses. Gaining insights into written bills, I plan to take proposed legislation a step further. I will curate new findings via personal interviews with selected state representatives, creating fresh information to digest dense material. As an aspiring law student, I am eager to engage with prestigious lawmakers regarding their legislation. With my inquiries, I will provide a new analysis of AI regulations within the United States.

Being Fed to Atlanta's Undead
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Nia Redmond
Research Mentor: Michelle Miles

I will present information about Atlanta's goth scene through a detailed poster. This includes research on the music, fashion, gender, sexuality, race, and social and political values within Atlanta's goth scene, as these themes connect with the goth subculture's identity and history. This topic correlates with the research I plan to conduct through my Fulbright grant, about the artistic expression, cultural experiences, and globalization of the goth subculture in South Korea and the U.S. through a comparative cultural study conducted in Seoul. My overall goal is to examine how individuals connect through a subculture, challenging assumptions about East-West cultural divisions, and revealing how alternative communities create acceptance and understanding. I must first research and observe my local goth scene here in Atlanta, Georgia, which I am a part of. I'm gathering preliminary results about Atlanta's goth scene that serve as excellent grounds for further research, this being the potential overlap between Atlanta's goth/alternative, LGBTQ+, and other artistic communities. These communities tend to intersect through mutual experiences of marginalization, alternative self-expression that clashes with the normative, and the craving for belonging, raising questions about how the goth scene cultivates identity and acceptance among individuals who feel excluded from mainstream culture. Primarily, I'll investigate how citizens of Atlanta express goth identity through music, fashion, other forms of artistic expression, and community. My research methods will include concept mapping Atlanta-based goths and goth musicians, examining their interests, music and visuals, and documenting local events and community spaces. As a fellow goth involved in Atlanta's scene and an independent alternative musician, I plan to incorporate participant observation with both personal knowledge and findings from primary sources. This research aims to contribute to the documentation of Atlanta's contemporary goth scene and establish a solid foundation for examining how local communities adapt and express a subculture.

Do You Use AI? A Talk-Aloud Study to Determine How Students are Using AI in Their Writing
Virtual Presentation (Session B)
Friday, November 20, 2026, 4:00pm - 5:00pm

Join the Teams Meeting
Undergraduate Student: Kylee Johnson
Research Mentor: Jeanne Law

This study examines how students use generative AI tools in their academic writing. As generative AI tools such as ChatGPT become increasingly common, students and instructors have been faced with the ethical challenges of academic integrity, originality, and authorship. The purpose of this study is to look deeper into how students are incorporating generative AI into their academic writing processes and assess whether their usage aligns with concerns regarding diminished learning or authorship. There is a lack of consensus around what constitutes ethical AI use, and this study has been a conversation starter about a change in traditional definitions of integrity and originality. While much of the discussion surrounding AI in education focuses on potential misuse, fewer studies examine how students interact with it when writing. This study used a talk-aloud protocol to examine how twenty first-year college students interacted with generative AI while completing an academic writing task. The think-aloud methodology provided insight into the students' cognitive processes and decisions as they engaged with AI. Participants also completed a short survey to report their perceptions and attitudes toward AI. Following data collection, the research team conducted a qualitative analysis of the think-aloud transcripts. During the summer research period, transcripts were systematically coded using a standardized coding framework to recognize patterns in how students interacted with AI. Analysis included how the students evaluated AI-generated responses and how those responses influenced subsequent writing decisions. Researcher reflections also provided additional context for interpreting participant behavior and analyzing where, when, how, and even if generative AI entered into students' writing processes by comparing observed AI-use behaviors with students' self-reported attitudes, this study provides insight into the relationship between what students consider appropriate AI use and how they use these tools in real time.

Dungeons and Dragons as a Literary Medium: Analyzing the Link Between Dungeons and Dragons and Creative Literacy
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 1:00pm - 1:50pm
Undergraduate Student: Shreyon Rajesh
Research Mentor: Kurt Milberger

Dungeons and Dragons is a collaborative, tabletop roleplaying game focusing on player interaction and teamwork, with a mix of imaginative play and traditional pen-on-paper mechanics involving a bit of chance with dice rolls as well. For many players of D&D, quite a lot of time is spent creating and polishing their characters and worlds, fine-tuning them to their specific party's needs and wishes on the fly, or even adding in bits of their own personal fantastical elements, all coming together to create a truly unique and impactful gaming experience. Due to its somewhat niche nature, many of the creative pursuits of the players are often overlooked in terms of their literary potential, being relegated to realms of leisure alone. With my research, I will draw a connection between participation in Tabletop Roleplaying Games, D&D in particular, and prowess in creative literacy and writing present therein. I will achieve this through a directed survey analyzing responses from several students who frequent D&D spaces and gatherings on campus, focusing on how skilled they consider themselves when it pertains to creative writing, as well as how much they believe their skill pertains to D&D. I will further break down these questions in terms of character creation, worldbuilding, and general roleplay, to illustrate which aspects of D&D gameplay directly contribute to building creative literacy in these students. I will also use this data, along with some general research on the subject, to demonstrate a link between D&D and creative literacy on a larger scale, proposing the methods and processes of Tabletop Roleplaying as an agent of developing creative literacy akin to novels and poems.

Effects of Femininity on Perceptions of Professionalism: A Synthesis of Masculine Defaults at Work
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 2:00pm - 2:45pm

Undergraduate Student: Sam Alderton
Research Mentor: Erin Bahl

There has been substantial scientific inquiry into gender discrimination in the workplace, but less emphasis has been placed on understanding the effect of gender expression as a primary factor in perceptions of professionalism and competence. By examining femininity as separate from (but still related to) womanhood, it is possible to explore what is involved in professional expectations across genders. This research aims to answer the following questions: 1. How does gender expression affect levels of perceived competence? 2. How do perceptions of professionalism affect feminine individuals? This research draws on quantitative and qualitative studies in psychology and sociology to answer these questions. The goal of this line of inquiry is to understand not only the large-scale patterns of discrimination and bias, but also the subjective experiences of participants who have suffered the consequences of systemic beliefs regarding professionalism. Special consideration is also given to primary accounts of personal experiences related to femininity discrimination in the workplace and the changes employees make to avoid being perceived negatively, collected from LinkedIn posts. The literature will be organized by themes and patterns that emerge, and connections will be drawn to theories and concepts such as intersectionality and heteronormativity. This is a graphic research project that aims to visually synthesize the state of the literature via the use of a 20-page comic strip. This format transforms academic research into a concise, appealing, sequential medium so that it can be communicated to a general audience. The comic will guide readers through existing research on gender expression and competence and clearly show how social perceptions and expectations regarding professionalism can deeply impact life in the workplace.

Graphic Access Lab: Using Comics to Tell Stories of Student Experiences with Accessibility
In-Person Visual Display (Event Center, Poster #15)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Dylan Johnson & Somaya Malik
Research Mentor(s): Erin Bahl & Shuchita Mishra

Access to academic accommodations is essential for creating inclusive learning environments, yet students with disabilities may encounter challenges navigating university support services. The Graphic Access Lab, an interdisciplinary research initiative at Kennesaw State University, explores how comics-based storytelling can communicate student experiences with accessibility and make accommodation processes more understandable. This project examines how visual narratives can represent accessibility barriers, amplify student perspectives, and encourage greater awareness among university communities. Drawing on comics-based research, information design, and disability advocacy, the study seeks to bridge the gap between institutional accessibility policies and students lived experiences. The proposed research methodology includes participant screening, interviews, journey mapping, and qualitative analysis to identify recurring challenges students experience when seeking academic accommodations. These experiences will eventually inform the development of illustrated narratives created collaboratively with participants, allowing them to review and influence how their stories are represented. Currently in its early stages, the project focuses on research design, methodological exploration, and preliminary creative work. As a student researcher, my contributions include participating in the development of research procedures and exploring visual storytelling through an original eight-page comic addressing disability and accessibility. This creative work provides an opportunity to investigate how illustrations, narrative sequencing, and visual communication can communicate complex accessibility-related topics. Although participant findings are forthcoming, the project aims to demonstrate the potential of comics as an accessible medium for sharing experiences, encouraging empathy, and supporting more inclusive approaches to information design. Future research will evaluate how these narratives can improve understanding of the accommodation process and promote accessibility awareness within higher education.

Investigating how Scout Organizations' Environmental Rhetoric Reinforces Gender Roles
Virtual Presentation (Session B)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting

Undergraduate Student: Alexis Barton
Research Mentor: Laura McGrath

Girl Scouts of the United States of America (GSUSA) and Boy Scouts of America (BSA), since their establishment in 1912 and 1910, respectively, have made it their mission to encourage children across the United States to get involved in environmental change and community action. The environmental rhetoric used by both organizations, however, carries charged language that points to a gendered divide in the perception of children as participants in the outdoors. The purpose of this research is to compare the language used by GSUSA and BSA across historical and contemporary sources in an effort to better understand gendered perceptions of children's relationships with the environment. Additionally, it will explore how the organizations use environmental rhetoric as a vessel for presenting gender roles to youth. Data will be collected through rhetorical analysis by examining word choice in foundational texts such as handbooks, mission statements, and technical documents, comparing them in the temporal context of gender norms and environmental rhetoric throughout the history of the organizations. Preliminary analysis suggests that while both organizations encourage children to be good stewards of the environment, they frame their responsibilities differently based on gender, positioning girls as "carers" of the environment and boys as "protectors." Although research has been conducted on environmental rhetoric and gender roles as separate entities, this project aims to uniquely connect them within the nuanced setting of GSUSA and BSA literature. In doing so, its conclusions may reveal insight into the organizations' use of environmental rhetoric to reinforce gender roles and what significance that holds in relation to gender perception, environmental activism, and children as participants in nature.

Maternal Rhetoric and the Authority of Young Women's Environmental Activism
Virtual Presentation (Session B)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Esther Lee
Research Mentor: Laura McGrath

This research examines how contemporary young women environmental activists use and transform the maternal rhetoric women relied on to establish authority in the environmental justice movement of the 1980s. I will first examine how women like Lois Gibbs, Hazel Johnson, and Dollie Burwell used their personal experience as mothers determined to protect their children to support their credibility as environmental activists. I will then compare their approach to those of younger twenty-first-century activists, like Mari Copeny, Autumn Peltier, Jamie Margolin, and Greta Thunberg, to explore how young women have redefined the traditional association between motherhood and environmental responsibility. By comparing activist rhetoric from these two periods, I will demonstrate how gendered assumptions surrounding care and protection shape both the possibilities and limitations young women face as they establish authority and participate in environmental activism. My research builds on existing scholarship on feminine style, maternal militancy, care ethics, and youth rhetorical agency. I will perform rhetorical and thematic analysis of rhetorical artifacts produced by these activists, such as memoirs, speeches, and letters located through bibliographic and archival research. To better understand how young women's authority is received, I will also examine the public response to their activism. My preliminary analysis suggests two patterns. First, contemporary activists adopt the maternal militancy that environmental justice mothers used to confront failing institutions, but because they speak as both protectors and protected, they invert the adult-child relationship to hold adults accountable. Second, this position places young women in what feminist scholars call a double bind: it grants them moral authority, but because it also conforms to gendered expectations of caretaking, audiences can praise "girl activists" while ignoring their demands.

Patriotism to Savior, An Analysis on Rhetorical Strategies and its Effects on Youth Environmental Activism
Virtual Presentation (Session C)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting

Undergraduate Student: Marianne Ocampo
Research Mentor: Laura McGrath

Patriotism to Savior, An Analysis on Rhetorical Strategies and its Effect on Youth Environmental Activism Author: Marianne Ocampo Kennesaw State University Department of English 440 Bartow Ave NW, Kennesaw GA 30144Background: Early exposure to nature at a young age targets the idea that it will lead to environmental activism in the adult years. Adults have emphasized the notion of kids being the main protectors of the natural world and have utilized different materials to persuade kids to build a relationship with it. However, the strategies applied in these materials vary based on current events and adapt to the media and trends fitting the present youth. The purpose of this research is to analyze the different rhetorical strategies used towards the younger generation in order for them to have a relationship with the environment, therefore building a pathway to environmental activism. Methods: Materials and texts from different time periods will be examined to find similarities and differences in their methods. Materials will vary from media, Captain Planet and the Planeteers, to articles and newspaper publications. Language and presentation will be analyzed to find a connection to its publication date. The impact of their persuasiveness will be considered based on the response of the targeted audience. Results of the analysis will include language use, activism participation, and long-term effects of the persuasive techniques. This study does not aim to choose which approach is more effective, rather it will show its relevancy and purpose during the given time. It aims to show how rhetorical strategies slowly change to adapt to their environment.

Persuasive Strategies in Early 20th Century Humane Education: A Comparative Rhetorical Study
Virtual Presentation (Session C)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Janelle Morales-Ruiz
Research Mentor: Laura McGrath

In the early twentieth century American public schools began integrating human education, bird protection programs, and nature study into school curricula. The purpose of integrating these lessons was to build moral character and civil duty in students at an early age. In this research I will be examining the rhetoric educators and environmental leaders utilized to promote nature conservation and wildlife preservation in schools during the 20th century. Researching 20th century lesson plans, student projects, and county handbooks and comparing them to modern day resources. The study will compare old rhetoric strategies and how they are still rooted in modern environmental lesson plans. Primary texts like Alice Hall Walter's column in Bird-Lore, research by Keri Cronin on humane education, and Anne Marie Todd's concept of environmental patriotism set up the foundation of protecting nature as civic duty. Walter's writing highlights strategies for connecting local Audubon Societies with public education institutions, emphasizing efforts to supply nature-study literature to public libraries and rural schoolteachers. It has requests from educators asking for materials to help students study and protect local bird life in the classroom. Furthermore, connecting these early efforts on conservation carries over into modern environmental lessons.

Planting Responsibility: The Changing Rhetoric of Gardening and Childhood
Virtual Presentation (Session B)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Catherine Michael
Research Mentor: Laura McGrath

This project asks how early twentieth-century nature study rhetoric linked gardening to children's moral and civic development and how contemporary therapeutic-horticulture discourse has revised that relationship through the languages of wellbeing and environmental stewardship. Using Louise Klein Miller's Children's Gardens for School and Home as the primary source, this study analyzes school gardening within Progressive Era concerns about discipline, productive labor, citizenship, and public improvement. It then places Miller in conversation with William T. Hornaday's conservation rhetoric and with later work by Wendell Berry, David Orr, Charles A. Lewis, Sharon Simson, and

Martha Straus, Jill Mays, Anne Marie Todd, Richard Louv, and the Children & Nature Network. Although previous scholarship has examined nature study, conservation education, children's environmental experience, and horticultural therapy, these fields are often discussed separately. This project aims to contribute a rhetorical history of cultivation by analyzing how similar gardening practices have been used to construct changing ideals of childhood, health, responsibility, and citizenship. Through comparative rhetorical analysis and close reading, the study examines recurring keywords, appeals, intended audiences, and standards of successful development. Particular attention is given to the terms discipline, responsibility, care, growth, health, participation, belonging, and stewardship. Preliminary findings suggest that contemporary therapeutic horticulture does not abandon the earlier belief that caring for plants shapes human character. Instead, it translates moral discipline into individualized wellbeing. Responsibility likewise changes from an adult-imposed obligation into a more reciprocal relationship among participants, plants, communities, and places. However, the therapeutic model does not completely escape earlier disciplinary assumptions because practitioners still define goals and evaluate development. These findings will be discussed within broader debates about education, disability, environmental citizenship, and the ethical relationship between personal restoration and environmental care in American educational and therapeutic contexts across the century.

Teaching the Youth About Nature: A Comparative Analysis of Environmental Rhetoric in the Early 1900s and the 1970s
Virtual Presentation (Session B)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Megan Hyers
Research Mentor: Laura McGrath

Throughout the 20th century, supporters of environmental education have used multiple rhetorical strategies to encourage environmental stewardship among young people. The two timeframes of the early 1900s and the 1970s both encourage environmental education to connect children with knowledge of the environment, develop their skills beyond the classroom, develop their empathy with nature, and influence the people around them. However, there is a rhetorical change regarding language, tone, emotional appeals, themes, and imagery between these two eras. The purpose of this paper is to examine both the similarities and changes, as well as how the changes affected the reactions from young people over this span of time. Early 20th-century supporters of nature study in schools often romanticized the natural curiosity children have for nature and used poetic appeals to drive their arguments. This rhetoric highlighted the opportunity for educators to expand children's minds in a variety of ways (such as developing a strong sense of empathy). In contrast, rhetoric from the 1970s tended to radicalize the concept by treating young people as victims of environmental downfall; writers often used a tone of urgency to persuade children to be "heroes" for the environment. Several primary and secondary sources regarding nature study in schools, expansion on crisis rhetoric, the origin of Earth Day, and excerpts from relevant media/entertainment were used to guide this research. By performing such research, there is potential to better understand how environmental rhetoric builds a foundation for moral and ecological responsibility in our children, as well as how their role functions regarding social influence.

Transcending Harmful Healing: Closing the Gap Between Chemotherapy Sequelae and Targeted Cancer Drug Delivery
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Nicole Sonny-Joe
Research Mentor: Benjamin Compton

Chemotherapy remains vital for cancer treatment despite inducing severe, life-altering sequelae. Anthracycline-based regimens carry dose-dependent risks of cardiotoxicity and immunosuppression with heart failure risks that rise from 3-5% to 18-48% at cumulative doses. While targeted drug delivery systems aim to concentrate chemotherapy at tumor sites and mitigate systemic harm,

regulatory frameworks may not validate these benefits. This analysis addresses whether early-phase clinical trials of targeted delivery methods are structurally designed to test systemic toxicity reduction and if clinical trial safety endpoints may limit the clinical adoption of innovative preclinical targeted drug delivery systems designed to reduce systemic toxicity. A policy and literature analysis evaluating FDA oncology endpoint guidance alongside preclinical targeted delivery literature (chitosan nanogels, nuclear-targeted nanoparticles) and published phase 1 trial data for thermosensitive liposomal doxorubicin delivery (TARDOX, PanDox) were conducted. PubMed and ClinicalTrials.gov searches between 2015-2026 were also done to determine whether toxicity-reduction outcomes are actively measured alongside standard feasibility and safety parameters. FDA oncology endpoints prioritize survival, disease progression, tumor response, and symptom improvement, while toxicity reduction is not recognized as a primary efficacy endpoint. TARDOX and PanDox, testing the same focused-ultrasound-triggered liposomal doxorubicin platform in liver and pancreatic tumors respectively, confirmed enhanced tumor drug concentration and safety, but neither included a dedicated endpoint comparing cardiotoxicity or immunosuppression between targeted and standard delivery, and their single-cycle designs cannot capture the cumulative, dose-dependent toxicity chemotherapy is known to cause. Preclinical innovations in targeted delivery remain similarly untested for toxicity reduction before advancing toward human trials. Diagnostic tools to measure chemotherapy-related cardiotoxicity are already used in standard oncology care. Funding agencies and policymakers should require these measures as endpoints in phase 2 trials for targeted delivery methods that have cleared phase 1 safety testing, rather than continuing to fund feasibility trials alone.

Youth Conservation, Rhetoric, and the Legacy of Junior Audubon Clubs
Virtual Presentation (Session B)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Landon Postell
Research Mentor: Laura McGrath

Academic research has a gap regarding environmental and conservation accomplishments, milestones, and youth participation in organizations such as Junior Audubon clubs. While substantial literature on environmentalism, conservationism, and youth engagement exists, it has given little attention to documenting and reporting Junior Audubon Clubs' accomplishments and milestones. Most research focuses on broad movements or general nature education. Very little attention has gone to Junior Audubon Clubs, leaving their contributions and language largely unexplored in academic discussion. The purpose of this research is to understand, document, and analyze what young people have accomplished through Junior Audubon Clubs, how they contribute to conservation, why their role in environmentalism deserves recognition, and how it is described. This research also highlights the importance of youth participation in environmental and conservation activism and the language used to facilitate it. This project uses bibliographic and archival humanities research methods, along with thematic and rhetorical analysis, to answer the research questions developed. This project will also use a comparative analysis and an examination of crisis rhetoric, persuasive appeals, calls to action, and youth empowerment to reach my conclusion. The research results will contribute new knowledge on my topic to the fields of English studies and environmental rhetoric while also acknowledging the environmental milestones and achievements in activism by the organizations from the conception of Junior Audubon.

Youth Education: The Resolve for Dismantling Bird Millinery
Virtual Presentation (Session B)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Gabrielle Keen
Research Mentor: Laura McGrath

The purpose of my research is to analyze and discover how nature conservation rhetorical techniques linked with youth nature education dismantled bird millinery consumer fashion of the time. Using

Nature Study by Fredrick Holtz, I will analyze how his work was used to rebuild what children understood about birds and bird millinery. He argued that hands-on activities with birds and wildlife would lead to a more successful conclusion. With this, children were beginning to learn the importance of bird conservation through hands-on activities and joining Junior Audubon societies and Girl/Boy Scout clubs that changed the way children viewed birds. They were praised for their goodwill towards nature, and in turn they took what they learned and went back to their homes, where they could confront their mothers who wore the bird hats. I have noticed in my research a gap in the at-home confrontations from the children and the dynamic between child and adult during or after the confrontations. In Nature Study by Holtz, he states that children will become great at conserving, yet there is no detail of what this confrontation would do to the family or what a child may experience in doing so. The Junior Audubon societies and work within them were a vehicle that drove the birdless hat market, and how Fredrick Holtz Nature Study was a success which led to major change within schools and the children's homes – this proves that what a child learned early in their education was the vehicle for change that helped end the bird hat crisis, yet I hope to examine what stakes were held in doing so.

Department of Geography and Anthropology

A Preliminary Analysis on Native American Soapstone Vessels in the Southeast
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Finn Killingsworth
Research Mentor: Terry Powis

Soapstone, also known as steatite, is a talc-based stone primarily used all over North America during the Late Archaic (8000-1000 BC) to the Middle Woodland period (600 BC-AD 300). Soapstone vessels were used in cooking, storage, and even ritual practices by Native Americans. In the Southeastern United States, these vessels often predate pottery. While not as commonly found as lithic projectile point/knives or pottery sherds, fragments are still found within sites as far north as the Arctic Circle and as far south as the Maya in Belize. At most sites, archaeologists primarily record preliminary information (such as weight and size) on the soapstone fragments then they are set aside to talk more deeply about other material culture recovered. Consequently, little research has been pursued into these early containers other than attributes focusing on dating and sourcing. My aim is to conduct a more in-depth analysis on function and how these vessels were actually used in pre-contact times by examining soapstone fragments excavated from the Cummings Site between 2021 and 2025. Cummings is a multi-component site located about three kilometers northwest of the Etowah Indian Mounds in Bartow County, Georgia.

Appendicular Osteoarthritis in Byzantine Era Chryssi Island, Greece
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Morgan Fowler
Research Mentor: Susan Smith

Osteoarthritis is the most commonly documented pathology in the skeletal record, and its distribution across joints can reflect patterns of habitual physical activity. This study evaluates whether osteoarthritic change in the appendicular skeleton of two Early Byzantine (5th- 7th century C.E.) burials from Chryssi Island, Greece, reflects repetitive biomechanical loading. A total of 310 adult upper and lower limb bones were examined, and the presence of marginal osteophyte formation (lipping), joint surface pitting, and eburnation was recorded for each articular surface. Diagnostic osteoarthritis is defined as lipping with pitting or eburnation. Diagnostic cases occurred in only one of the two graves (eight in the upper limb and four in the lower limb), while isolated lipping and pitting occurred in both graves. Lesions were concentrated at the sternoclavicular joint of the upper limb and at the acetabulum and femoral and tibial condyles of the lower limb, which are joints that transmit substantial force during repetitive movement. One grave had significantly more lesions than the other, though the overall physical distribution was similar across both graves. The distribution of

lesions may reflect activities involving coordinated upper- and lower-limb movement, including rowing, agriculture, load carrying, or fishing. The results of this study show that osteoarthritis distribution can offer insight into the physical demands of daily life in the Early Byzantine Aegean.

Automated Detection of Outliers from Terrestrial Laser Scanning Point Clouds
Virtual Presentation (Session B)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting
Undergraduate Student: Levi Walker
Research Mentor: Mostafa Arastounia

Terrestrial laser scanning (TLS) is increasingly used to capture three-dimensional (3D) data from complex real-world environments in high-resolution. However, the automated extraction of objects and features from the resulting point clouds remain a significant challenge — particularly in dense, cluttered scenes where humans, vehicles, ground surfaces, and structural elements coexist at similar spatial scales and where there is potential obstruction from fixed scanner viewpoints. This paper presents a practical, semi-automated five-stage pipeline for identification of outliers from a TLS point cloud acquired at a complex industrial and pedestrian environment comprising over 17 million points spanning approximately 35 × 65 meters. The proposed methodology identified data points on the ground surface, sub-terrain anomalies, human figures, vehicles, and scattered outliers — in that order — without requiring pre-labelled training data beyond a single manually verified reference segment. First, ground elevation is estimated using the second percentile of elevation across the full scene. Next, for human detection, a mid-body DBSCAN clustering approach was utilized to filter against dimensions measured directly from confirmed human figures in the dataset. Vehicle detection matches candidate clusters against a manually segmented reference vehicle using bounding box comparison and a length-to-width ratio filter to eliminate square-footprint false positives. Finally, a global structure-adjacency filter ensures no classification is assigned to points laterally connected to structural elements. At the object level, six individual humans and three vehicles were correctly identified with no false positives. At the point level, this corresponded to 9,277 human points and 60,695 vehicle points, alongside 1,415,897 ground points, 9,434 sub-terrain points, and 145,203 scattered outliers across the full scene. Results demonstrate that calibration-driven, rule-based classification can achieve reliable performance on real-world TLS data without deep learning overhead, with direct applicability to site safety monitoring, access control, and infrastructure inspection.

Dental Analysis of the People of Byzantine Era Chryssi
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Bella Churchill
Research Mentor: Susan Smith

Bella Churchill Dental Analysis of the People of Byzantine Era Chryssi Abstract The present study was conducted to examine dental characteristics of the Early Byzantine era 6th c. AD skeletons excavated from two adjacent graves on Chryssi island of Crete, Greece. This study is to assess the presence of linear enamel hypoplasia (LEH), number of caries, and amount of antemortem tooth loss (AMTL) among the permanent dentition of the graves in order to better understand the health of the people who occupied Chryssi island at this time. The frequency and presence of these conditions were calculated and identified by tooth type. Based on the frequency of LEH, which form as a result of childhood nutritional or health stresses. Some of the skeletons exhumed appeared to have had poor health or malnutrition as children. Many of the mandibles and maxillae we studied had evidence of AMTL, but few had caries. We compared these dental conditions between the two graves. Preliminary results show that grave A607 had the majority of AMTL and LEH studied with AMTL at 20% and LEH at 19.20%, whereas grave A650 had AMTL at 8% and LEH at 3.26%. These results show that there is a clear difference between the dental characteristics of the two graves.

Improving Duplicate Message Handling in Cloud-Based Publish-Subscribe Systems
Virtual Presentation (Session A)

Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Farihah Awan
Research Mentor(s): Nicholas Ellwanger & Aaron French

Cloud-based messaging systems allow applications to communicate asynchronously and reliably, but messages can sometimes be delivered more than once, which can lead to duplicate processing. This project shows how duplicate messages can be identified and managed in a cloud-based publish-subscribe system while still maintaining reliable message delivery. The project is part of a group-based Information Systems capstone sponsored by Manhattan Associates and uses Google Cloud Pub/Sub to build a messaging solution connecting a producer, messaging service, consumer, database, and user interface. The individual research component focuses on duplicate message handling and processing within this system. The research will explore publish-subscribe messaging, message acknowledgment and redelivery, reliable message delivery, and methods for preventing duplicate processing. Based on this research, a duplicate-detection approach using unique message identifiers will be designed and implemented in the messaging application. The solution will be tested using scenarios involving new messages, multiple messages, duplicate messages, and message redelivery. Testing will evaluate whether the system can recognize messages that have already been processed and prevent unnecessary duplicate storage or processing. The results will be used to evaluate the effectiveness and limitations of the approach and provide practical insight into managing duplicate messages in cloud-based messaging applications. Overall, this project combines research with the development and testing of a working software solution to better understand reliable message processing in cloud environments.

X-ray Reliability for Assessing Rickets on Archeological Molars
In-Person Poster Presentation (Event Center, Poster #25)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Samantha Ibarra Rodriguez
Research Mentor: Susan Smith

This study focuses on testing the effectiveness of X-rays of adult archaeological teeth (molars) to assess the presence of rickets. Rickets is a metabolic bone disease in which the lack of Vitamin D (mainly obtained by sunlight), calcium, and phosphorus affects bone development in children. Rickets can cause many physical deformities including bowed legs and stunted bone growth due to the lack of Vitamin D needed for the mineralization of bones. This study will focus on the reliability of molar x-rays as indicators of rickets which affects the morphology of growing teeth. Dental morphology effected by rickets is noted by a chair-like shape of the pulp chamber in which the horns developed to differing heights or constricted pulp chamber horns. To determine whether researchers can consistently assess these dental features on X-rays, a blind test was conducted with two researchers where they placed 44 molars into one of 4 categories of rickets expression: Yes, Possible Yes, No, and Undecided. The use of a blind test has been utilized in studies prior; they were able to determine the presence of rickets in archeological individuals using histological methods and a comparison to living individuals with confirmed rickets. This study is focused on determining whether researchers are able to demonstrate agreement of the categories to which the molar x-rays belong. Results of the study were assessed how frequently the two researchers agreed on the presence of rickets exhibited in each molar pulp chamber. Results suggest that X-Rays are an effective non-invasive method for determining rickets in archaeological molars.

Department of History and Philosophy

1783: Weaponized Neutrality, and The American Revolution as a Catalyst for the Annexation of Crimea
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 1:00pm - 1:50pm
Undergraduate Student: Mira Eid
Research Mentor: Amy Dunagin

Crimea and the United States are an ocean apart with second to none in common, especially in 1783, so how could a revolution in one have led to the annexation of another? Historians analyze the 1783 annexation of Crimea as a localized Eastern European event caused through the affairs within the Black Sea's Ottoman control with only a short mention of the influence of the recent American Revolution serving as a convenient distraction for Western Europe to withdraw from the bureaucratically weakened region following centuries of prior conflict. Due to this, Russia's presence during the revolution abroad has been viewed by historians as a neutral and cold affair, with the strategic baseline of the Black Sea being the final goal through finalizing efforts to further weaken the British Monarchy with no major bond between these transcontinental events. Despite this baseline of neutrality for Catherine II's diplomacy, all documentation of Russo-American affairs pointed to a similar question: Why had Russian diplomacy invested so heavily into the Revolution if the claimed concern was Crimea ?Through uncovering and analyzing a variety of sources dating back to Vienna 1781 pointing to Catherine II as an active participant within the American revolutionaries strategically through Russia's diplomacy to aid in her militarization of the Black Sea. This study will provide a new approach to Russian diplomacy during the American Revolution, weaponized neutrality rather than traditional neutrality, and provide a proper timeline into the annexation of Crimea with the United States at the forefront of its justification.

A Deemphasis on Underrepresentation: How American Colonial Reactions to the Tea Act of 1773 Were Deeper than Underrepresented Taxation
Virtual Presentation (Session A)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Luke Frisina
Research Mentor: Amy Dunagin

This paper focuses on the importance of the Tea Act of 1773 within the American colonies as well as how the American colonists reacted to the act in question. To many, the Tea Act and its passage was a matter of the famously known line, "no taxation without representation" with the colonists arguing that underrepresented taxation was unfair yet, there were deeper facets to the reactions surrounding this act. Particularly this paper looks at a less focused perspective of the Tea Act and argues that many colonists held the act in such low regard due to the reasoning for the act's passage. In particular the act was passed essentially as a bailout for the East India Company, as the Company had driven itself to bankruptcy in India due to a spread of corruption, lack of proper governance, and the notorious 1770 Famine of Bengal. Due to all these compounding factors, the Company relied on Parliamentary assistance, in the form of the Tea Act, to offload all of its unsold tea into the American colonies, cutting out any middleman and forcing the colonies to pay a heavy tax on tea, with the hopes of potentially bringing the Company back from bankruptcy. Many within America were well aware of the Company's dealings in India and held a disdain for the Company, and how they handled the occupation of the region, believing that they didn't deserve a bailout of this sort, especially one paid entirely out of the pockets of them and their brethren. This showcases that in regard to the reactions of the Tea Act, there is an almost unrecognized emphasis on the actual importance of the tea itself and the reasons behind the passage of the act, rather than just the idea of underrepresented taxation.

Anti-Catholicism and the 1774 Quebec Act: Examination of Anti-Popery in response to the 1774 Quebec Act and its Communication to the American Public
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 1:00pm - 1:50pm
Undergraduate Student: Clark Frederick
Research Mentor: Amy Dunagin

In this paper, I seek to explore the origins of anti-Catholicism within the colonial American context, its extent in the colonial response to the 1774 Quebec Act, and its use a rhetorical tool by different groups in Colonial America. While this paper is classified under a larger subdiscipline regarding anti-Catholicism within American history, I seek to explore the extent of its use as a rhetorical tool by members of the American ruling class and elite, and how this was transmitted to the rest of American

society. This paper will examine the historical accounts, private correspondence, writings, and published works of prominent American elites, writers, and ordinary colonial Americans within pre-revolutionary America. This paper aims to examine the difference in American responses to the 1774 Quebec Act and its communication by writers and politicians towards the American public. This paper argues that while anti-popish rhetoric was extremely common in colonial America, the reasons for it differed considerably between each level of society. The American elite, while concerned of the theological implications, viewed the emancipation of Quebecois Catholics as more of a geopolitical and social issue. While an ordinary Protestant colonist would have viewed the Quebec Act more as an existential threat both to Protestantism and their patrimony. This is not to say that these worries did not largely overlap, but that different concerns were prioritized over others between different classes, and Anti-Catholic rhetoric permeated all levels of American society but manifested in different ways due to the communication of the American elite to the ordinary colonial Americans who viewed the 1774 Quebec Act largely through a different lens.

Ashoka, the Major Edicts, and Royal Reform
Virtual Presentation (Session A)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Andrew Bramlett
Research Mentor: Yoshina Hurgobin

In the third century BCE, the Mauryan emperor Ashoka became one of Ancient India's most important rulers and sought a twofold reform of his personal image and the idea of kingship more broadly. Through a series of messages carved on stone now known as the Edicts of Ashoka, the once-conquering hero expressed regret about his bloody conquest of the kingdom of Kalinga in 261 BCE. In the wake of this violence, the self-proclaimed "Piyadassi" (Beloved of the Gods) projected an image for his subjects of Dhamma, or righteous conduct. This change is intimately connected to his conversion to Buddhism. Ashoka strove to turn away from his violent past and towards a rule built on respect for the lives of all living creatures. More importantly, he hoped to project this new image to his subjects through his Edicts. Shifting his public image was not enough: while he worked to change the values associated with the Kshatriya caste, he also undertook administrative reforms to ensure these changes continued under the rule of his "sons, his grandsons and his great grandsons." This entailed creating a bureaucratic state for the "quick dispatch of business and the receipt of reports," and abandoning "pleasure tours" in favor of trips across his domain to meet with leading religious and political officials. Ultimately, the Edicts of Ashoka (and their distribution through visible, long-lasting inscriptions) were an assertion of his desire to solidify the control of his empire, morph the public's understanding of kingship, and guarantee the longevity of his reforms after his death.

Ashoka's Dhamma: Centralization of Power
Virtual Presentation (Session A)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Heleana Allen
Research Mentor: Yoshina Hurgobin

The Maurya king Ashoka is widely regarded in an ideal lens from a Buddhist viewpoint due to his close incorporation of Buddhist practice of Dhamma, or righteousness, into his law following the guilt of the 261 BCE Kalinga war. In his attempt to reform his practice of expansion and encourage the empire in the ways of Dhamma, he erected a number of engraved stonework labeled in minor edicts, fourteen major edicts, and seven pillars, each speaking on Dhamma and how it would be incorporated in the life of the empire's residents. Unlike certain sources from Kings before him and the period surrounding Ashoka's Maurya dynasty, the edicts erected on stone by Ashoka reflect his own words. Such edicts were placed in a specific manner around the empire's borders and routes of trade, where they would have the widest distribution to those living in the extended Maurya empire. Ashoka's campaign in expansion of the empire before the introduction of Dhamma contributed to civil unrest in newly-acquired territory due to the fact that it included, in his own thirteenth edict,

"violence, murder, and separation from…loved ones." It has thus been suggested that Ashoka's edicts were not merely over righteousness as a value, but rather rooted in the lack of support in his political campaign and used as a feature to consolidate the empire and therefore his own power. By examining the texts of two major rock edicts, this research explores dhamma's application as a form of law and unabridged policy for Ashoka within the Mauryan Empire in order to minimize unrest and centralize empirical capacity as a whole.

British Party Politics and the American Revolution
Virtual Presentation (Session A)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Ian Kirkland
Research Mentor: Amy Dunagin

This research project investigates why British Whig politicians lent their support to the American Revolution despite their belief in British Parliamentary rule over the colonies. The American Patriot movement that led the revolution was greatly inspired by British intellectuals, especially those involved in the British Whig party. Many Whigs, such as in the British Patriot camp, were outspokenly supportive, but many others believed that America was not ready to gain its freedom and that they were better off under British Parliamentary rule. Others supported greater American independence but worried about the effect it would have on other British colonies. For a long time, these concerns and fears played a role in the growing belief in America that independence was the only option. Despite this, once the revolution began, Whig politicians mostly put their backing behind the American independence movement. For this subject I will be looking at the party politics of Britain and the complicated relationship between the Whigs and American Patriots using the writings and correspondence of 18th century politicians and intellectuals. I will be using writings from figures such as James Anderson, Charles James Fox, and William Pitt. Other primary sources such as debates within Parliament, court records, and news publications will also be used in my research. I will be using these sources to look at how internal party politics affected the Whig party throughout the American Revolutionary War. As well as how it affected the American colonies and other British colonies such as Ireland and India.

Differences of Republican Motherhood Between Northern and Southern Mothers
Virtual Presentation (Session A)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting
Undergraduate Student: Emily Mansfield
Research Mentor: Amy Dunagin

Why did the North and South develop subtly different versions of republican motherhood in the revolutionary and early republic era? To first dive into the question, we have to understand what republican motherhood is which is women's political role in the new republic by teaching their boys how to be good republican men and their daughters how to teach those men. The effects of the Revolutionary War led these women to continue to speak and act politically. Northern women focused a lot on educational expansion as well as expanding women's work outside the private sphere. Southern women's teachings were focused on their daughters being submissive and a more patriarchal approach. When looking at southern first northern perspective, it is no surprise that Northerners are more progressive in comparison to Southern ideas. I find that you can spot this distinction through their different definition of civic virtue. The different priorities in their civic virtue led to the teaching of republican motherhood to have stark differences. I want to explore the actions of these women and how they developed into just another thing to teach in the movement it is today. I will not just be looking at one woman but rather a collection of women and the story of their lives during this time. I'll find my sources from the Library of Congress, the New York Public Library, EBSCO, and more to support my argument, I will be examining letters, diaries, and personal accounts from women such as Eliza Pickney, Penelope Barker, Martha Washington, Abigail Adams, Judith Sargent Murray, and Mercy Otis Warren.

Edicts of Ashoka
Virtual Presentation (Session A)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Presley Knudsen
Research Mentor: Yoshina Hurgobin

The Rock Edicts are a set of carvings created by Ashoka Maurya after the bloody Kalinga War in 261 BCE. These Rock Edicts were a representation of Ashoka Maurya's shift from conqueror into Buddhism, they promoted dhamma, or the idea that life of humans/non-humans should be protected and people should live righteous lives. There were different Edicts, from the major Rock Edicts, the minor Rock inscriptions, and the Pillar Edicts, these all had the purpose of spreading dhamma in Ashoka's Mauryan Empire. In the very first Major Rock Edict it is stated, "Here, no living thing having been killed, is to be sacrificed." Immediately, Ashoka's dhamma makes it a point to condemn the practice of animal sacrifice used by the brahmana in ritual, while also condemning his own past actions of conquest that led to bloodshed. The eleventh Major Rock Edict states, "And this is – good behaviour towards slaves and servants, obedience to mother and father, generosity towards friends, acquaintances, and relatives and towards sramanas and brahmans… there is infinite merit, through the gift of dhamma." In this edict, Ashoka makes it a point to emphasize the importance of treating others well, even people who are slaves and servants; dhamma is a philosophy of kindness and preserving the sanctity of life. In this essay, I will use Ashoka's Rock Edicts to explore how they were deeply transformative to the culture of the Indian subcontinent.

EIC: The Cost of Victory
Virtual Presentation (Session A)
Friday, November 20, 2026, 3:00pm - 4:00pm
Join the Teams Meeting
Undergraduate Student: Draylen West
Research Mentor: Amy Dunagin

For my Research Seminar Project my focus shall be on the East India Company and its early military successes, which led to its downfall. I already have a set of ideas about important characters and dates that pertain to this topic, as well as several historians who've answered this question with their opinions and research. Historians have been split on the reasons for the East India Company's failure in the 18th century. Some say that it was a mishap of economics handled poorly during the height of their power in the 1760s that eventually led to much of their previously enjoyed freedoms being stripped away. Others would say that a failure in policy is to blame, as there were no previous safeguards put in place to prevent corruption within the company's leadership. Some key figures that come up frequently are Robert Clive, who was the leader of the East India Company during its rise after his victory at the Battle of Plassey, which gave the company the vow of diwami, or the right to tax the populace, and Warren Hastings, the first Governor-General appointed in India, who shaped the policies of the company for the rest of its existence, and many others. The timeline spans a couple of decades before the American Revolution and then moves into the company's role in the conflict. I have several secondary sources providing the opinions and findings of other historians; I am currently researching and reading primary source documents, predominantly newspapers talking about the actions of the company or the consequences of said actions or trade, military documents, and political documents. I look forward to presenting my findings.

Fourth Anglo-Dutch War
Virtual Presentation (Session A)
Friday, November 20, 2026, 12:00pm - 1:00pm
Join the Teams Meeting
Undergraduate Student: Kyle Gray
Research Mentor: Amy Dunagin

The role of the Dutch during the 1770s and 1780s is a somewhat confusing one because their actions during the American revolution started their own war with Great Britain and ultimately led to their

continued decline on the world stage. The Dutch supplied a lot of goods and weapons to the colonial enemies of Great Britain which led to the 4th Anglo-Dutch War that started in 1780 and lasted until 1784. The war came about due to the disagreement over the Netherlands trading with enemies of Great Britain and provides an interesting perspective to the events going on during the American revolution through economics and military action. The reasoning that the Dutch had to trigger war with Great Britain remains a debated topic among scholars. There are two main schools of thought when it comes to this subject that consist of those who believe the Dutch had grown resentful of the British over the recent years as the political policies of William III had forced the Dutch to be more reliant on the British empire and in turn caused the Dutch to continue in their steady decline. The other school of thought that is widely used consists of the Dutch's desire and support for free and unrestricted trade. The Netherlands largely remained a neutral party in Europe throughout the 16th, 17th, and 18th centuries through the use of one of the largest neutral two-way ports in Europe, and many people in the Netherlands were believers of, "free trade equals free goods." The Dutch conducted two-way trade with the colonists in North America and believed they were shielded by their neutral status and the Russian led alliance that they joined in an effort to secure protection and a market in North America.

Most Gentle and Most Cruel: Hamidian-Era Governmentality and Armenia in the Late Ottoman Empire
In-Person Poster Presentation (Event Center, Poster #24)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Emma Kimbrough
Research Mentor: Hakki Gurkas

In 1892-3, Ottoman authorities in the Anatolian provinces of Ankara and Sivas discovered the disbursement of placards expressing great discontent and distress under the authoritarian rule of Abdul Hamid II. These placards were placed by the Armenian Hnchak Party, a revolutionary body pushing back against the violence of the regime, and suspected revolutionaries and Armenian civilians were quickly punished as a result. The Hamidian regime was characterized by the employment of surveillance, censorship, and various constabulary bodies in order to exercise control, and the discovery of these placards only increased levels of violence from the Ottoman state against Armenian communities. Hamid favored modernization, but territorial losses in the 1877-78 Russo-Ottoman War led to excessive authority in governing. The Hamidian response to the Placard Affair was that of violent policing and militarized force against Armenians in a three-month search for suspects, as well as a mass trial after extensive arrests. I argue that the Placard Affair of 1892-3 unveiled how excessive apparatuses of control and security, the use of constabulary bodies like gendarmeries and pastoral tribesmen, and surveillance and intelligence gathering were emblematic of the Hamidian regime.

Problems With Bill 64
Virtual Presentation (Session A)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Christian Zuluaga
Research Mentor: Amy Dunagin

Why did Jefferson create Bill 64 during the American Revolution, and why was it unsuccessful in the Virginia General Assembly after the American Revolution? During this time Thomas Jefferson was trying to reduce problems including punishments that were too harsh, and presented to the Virginia General Assembly in 1779 through Bill 64. During this time Virginia changed from a colony to a state. According to what I researched in the historiography things such as the death penalty, murder, and capital punishment were things that were important during this time. Bill 64 was a document created by Thomas Jefferson to reduce crimes and punishments like the death penalty. It was written in 1779, but it was brought in front of the General Assembly after the American Revolution. Jefferson wrote it. As of right now what I have found out that Virginia's legal system was changing quickly. What I have read so far in terms of secondary sources talk about the legal aspects. Another thing that

I noticed was the rapid change in both the legal system in Virginia and also the arguments of the lawmakers in the General Assembly. One of the sources is the actual bill itself, and another is a book written in his way of thinking. To me this is important so that other criminal justice agencies can see how harsh the death penalty is.

Shipping Off to Boston: Investigating the Overlap between Privateering and Patriot Ideologies in New England and New York
Virtual Presentation (Session C)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Ryann Forrester
Research Mentor: Amy Dunagin

In 1776, the United States Congress released an excerpt detailing the fitting out of privateers and instructions to commanders of privately owned ships of war. This allowed for people to arm their own vessels and legally plunder British goods, provided they had a letter of marque and were willing to give a cut of their gains to the American government. New England and New York possessed valuable harbors and were therefore at a higher risk of being attacked by the British. Due to this, there was a higher concentration of privateers in those areas as both a line of defense opportunists seeking economic gain from British vessels. Beyond the military necessity of privateers to bolster naval strength, there is a chance that privateering became so popular in those areas because it was potentially seen as a beacon of Patriot ideals, and may have been viewed as one of the best ways to fight back against the British. This paper seeks to examine the shared ideology between American Patriots and privateers in New England and New York, and to understand the numerous reasons why privateering was more prominent in those regions than elsewhere in the United States. Using primary sources like legal documents, pamphlets, personal correspondences, and newspapers will be used to examine public perception of privateers from both an American and British perspective. Newspapers specifically will be used to examine how privateers were recruited and what rhetoric was used surrounding the practice. Secondary sources will be used to bolster a general understanding of the topic and time period. This paper will investigate why privateering appealed to New Englanders and New Yorkers, and show how the closely aligned beliefs of privateers and Patriots led them to becoming allied against the British during the American Revolution.

The Pen is Mightier: Francis Dobbs and How Political Performance Progressed the Irish Patriot Movement
Virtual Presentation (Session A)
Friday, November 20, 2026, 2:00pm - 3:00pm
Join the Teams Meeting
Undergraduate Student: Cody Fischer
Research Mentor: Amy Dunagin

Why did an Irish barrister and Patriot write a play on medieval Irish history, and then write political pamphlets during the late eighteenth century? My topic discusses Francis Dobbs, a playwright, barrister, and pamphleteer, and how he used political performance to promote Irish national identity and advance political reform in late eighteenth century Ireland, as evidenced by his other political writings. In 1774, Francis Dobbs, debuted his play, The Patriot King or Irish Chief. It centered around an Irish victory over invading Danes in Viking-aged Ireland around the tenth century. What was the connection between the play and Dobbs' world? Imbedded in the Irish Patriot Movement, Dobbs was able to use political performance to tap into an emotional need that helped bring a stronger sense of national identity while Ireland was stifled by British rule. Equally devoted to his literary pursuits and military affairs, Dobbs would go on to become an influential member of the Irish Volunteers, a group that was formed because the American conflict drew British troops out of Ireland, leaving it undefended. It would not take the Volunteers long to grow from a military force into a political force against British state power. During this time Dobbs would find the same success with political writing as well, penning politically driven pamphlets that evoked the same national identity that his play did. By using primary sources of his play, his pamphlets, and his memoir, I will show

that Dobbs was able to use symbolism, civic duty, and emotional connections to turn political performance into mobilization that would help Ireland gain legislative independence and inspire future Irish patriot movements.

Theater, Politics, and Gender in the Imperial Crisis
Virtual Presentation (Session A)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Veronica Schmidt
Research Mentor: Amy Dunagin

During the eighteenth-century imperial crisis, many forms of political satire influenced the opinions of the general public. Theater in particular became a popular way for one to express their beliefs to a wide audience, inviting new perspectives not previously platformed. Previous scholarship on women's literature in this period has focused primarily on the novel or the essay, overlooking the importance of other genres. However, theater was a significant way women could express their beliefs, even though many still did so anonymously. This research will focus on the political input of literary women such as Hannah Cowley (in The Belle's Stratagem and A Bold Stroke for A Husband), Mercy Otis Warren (in The Adulateur and The Defeat), and Charlotte Lennox (in The Sister and Old City Manners.) In particular, this research is interested in how and why theater became a place of political expression for them during the eighteenth-century British imperial crisis. These women are the focus both for their significance to the genre and due to the similarities in their subject matter. While their engagement with these topics was certainly not identical, they all challenged gender roles within their works and critiqued existing social and political systems. Theater is a focus of this project as it was an art form which the wider public could engage with even if not performed, as they were sometimes published in newspapers or pamphlets. The scope of this art form is what makes it stand out within women's writing of the time. By analyzing a combination of letters, diaries, and female written plays, this research aims to contribute a new perspective to women's literary history and to understand the importance of theater to women's voices.

Understanding the British Patriots Animosity Towards the Quebec Act
Virtual Presentation (Session A)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Varinah Dubuisson
Research Mentor: Amy Dunagin

In 1763 Britain acquired control over the Province of Quebec from the French. A decade later in 1774 the British Parliament passed the Quebec Act, which set up a permanent government for the province. The act established a governor, with an appointed council, put in place British criminal laws while keeping French civil laws, expanded Quebec's borders, and allowed religious freedom. While French Canadians were content with the act, many others found issues with it. One of the groups that made their grievances against the act well known were the American Patriots. While much attention has been paid to the American Patriots negative reaction to the Quebec Act, less have studied how Patriots in Britain responded to the act. With the use of newspapers, pamphlets, and books from the period this research will examine the negative responses in Britain towards the Quebec Act, specifically focusing on why British Patriots responded to the Quebec Act with such animosity.

Voluntary Victory: The Suffolk Voluntary Subscription and British Politics in 1782
Virtual Presentation (Session A)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Jack Figliolini
Research Mentor: Amy Dunagin

In 1782, Suffolk county gentry asked other landholders and merchants to aid in raising voluntary subscriptions for a third-rate ship of the line for the use of the Royal Navy. In this paper, I examine why this was believed to be necessary, the arguments for its conception, the arguments against it, and, overall, how Britons reacted to the proposal and what it means in the context of the American Revolution as a civil war within the British empire. Few scholars have examined naval subscriptions in the American Revolution, and this particular episode has only been studied to understand the role of the gentry involved. In this paper, I analyze the address pamphlet proposing the Suffolk subscription, an anonymous pamphlet which criticizes Lord Sandwich's expenditures for the navy, and correspondence between Arthur Young and Capel Lofft debating the subscription for a ship of the line. I argue that the subscription was less a practical answer to degraded naval assets than an attempt to rouse Britain with patriotic spirit, to supplement what the public perceived as an incompetent parliament with voluntary subscriptions. Some Patriot Whigs denounced the subscription for addressing the government's failings through volunteerism rather than seeking parliamentary reform, also criticizing its threat to the constitution and the legislative power of the British government.

Department of Psychological Science

Adversity, Service, and Intergenerational Resilience: Exploring the Living Legacy of Black Veterans During the Civil Rights Movement
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student(s): Adrian Alicea, Devin Taylor, Ethan Klene, Savannah Gill, Shania Mister & Aishat Oyelade
Graduate Student: Zachary Carden
Research Mentor(s): Kristin Horan & Chris Hess

This study examines adversity and resilience among Black veterans who served during periods of military segregation or early integration and participated in the Civil Rights Movement across the southeastern United States. Despite their significant contributions to the nation and their communities, these veterans' experiences, particularly their resilience in navigating military related stressors, racial discrimination, and other life challenges, remain an understudied area in historical and psychological research. This study aims to explore the adversity that these veterans encountered, the effects of these experiences on their lives and families, and the personal and social resources that supported their resiliency. Family members were identified through memorial cemetery burial records and genealogical records. Four semi-structured interviews have been conducted to date. They have been transcribed and coded for preliminary themes of adversity and resilience. Preliminary findings suggest that veterans rarely discussed their military experiences or related stressors with family members, opting to "hold it in". Participants also described challenges involving racial discrimination, segregation, family relationships, employment, financial hardships, and health. Participants identified several resources for supporting resilience, including a strong work ethic, a sense of duty, religious faith, and building community relationships. These preliminary findings highlight the potential importance of personal values and social support in understanding resilience amongst historically underserved veteran populations. By preserving family narratives and intergenerational perspectives, this study contributes to a broader understanding of how Black veterans navigated adversity while also continuing to server their faith and community at large. Continued work on conducting interviews and analysis may illuminate additional resources that foster resilience across generations while preserving and telling these Veterans' historical legacy.

Authority Figures Lying, and How Children Choose to Trust in the Future
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 1:00pm - 1:50pm
Undergraduate Student: Charlotte Clement
Research Mentor: Nicole Martin

This study is a part of a larger study that focused on how children make sense of authority figures when they lie, and whether children trust those figures after dishonesty is displayed. The present study specifically examined how children move forward once an authority figure has lied and process a future relationship with the liar. 125 children listened to a series of vignettes in which an authority figure potentially lied to a child. For purposes of this analysis, we specifically focused on how children responded to being asked whether they would trust the adult in the story going forward and why. While further data analysis is taking place, our preliminary results indicate that while children may accept these lies, they are less likely to trust their authority figures in the future when they detect and comprehend dishonesty. Regardless of the level of authority, children reported not trusting authority figures in the future who displayed dishonesty in the vignettes. The stories were descriptive of situations participant children could potentially face and therefore may be a situation they are challenged to navigate. For example, in one vignette, a school principal clearly lies to the class of students. In a parallel, real-world situation, children must reconstruct their feelings of trust and general assessment of such an authority figure, while also contemplating having no power to right a wrong or challenge the principal. This insight can be beneficial for those seeking to understand how children detect and comprehend lies coming from their authority figures, and what that can mean for the trusting relationship moving forward. The implications of this study point towards declining trust in child-authority relationships with dishonesty present, potentially changing the relationship dynamic.

Dying is Complex: Barriers to Advance Care Planning on U.S. Adults
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Lea Allen, Bella Barnes & Hamna Zahoor
Research Mentor: Anisah Bagasra

Only one in three Americans have a completed advance directive (Yadav et al., 2017), with lower rates among minority communities (Hong, Yi, Johnson, & Adamek, 2018). Though Americans view advance care planning as important, they have low knowledge of what it actually is (Bagasra & Agans, 2026). The present study examines perceived barriers to engaging in advance care planning and completing an advance directive in a sample of 22 adults residing in Georgia ranging in age from 20 to 66. Participants joined a one-hour, in-person focus group session. Six focus groups ranging in size from 2 to 6 participants were held in Spring 2026. Participants were shown a brief, 3-minute video about advance care planning at the start of the session and asked if the video changed their understanding of advance care planning. They were then asked six additional questions about designating a care agent, what challenges they perceive in starting ACP conversations, what resources they feel they need, and what steps they would take towards completing an advance directive. Focus groups were transcribed and thematic analysis conducted by three researchers to establish inter-rater reliability. The dominant themes that emerged centered on discomfort starting ACP conversations with loved ones, deciding who is a good fit as a health care agent, wanting more information about religious values surrounding life-extending treatment, and wanting more medical knowledge of the benefits and risks of life-extending treatments. Participants felt that the video helped them understand that advance directives are not the same as a will, and that they can be updated regularly. Most participants want to talk with a medical professional and want some sort of facilitation to walk them through decision-making options and to facilitate conversations with their loved ones before completing an AD. These findings reiterate the need for ACP Education and facilitation.

Examining Childhood Emotional Environments and Adult Somatic Stress Expression: The Role of Mental Health Stigma in Emotional Processing
In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Besa Prince
Research Mentor: Sharon Pearcey

Childhood family environments can shape how individuals learn to understand and express their emotions, potentially influencing how they recognize, process, and respond to stress in adulthood. However, the relationship among childhood emotional experiences, family-based mental health stigma, and the physical and psychological expression of stress warrants further investigation. This study examines whether childhood emotional environment and family attitudes towards mental health are associated with stress expression among young adults, with particular attention to somatic symptoms and the potential roles of attachment styles and emotional processing. Using a quantitative, cross-sectional survey design, the study aims to recruit 100 undergraduate students aged 18 and older enrolled in Introduction to General Psychology at Kennesaw State University through the Psychology Research Experience (PREX) in SONA systems. Participants completed an anonymous online Qualtrics Questionnaire assessing demographics, childhood emotional validation and suppression, family mental health attitudes, attachment dimensions, emotion regulation, alexithymia, current depression, anxiety and stress symptoms, and physical and psychological responses to stress. Standardized measures include the Experiences in Close Relationships–Revised (ECR-R), Emotion Regulation Questionnaire (ERQ), Toronto Alexithymia Scale (TAS-20), and Depression Anxiety Stress Scales (DASS-21). The study is expected to identify associations between childhood family emotional experiences and adult stress expression, including differences in how individuals recognize and experience physical versus psychological symptoms. Findings may contribute to a better understanding of the relationship between early family environments, emotional processing, and somatic stress expression and inform future research on mental health stigma and holistic approaches to psychological well-being. Results and analyses will be presented at the Kennesaw State University Fall Symposium of Student Scholars 2026.

Examining the Relationship Between Smartphone Addiction, Emotion Dysregulation, Cognitive Control, and Student Burnout

In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Chancellor Sienkowski
Research Mentor(s): Sharon Pearcey & Cody Mashburn

Smartphone use has become an increasingly prominent part of daily life, particularly among college students, who frequently rely on smartphones for communication, entertainment, academic tasks, social interaction, and a plethora of other various uses. Although smartphones provide many practical benefits, problematic or excessive smartphone use has been associated with difficulties in psychological functioning. This includes reduced emotion regulation, increased stress, and academic or personal burnout. Since college students are exposed to demanding academic tasks regularly whilst also maintaining varying ranges of digital consumption and balancing external demands, they represent an important population to further examine these very relationships. The present study will examine associations among problematic smartphone use, emotion dysregulation, cognitive interference, and burnout in college students. Problematic smartphone use will be assessed using the Smartphone Addiction Scale-Short Version (SAS-SV), emotion dysregulation will be assessed using the Difficulties in Emotion Regulation Scale-16 (DERS-16), and burnout will be measured using the Maslach Burnout Inventory-Student Survey. Participants will also complete a computerized Stroop task that includes emotionally negative, neutral, and smartphone-related words. The Stroop task will provide behavioral measures of response accuracy and reaction time, allowing the study to examine whether attentional interference differs depending on the type of stimulus presented (i.e., negative, neutral, smartphone-related). Data collection is still ongoing. Examining these variables together may provide a more complete understanding of how problematic smartphone use relates not only to self-reported psychological functioning but also to behavioral indicators of attentional interference. In particular, the study will explore whether greater problematic smartphone use and emotion dysregulation are associated with differences in responses to smartphone-related stimuli and whether these factors are also related to higher levels of student burnout. Understanding these relationships may contribute to the broader literature on smartphone use, emotional functioning, attention, and well-being among college students.

Exploring Curvilinear Relationships Between Workplace Conflict, Burnout, and Perceived Organizational Support
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Adrian Alicea, Rhayne Ash & Raima Hussain
Research Mentor: Kristin Horan

Workplace interpersonal conflict is commonly examined in Industrial Organizational (I-O) psychology as an occupational stressor associated with employee strain and reduced worker wellbeing. However, workplace conflict may have different consequences depending on its frequency and context (Hershcovis, 2011). Management research suggests that relationships between workplace factors may instead have a curvilinear relationship, such that effects change at different levels of a predictor rather than follow a consistent linear pattern (Pierce & Aguinis, 2013). Additionally, examining alternative functional forms of conflict can improve understanding of complex organizational phenomena (Nikolaeva et al., 2015). This study looked to examine the linear and curvilinear relationship between the frequency of interpersonal conflict at work and five outcomes: attitudes towards workplace safety and health programming, burnout, attitudes towards mental health treatment seeking, and perceived organizational support. Participants were 100 students recruited through Kennesaw State University's SONA research participation system. Hierarchical multiple regression analyses examined linear and quadratic relationships between interpersonal conflict frequency and five outcome variables. Linear models were compared with quadratic models to determine whether adding a quadratic term significantly improved explained variance. Curve estimation plots characterized significant curvilinear relationships. Interpersonal conflict frequency was not significantly related, linearly or quadratically, to attitudes toward workplace safety and health programming, intentions to participate in such programming, or attitudes toward mental health treatment seeking. Both linear and quadratic models were significant for burnout and perceived organizational support, with quadratic models explaining significantly more variance. Curve estimation plots revealed an inverted U-shaped relationship between conflict and burnout, with burnout highest at moderate conflict levels. Conversely, perceived organizational support demonstrated a U-shaped relationship, with perceived support lowest at moderate conflict levels. These findings suggest that curvilinear models may better explain relationships between interpersonal conflict and perceptual outcomes than linear models. However, this interpretation still requires further investigation.

From Early Adversity to Fear Memory: Altered AMPA Receptor Trafficking
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Armanda Cuyler
Research Mentor: Erica Holliday

AMPA glutamate receptors are essential for synaptic plasticity and memory formation in the brain. During learning, these receptors move to and from the synapse, strengthening neuronal communication. However, early-life maternal stress can disrupt normal brain development and alter how these glutamatergic receptors function later in life. In this study, rat dams and their pups were exposed to a limited bedding and nesting model, replicating early maternal stress effects observed in humans. To evaluate how early stress influences AMPA receptor trafficking and memory, adult male and female rats were trained in a fear-conditioning paradigm, pairing a distinct context with mild footshocks. Following behavioral testing, hippocampal tissue from male and female rats was harvested to study regional receptor dynamics. The hippocampus was chosen due to its central role in context-dependent fear learning. Tissue samples were prepared by total tissue homogenization and synaptosome isolation to isolate both total homogenates and crude synaptosome fractions. We then implemented a fast Western blotting protocol utilizing accelerated capillary electrophoresis and shortened antibody incubation steps to detect and quantify AMPA receptor subunit levels (specifically GluA1) efficiently. By comparing receptor localization in synaptosomes relative to total homogenates, this rapid method tracks the movement and synaptic insertion of AMPA receptors. The resulting data

will provide a clearer view of how early-life adversity reshapes the glutamatergic system and alters synaptic response during fear conditioning.

More Than a Label: How Stereotypes of Hispanic Students Affect Academic Achievement
In-Person Poster Presentation (Event Center, Poster #1)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Aryanna Vasquez
Research Mentor: Amy Buddie

This autoethnography explores how stereotypes and assumptions about Hispanic students can influence their educational experiences, academic confidence, and achievement. This study examines how negative stereotypes may shape teacher expectations, student motivation, peer interactions, and how Hispanic students view their own academic abilities. Research on stereotypes in education has shown that students can be affected when they feel underestimated or treated differently because of their cultural or ethnic background. These experiences can influence confidence, participation, and overall academic performance. This project continues the discussion by connecting research-based ideas with personal experiences and the words of individuals who have experienced similar situations. This study will use personal experiences to reflect on situations involving stereotypes, academic expectations, and treatment in school. Interviews with Hispanic students will provide additional perspectives on how stereotypes have affected their confidence, academic experience, motivation, and relationships with teachers. This project will also investigate educational influencers and advocates who discuss bias, stereotypes, and Hispanic students in schools. Results will be presented at the Symposium. The expected results are that stereotypes can negatively affect students by lowering confidence, creating pressure to prove themselves, and influencing how teachers and peers interact with them. The results will show why it is important for schools to create environments where Hispanic students feel supported, respected, and capable of success.

Muslim Parents' Perspectives on Children's Developmental Health
In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Duaa Bilal
Research Mentor: Anisah Bagasra

Autism spectrum disorder (ASD) is a developmental condition that can benefit from early diagnosis and intervention. However, Muslim families remain underrepresented in developmental health research and may face barriers in accessing autism assessment and therapy services. Further research is needed to understand how religion may influence Muslim parents' decisions to seek services. Therefore, this study asks: how are autism literacy, self-stigma, and religious commitment levels associated with help-seeking intentions among adult Muslim parents in the United States? To qualify for this study, participants must be at least 18 years old, identify as Muslim, live in the United States of America, and be the parent of at least one child. To date, 82 participants have complete our brief, anonymous Qualtrics survey that includes demographic questions and scales measuring autism literacy, self-stigma, religious commitment levels, and help-seeking intentions. Participants were recruited through social media platforms such as Instagram and WhatsApp, Muslim community organizations, mosques, and online parent networks. Moving forward, survey responses will be analyzed using descriptive statistics, correlations, and regression analyses to examine the relationships among the variables. Through this research, we aim to increase understanding of Muslim families' experiences with children's developmental health and improve their representation in developmental health research. By examining the factors related to parents' help-seeking intentions, this study may also help inform autism education and support services that better reflect the cultural and religious experiences of Muslim families.

Reinforcement Schedule in the Operant Conditioning Framework: Interaction with Motivation in Education
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Julia Tynes

Research Mentor: Lauren Taglialatela

This study is designed to evaluate the impact and utilization of operant conditioning techniques in an academic framework specifically in context of the time-frame and types of feedback provided to students. Although millions of students are enrolled in higher-education and foundational principles of operant conditioning have been amplified since the mid 20th century, little research has examined the application of such principles and their potential impact on student success. Two surveys were designed: one for students and one for faculty. The surveys focus on student and faculty experiences and perspectives of feedback. Data collection via the SONA system has begun, and detailed results including descriptive statistics, correlations, and comparison of groups means will be presented. We anticipate finding longer feedback latencies for complex assignments that require calculations and/or extensive writing, and we anticipate differences in feedback timeframe depending on course modality. We also anticipate that students strongly prefer immediate feedback, as operant conditioning principles suggest, but that faculty will indicate multiple challenges in providing immediate feedback. Understanding these research results will help inform whether to conduct further research on this topic.

Relationship Between Parental Racial Socialization and Critical Consciousness Among College Students

In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Isabella Klynoot
Research Mentor: Carlisa Simon

Parental racial socialization may play an important role in how youth understand racial inequalities and engage in social change. Although previous research has examined racial socialization and identity development, less is known about the connection between parental racial socialization and critical consciousness among college students. The current study examined whether undergraduate students who reported higher levels of parental racial socialization also reported higher levels of critical consciousness. The sample consisted of 217 undergraduate students that completed an online survey assessing preparation for bias, promotion of mistrust, perceived inequality, critical motivation, critical action, and demographic characteristics. Results partially supported the hypothesis. Preparation for bias was positively associated with critical consciousness measures of perceived inequality, critical motivation, and critical action. Promotion of mistrust was positively associated with critical action, but was not significantly associated with perceived inequality or critical motivation. Follow-up analyses showed the relationship between promotion of mistrust and critical action were significant among liberal and conservative participants, but not moderate participants. More broadly, these findings show the importance of the role of family socialization in shaping how young adults recognize and respond to systematic inequality.

Relationship Between Sleep Health and Anxiety

In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Anelie Croteau
Research Mentor: Ebony Glover

Sleep health is a pervasive issue among college students, with 70.6% of students failing to meet the recommended nightly sleep duration for their age group (Lund et al., 2010). Additionally, reports have shown that the number of college students facing mental health struggles has increased in the past decade, with anxiety almost doubling in prevalence since 2013 (Healthy Minds Network, 2026). Various studies have explored the relationship between sleep and generalized anxiety, but less is known about anxiety specific to academic environments and responsibilities. In this study, we will examine the correlation between sleep health and academic anxiety to better understand the relationship between sleep habits, mental health, and school stress in the college population. This study is part of a Course-based Undergraduate Research Experience (CURE) in Cognitive Psychology at Kennesaw State University, which engages students in developing and conducting original research. The research question and survey materials have been developed, and data

collection is currently underway. We will use a correlational self-report design to gather data from Kennesaw State University students across all four academic years. Participants will complete an anonymous survey assessing sleep difficulties using the eight-item Sleep Condition Indicator (Espie et al., 2014) and academic anxiety using the eleven-item Academic Anxiety Scale (Cassady et al., 2019). We expect that students reporting healthier sleep patterns will also report lower levels of academic anxiety. If supported, these findings would suggest that sleep health is an important factor associated with academic anxiety among college students. This relationship could additionally establish a foundation for future studies investigating potential causal relationships. Data analysis is expected to be completed before the Symposium, where the findings will be presented.

Research on the Effects of Negative News on Minority Groups
Virtual Presentation (Session B)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Cinthia Perez-Martinez
Research Mentor(s): Amanda Wolfe & Danica Kulibert

The act of doomscrolling and recurrent exposure to negative news media has been linked to negative psychological effects, such as news anxiety, stress, and avoidance. Additionally, hope appears to be a protective factor for doomscrolling. However, there is only minimal research examining doomscrolling and online news media consumption in minority groups. This study seeks to examine the relationship between doomscrolling and hope in college students with marginalized identities. It is hypothesized that doomscrolling will have an inverse relationship with trait hope in minority students. Data is currently being collected through the Department of Psychological Sciences Departmental Survey, which is completed by PSYC 1101 students. Preliminary findings will be presented from this research.

Syllabus vs. Syllabus; A Content Analysis of Two Types of Research Syllabi
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Mariana Mercado & Patrick Drake
Research Mentor: Amy Buddie

A syllabus is an introduction to a course that includes information about grading, the course schedule, assignments, and policies. However, a syllabus goes beyond just providing students with critical information. A well-written syllabus can shape the way a student views the course, either exciting them about the class or filling them with dread. Undergraduate research courses are required to have syllabi, but there is currently little research on these syllabi, and there is no research on syllabi for Course-based Undergraduate Research Experiences (CUREs) compared to the more traditional Apprentice Research Experiences (AREs). Our study focuses on addressing this research gap. In this study, we examined the extent to which CURE and ARE syllabi are different from each other in quality. We collected syllabi for classes in STEM fields that were categorized as either CURE (n = 22) or ARE (n = 147). The syllabi were content analyzed according to best practices in the field (for example, being learning centered, having measurable learning objectives, having a positive tone). We hypothesize that CURE syllabi will score higher than ARE syllabi because a CURE is a more traditional course, and faculty are more familiar with this type of syllabus. They also may put more effort into a CURE syllabus, making it better structured and easier for students to comprehend. The results of this analysis will be presented at the Symposium. This research is important because as a possible first impression, it impacts students' mindset and ultimate commitment when going into a new research experience.

The Effects of Increasing Task Difficulty on Visual Attention and Reaction Time
In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Morgan Kesler & Sara Cunha
Research Mentor: Ebony Glover

Previous research suggests that increasing task demands can influence attention and cognitive performance. Treisman and Gelade (1980) demonstrated that visual search becomes more demanding when attention must be directed toward combinations of stimulus features, while Wolfe (1994) described how increasing the number of distracting items can influence visual search efficiency. Building on this research, the present study will examine how increasing task difficulty affects visual attention and reaction time among college students. As part of a Course-based Undergraduate Research Experience (CURE) in Cognitive Psychology at Kennesaw State University, participants will complete an online survey that includes a brief computerized visual search task administered through PsyToolkit. Participants will search for a specific target among varying numbers of distracting stimuli, representing different levels of cognitive demand. Reaction times will be measured across conditions with increasing numbers of distractors. We hypothesize that reaction times will increase as task difficulty increases, with participants responding more slowly when searching displays containing more distracting items. This pattern would suggest that greater cognitive demands require additional attentional processing, reducing visual search efficiency. Data collection is underway, and findings are expected to be available for presentation at the Symposium of Student Scholars. This research may contribute to our understanding of how attentional demands influence cognitive performance in everyday situations.

The Relationship Among Stress, Depression, Inflammation, and Cognitive Function
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Emily Clarke
Research Mentor(s): Sharon Pearcey & Cody Mashburn

The current study seeks to explore the genetic underpinnings of the aversive relationship among stress, depression, inflammation, and cognitive task-switching capabilities. Cognitive functioning is an overarching term with a variety of subcategories. The specific subcategory of interest, task-switching, is defined as the ability to adapt to changing environmental stimuli (Ravizza & Carter, 2008). Depression is known to illicit negative consequences toward cognitive functioning; additionally, depression and stress are heavily correlated and result in a detrimental positive feedback loop (Ross et al., 2017; Zainal & Newman, 2022). Chronic Stress carries negative effects towards cognitive functioning, potentially through the method of chronic neuroinflammation (Maydych, 2019). Although short-term, acute inflammation is necessary to recover from negative conditions like physical injury or illness, chronic overexpression of inflammatory pathways leads to aversive chronic inflammation (Chavda et al., 2024). Inflammation can be quantified using inflammatory biomarkers, such as C-reactive protein (CRP) (Sproston & Ashworth, 2018). Given the inflammatory response has a heavy genetic linkage, examining single nucleotide polymorphisms (SNP) as genetic markers for CRP may provide a genetic explanation for differences in the inflammation-depression-cognition relationship (Best et al., 2024). The current study seeks to explore the effects of the individual variables of stress, depression, and inflammation levels on cognitive task-switching capabilities. Approximately, 180 college students took surveys examining mental health: Depression, Anxiety, and Stress (Depression, Anxiety, and Stress Scale 21; DASS21; Lovibond & Lovibond, 1995). Cognitive task-switching was measured using the Number Letter Switch Task (millisecond.com). Participants provided a saliva sample for DNA extraction and analysis of CRP genotyping. Data is fully collected; however, salivatory biomarker and genetic analysis are ongoing. It is hypothesized that CRP genotypes and biomarker levels will be related to differences in cognitive task switching abilities; further, the presence of mental health issues toward depression and stress levels will amplify this relationship.

Training Police and Fire Services in Mental Health: Process and Evaluation of a New Mental Health Training for Public Safety Professionals
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Aishat Oyelade & Victoria Lopez
Research Mentor: Brian Moore

Introduction: First responders, including police officers and firefighters, often face work-related stressors that can negatively affect their psychological well-being. Previous research shows that mental health training provides positive outcomes for first responders, including improved mental health knowledge, reduced stigma, and stronger resilience. However, first responders are not monolithic and require profession-specific considerations. Thus, continuous evaluation is needed to understand program-specific outcomes of mental health training, including self-care knowledge, awareness of available mental health resources, and overall participant satisfaction. The current study aimed to evaluate a novel mental health training session offered to public safety professionals as part of a comprehensive suicide prevention program. Methods: Data were analyzed from a program evaluation of Mental Health 101 training offered to first responder agencies in Georgia. Participants completed anonymous surveys before and after the training. We collected 92 pre-training and 96 post-training responses, of which 85 pre- and post-training responses matched. Surveys assessed self-reported mental health knowledge, including familiarity with self-care, awareness of available mental health resources, and knowledge of where to seek support. We assessed participant satisfaction and intention to use the information learned after training. Paired t-tests were conducted in R version 4.4.1 to examine changes in self-reported knowledge, while post-training responses were analyzed using percentages. Results: Post-training evaluation data show a 74% increase in understanding mental health challenges. Furthermore, 68% of participants reported an intention to use what they learned in training in the future, such as practicing self-care and using available mental health resources. Finally, 83% of participants reported high satisfaction with the program. Discussion: These results support the idea that mental health training for first responders can be effective long term. The participants' increase in knowledge and likelihood of future use shows that the training was effective in properly educating these populations, as well as ensuring continuous well-being.

Department of Sociology and Criminal Justice

Professional Role Reconciliation of School Officers
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Logan Fugate
Research Mentor: James McCafferty

SROs, school resource officers, have to understand their role when it comes to being a law enforcement officer with a school. This definition of their role is ambiguous. This qualitative study has to do with narrative reconciliation, a method of "how officers and departments reframe personal and collective stories after critical incidents, trauma, or historical conflicts to build psychological healing and public trust" (Kypriandies & Taylor, 2024). To see how SROs define their own professional identity this study will employ a continuum that includes protector and mentor. For this study's purposes, a protector is a SRO who uses force that is more aligned with the formal side of policing to stop or prevent a student from causing harm or incident. A mentor is a descriptor that this study will use to describe a SRO who uses diplomacy and guidance more closely aligned with the informal side of being a SRO. These continuum will be different identity frames mainly to accommodate for the shift that may occur across different situations. Semi-structured interviews will be the method of data collection and SROs and school faculty members will be interviewed. The interview will include a hypothetical behavioral vignette to understand how both the SROs and faculty would respond to a situation. The interviews will be transcribed and analyzed to identify each of the dominant roles perceived. Faculty will be recorded separately from SROs to compare between how the officer sees themself and how they are seen by members of the school. This framework is used to understand three research questions? Do SROs more commonly perceive their role as a protector or a mentor? Do faculty perceptions of SROs' align with the SRO's perception? Lastly, what narrative strategies do SROs use to bridge the gap between enforcement mandates and their educational role during the job?

Department of Technical Communication and Interactive Design

Designing a Usable CBT App for College Students' Mental Health
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Makenzie Reid
Research Mentor: Kanu Priya Singh

Exploring CBT-Based Mental Health Support for College Students Through Mobile App Design College students experience mental health challenges, including anxiety, stress, and balancing school with their personal lives. Existing research demonstrates how digital mental health applications can be helpful. However, recent studies suggest that lack of usability and effective therapy techniques may hinder broader adoption of these systems. For mental health support, Cognitive Behavioral Therapy (CBT) has been found useful for its focus on understanding how thoughts, feelings, and behaviors are connected. This study looks at how CBT techniques can be integrated in a mobile mental health application, while increasing its overall usability to support college students' mental health and well-being. To explore potential CBT techniques, we conducted a literature review and interviews with 14 university stakeholders, including professors, academic advisors, and mental health professionals (female=10, male=3, non-binary). We identified two main themes for CBT integration within the mobile mental health app: Understanding Thoughts and Emotions Through CBT: A design to help students understand how their thoughts affect their feelings and behaviors because "just because we thought something doesn't mean it's true" (P11). A CBT activity could help students identify negative thoughts and process their emotions accordingly. Bite-Sized CBT Exercises: According to the participants, students need quick exercise in moments of distress to help them recover and get back into their daily workflow. At the same time, the exercise should be effective enough to help the student stay motivated to complete the action associated with the exercise. One participant mentioned, "It's not about trying. Once. It's about persistence" (P3). Having shorter exercises could encourage students to practice CBT techniques more regularly. AI Disclaimer: ChatGPT was used to assist with organizing research findings, drafting, and revising this abstract.

Southern Polytechnic College of Engineering and Engineering Technology

Department of Civil and Environmental Engineering

AI-Assisted Analysis of Infrastructure Monitoring Data for Deterioration Prediction
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student: Kiara O'Neal
Research Mentor: Da Hu

Civil infrastructure systems such as bridges and pavements deteriorate over time due to environmental exposure, traffic loads, and aging materials. Early detection of deterioration is essential for improving infrastructure maintenance and safety. While infrastructure inspection datasets provide valuable information about bridge characteristics, identifying patterns and predictions associated with deterioration remains a significant challenge. This study investigates the use of machine learning techniques to classify bridge condition using data from the 2025 National Bridge Inventory. The dataset was examined and preprocessed to address missing and invalid values, with bridge conditions categorized as poor, fair, good, or excellent. Three machine learning models, Random Forest, XGBoost, and LightGBM, were trained, validated, and tested to evaluate their ability to distinguish and predict these condition categories The performance of each model is assessed using standard evaluation metrics to identify strengths and limitations in predicting damage categories. The results show insights into the effectiveness of machine learning approaches for bridge condition assessment and how AI can support proactive infrastructure management.

Energy and Emissions Trade-Offs of Electric Vehicle Charging and Vehicle Fuel Consumption in the United States
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Laeticia Neno Aloyem
Undergraduate Student: Kleevens Gabriel
Research Mentor: Mahyar Amirgholy

While electric vehicles (EVs) produce no tailpipe emissions, their upstream emissions increase with the growing electricity demand from the power grid for battery charging. This research investigates how the growth in electric vehicle (EV) adoption and travel demand over time affects overall vehicle fuel consumption and emissions, as well as electricity demand for EV battery charging and the resulting upstream emissions from power generation through a predictive analysis across four major U.S. cities: Atlanta, Los Angeles, New York, and Seattle. Our results highlight the trade-off between reductions in vehicle tailpipe emissions from increased EV adoption and the corresponding increases in upstream emissions from EV charging. Although increasing EV adoption generally has a positive impact on reducing vehicle emissions, even after accounting for the upstream emissions associated with EV battery charging in regions that rely heavily on fossil fuels for power generation, such as Atlanta, Georgia, these environmental benefits are substantially greater in regions where renewable energy contributes a larger share of the electricity mix, such as Seattle, Washington, and Los Angeles, California. The comparison across these U.S. cities highlights the importance of clean electricity generation in maximizing the environmental benefits of transportation electrification.

Department of Electrical and Computer Engineering

Optical Characterization of Aluminum Nitride Films Using Spectroscopic Ellipsometry
In-Person Visual Display (Event Center, Poster #12)
Wednesday, November 18, 2026, 9:00am - 9:45am

Graduate Student(s): Fatima Pathan & Manika Nafisa
Research Mentor(s): Zhe Feng, Benjamin Klein & Ian Ferguson

This study characterizes the optical properties and thickness of aluminum nitride (AlN) films deposited by Metal-Organic Chemical Vapor Deposition on sapphire substrates using spectroscopic ellipsometry. The ellipsometric parameters, Ψ and Δ, were measured and were analyzed using an optical model that includes the AlN film, sapphire substrate, and surface roughness. Fitting the experimental spectra provided estimates of film thickness, refractive index, and extinction coefficient. The absorption coefficient was calculated from the extinction coefficient to examine how it changes with photon energy. The fitted film thicknesses ranged from approximately 5.67 to 5.86 μm, while the modeled surface roughness values ranged from 5.6 to 9.5 nm. The optical spectra showed an increase in refractive index over the measured energy range and low extinction at lower photon energies. As expected, a pronounced increase in absorption coefficient occurred near 6 eV. These results demonstrate the use of spectroscopic ellipsometry to estimate film dimensions and characterize the optical response of AlN films on sapphire. This work shows the importance of spectroscopic ellipsometry to better understand the optical properties of AlN for UV emitter and sensor applications.

Toward Dexterous Prosthetic Control: Finger Force Estimation from HD-EMG with Explainable AI
Virtual Presentation (Session B)
Friday, November 20, 2026, 4:00pm - 5:00pm
Join the Teams Meeting
Undergraduate Student: Mahin Haque
Research Mentor: Coskun Tekes

This project developed an integrated hardware and data acquisition system for wearable, multi-finger prosthetic control. Traditional high-accuracy prosthetic systems are often bulky or intrusive, prompting the need for a practical, ergonomic form factor. To address signal overlap and missing finger-force data, the project combined a 64-channel high-density electromyography (HD-EMG) grid placed over the forearm with flexible force-sensing resistor (FSR) sensors adhered to each fingertip. Custom signal-conditioning circuits and an Arduino microcontroller were utilized to manage multi-channel data acquisition and ensure precise temporal alignment between the sensors via a shared Analog-to-Digital Converter. Rigorous sensor calibration procedures mapped circuit voltage outputs against a digital reference load cell, successfully verifying that the FSR sensors maintained a strict force measurement accuracy within 5% to 8% of full scale. Data collection protocols successfully captured multi-level muscle contractions ranging from 10% to 90% of maximum voluntary contraction, establishing a reliable hardware foundation and clean data stream necessary for advancing future prosthetic research.

Department of Engineering Technology

MMPPE: A Device-Independent Multimodal Multi-Participant Experimental Platform for Synchronized Human-Subject Research
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 10:00am - 10:50am
Graduate Student: Dyuti Islam
Research Mentor: Sylvia Bhattacharya

Human-subject experiments increasingly combine physiological, behavioral, audio, video, and interaction data to understand complex human responses. However, collecting these data simultaneously across multiple participants remains challenging because researchers must coordinate heterogeneous sensing devices, experimental events, computers, and data streams while maintaining temporal alignment. Many experimental systems are also designed around specific devices or individual studies, limiting their reuse across research domains. This work presents the Multimodal Multi-Participant Physiological Experiment Platform (MMPPE), a modular and device-independent framework for designing and conducting synchronized multimodal experiments. The

platform separates experiment-specific procedures from the underlying data-acquisition infrastructure and supports configurable participant numbers, customizable experimental phases, behavioral response collection, event markers, audio/video capture, and multimodal sensor streams. Devices capable of Lab Streaming Layer (LSL) output can be integrated without requiring the experimental workflow to depend on a specific sensor manufacturer. A functional prototype has been developed to demonstrate the proposed architecture and multi-participant experimental workflow. The platform supports synchronized acquisition and organization of heterogeneous data streams across distributed computers while preserving experiment-event information needed for subsequent analysis. Current work focuses on evaluating synchronization accuracy, data integrity, system reliability, and usability across different experimental configurations. MMPPE is intended to reduce the technical burden of building multimodal experiments and provide a reusable research infrastructure for studies involving physiological sensing, behavioral measurement, human-computer interaction, and human-AI interaction.

Oral Health Workflow Time Study
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Brooke Lionberger, Sara Saeidi Saeidabadi & Hector Corral Torres
Research Mentor(s): Christina Scherrer & Robert Keyser

School-based Mobile Dental outreach programs provide necessary dental care to underserved youth groups, but operational bottlenecks can occur, limiting how many students are treated on a single visit. This study aims to find out where patient time is lost and how workflow changes could let each clinic treat more children without adding staff, chairs, or hours. Data is collected using continuous-timing time studies at school-based clinic sites. Time data is collected to pinpoint delays and redundancies. Although the study is still in progress, our preliminary results show an average visit of 24.8 minutes of which only 14% was value-added and 35% was waiting. Field notes point to a likely cause: children were released from radiography faster than chairs became free. Those sent back to the waiting area waited about 9 minutes longer. This suggests a coordination problem rather than equipment shortage. By optimizing the workflow at the dental sites, the dental staff can treat significantly more students on a single visit. This allows necessary oral care to be more easily accessible to underserved youth without compromising quality of care, equipment, or time.

Per-Event Analysis of Multimodal Physiological Fusion for Driving Behavior Classification Using Multi-Head CNNs
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Graduate Student: Selam Kelil
Undergraduate Student: Sarah Fernandes
Research Mentor(s): Sylvia Bhattacharya & Mohammad Naser

The study investigates multimodal fusion of physiological signals for driving behavior classification. Four modalities, EEG, EMG, ECG, and GSR, are evaluated across all combinations to classify five driving events using different CNN-based fusion architectures, including a baseline CNN, a multi-branch CNN, and attention and transformer-based variants. Results show that the multi-branch CNN achieves the highest accuracy (59.7%, chance level = 20%), outperforming more complex architectures and indicating that increased model complexity does not necessarily translate to improved performance. Modality analysis reveals that EEG+EMG+GSR provides the most effective combination, improving accuracy by up to 14% over the strongest unimodal baseline and reaching 63.2%, while ECG contributes minimal additional value in fusion despite strong standalone performance. Conversely, GSR, although weaker individually, provides substantial complementary information when combined with other modalities. Event-level analysis further demonstrates that optimal modality combinations are behavior dependent, with distinct subsets enhancing detection of specific driving events. Overall, the findings emphasize that careful modality selection and complementary signal integration are more critical than architectural complexity in multimodal physiological fusion.

When Humans Change Their Minds: Modeling Uncertainty for Human-Guided AI
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 10:00am - 10:50am
Graduate Student: Dyuti Islam
Research Mentor: Sylvia Bhattacharya

Human decision-making under uncertainty is influenced by behavioral, physiological, and social factors that evolve throughout an interaction. However, studying these processes in multi-participant settings is challenging because behavioral responses and physiological signals must be collected and temporally aligned across participants and sensing modalities. This ongoing research develops a multimodal experimental framework to investigate how individuals maintain or change decisions during group-based uncertain decision-making. Participants complete a structured multi-round decision task in which they receive information, communicate with other participants, make individual decisions, report confidence, and provide reasoning. The experimental system synchronizes behavioral events with multimodal measurements, including electroencephalography (EEG), electrocardiography (ECG), electrodermal activity (EDA), electromyography (EMG), eye-tracking, audio, and video. Event markers are used to align physiological signals with specific stages of the decision process, including information exposure, discussion, voting, and confidence reporting. Preliminary system development and testing demonstrate the feasibility of collecting and temporally integrating multi-participant behavioral and physiological data within a controlled experimental workflow. The resulting dataset will be used to examine behavioral and physiological differences between maintaining and changing a decision and to identify indicators of decision conflict and uncertainty. Ultimately, these findings will support the development of a human-guided artificial intelligence framework designed to better interpret and support human decisions under uncertainty.

Department of Industrial and Systems Engineering

A Multi-Criteria Decision Analysis Framework for Evaluating Cancer Screening Strategies
Virtual Presentation (Session A)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Graduate Student: Sreehitha Korrapati
Undergraduate Student(s): Jessica Mambo & Ahamed Sadik
Research Mentor: Maryam Eghbalizarch

According to the American Cancer Society, an estimated 2,041,910 new cancer cases and 618,120 cancer deaths were projected to occur in the U.S in 2025. The cancer mortality rate continued to decline through 2022, averting nearly 4.5 million deaths since 1991 due to reductions in smoking, earlier detection of some cancers, and improvements in treatment. However, cancer remains the second leading cause of death overall in the U.S and the leading cause of death among individuals younger than 85 years. Cancer screening aims to detect certain cancers at earlier stages, when treatment may be more effective and before symptoms develop. Well-established cancer microsimulation models have been developed through a National Cancer Institute-sponsored collaborative modeling initiative to evaluate the population-level impact of alternative cancer screening strategies and provide evidence to inform U.S. Preventive Services Task Force (USPSTF) screening recommendations. However, existing evaluations may not simultaneously consider a comprehensive set of benefits and harms when comparing screening strategies. In this study, we aim to compare screening strategies simulated using these established microsimulation models by considering a comprehensive set of screening-related benefits and harms. To accomplish this, we develop and validate a multi-criteria decision analysis framework to evaluate and prioritize screening strategies for specific cancer sites and compare the results with the current USPSTF screening recommendations for those cancer sites.

Automating Video Based Time Study Analysis for Nursing Skills Assessments Using Computer Vision and Large Language Models
In-Person Poster Presentation (Event Center, Poster #11)

Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Muhammad Awais Arshad
Research Mentor(s): Lin Li & Robert Keyser

Time study analysis is a well established method in industrial engineering for measuring task performance, but it remains a labor intensive manual process. In nursing education at Kennesaw State University, trained observers review video recordings of students performing clinical skills assessments and document each substep along with its duration, often spending several hours analyzing a single 30 minute session. This study explores the feasibility of automating that process using two artificial intelligence approaches: a traditional computer vision pipeline built on temporal action segmentation models, and a multimodal large language model approach that interprets video content directly. A central challenge in applying these techniques is that raw time study records contain over 20 fine grained work elements per skill, which are too granular for reliable model training. To address this, we developed a standardized annotation taxonomy in collaboration with domain experts that condenses these elements into 6 to 10 functionally coherent categories per skill. The taxonomy was validated across nine distinct clinical skill types, including intravenous push medication administration, tracheostomy suctioning, urinary catheterization for both male and female patients, and intramuscular injection. We applied this framework to 45 training videos spanning three academic semesters, with 5 additional videos held out for model evaluation. Preliminary analysis of the condensed dataset reveals consistent time distribution patterns across students performing the same skill while also capturing meaningful variation in phases such as medication preparation and sterile technique. Foreign element delays, including student questions to the instructor, equipment difficulties, and procedural errors, were systematically identified and separated from active task time. These results demonstrate that the proposed taxonomy provides a reliable foundation for training automated segmentation models and represents a novel contribution at the intersection of industrial engineering, nursing education, and applied machine learning.

Cooperative UAV–UGV Indoor Mapping with Autonomous Door Opening
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 10:00am - 10:45am
Graduate Student: Hamza Ali Khan
High School Student(s): Aaron Mok & Sinan Sarihan
Research Mentor: Adeel Khalid

Indoor floors can't be mapped well by one robot type: a UAV covers ground quickly but can't open a closed door, while a UGV can reach the handle but explores slowly. This project builds a heterogeneous team of one in-house UAV and one UGV carrying a six-joint arm, which together map a single indoor floor without GPS. The system splits map frontiers into free and door-blocked ones. For a closed door it estimates the handle type (push plate, lever, knob or bar), whether the door swings or slides, and how it will move. It then picks an opening strategy and keeps the robot out of the swing arc. The UGV opens the door with force-aware control while the UAV keeps exploring, and the newly revealed space is added to the shared map once the door is verified open. Development is simulation-first, using ROS 2, and Gazebo. A scaled 0.6 m × 0.8 m door rig and scripted demonstrations recorded in LeRobot format provide training data for vision-language-action policies (MolmoAct2). Hardware validation follows, with a defense targeted for June 2027. The planned outcomes are at least 90% correct handle-type and swing/slide classification on held-out simulated doors. They also include at least 80% autonomous opening success over 20 randomized simulated trials, and a cooperative team that beats single-robot and no-door-opening baselines on coverage and exploration time. On hardware, the target is at least 70% opening success over 10 trials, plus one recorded end-to-end mission. The lab arm and door rig run in Gazebo and the lever push opens the door in 4 of 5 live trials. A 20-episode pilot recorded 16 successful demonstrations, while the knob task is still in development. Future work includes shared mapping, task allocation, and UAV autonomy and docking.

Detect, Decide, Mitigate: An Operator-Supervised UAS for Locating and Mitigating Invasive Yellow-Legged Hornet Nests

In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 9:00am - 9:45am
Graduate Student: Muhammad Areeb
Undergraduate Student: Jaiden Drane
Research Mentor: Adeel Khalid

The yellow-legged hornet (Vespa velutina nigrithorax), an invasive predator of honey bees and other pollinators, was first detected in the United States near Savannah, Georgia, in 2023 and is now subject to a state eradication program. Its secondary nests are built 10 to 20 m above ground in tree crowns, where they are hidden from view and reached today only by ground crews tracking foraging hornets back from bait stations, a process that takes days per nest and cannot keep pace with the species' spread. This abstract presents a single uncrewed aircraft for finding and treating these nests within visual line of sight, with a human operator approving every decision. The quadcopter flies an autonomous grid pattern over the trees with co-aligned thermal and visible cameras and streams both feeds to a ground laptop, where detection models flag warm, nest-shaped objects and geolocate each one from the image pixel without assuming its height. On a detection the aircraft holds position and reports to the ground station, where the operator chooses to continue the survey, abort the mission, or mitigate the nest. To mitigate, the aircraft flies to a standoff position beside the nest using LiDAR-based reactive obstacle avoidance running on an onboard Raspberry Pi, centers the nest on an aiming reticle by adjusting its heading and height, and releases a commercial hornet spray, correcting the aim for the offset between its camera and the spray nozzle. Running all perception on the ground station leaves only the time-critical obstacle avoidance onboard, keeping the aircraft light and low-cost. The abstract describes the mission architecture, the thermal and visible detection fusion and localization algorithms, the operator decision loop, the obstacle-avoidance method, and the camera-to-nozzle aiming geometry. The approach is intended to generalize to other arboreal invasive species.

Detecting and Counting Cattle, Watermelons, and Pumpkins in High-Resolution UAS Imagery with Tiled YOLO Models
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 9:00am - 9:45am
Graduate Student: Muhammad Areeb
High School Student: Takara Cannon
Undergraduate Student: Ram Sudharsanan
Research Mentor: Adeel Khalid

Counting livestock and crops by hand is slow and labor-intensive. Unmanned Aerial Systems (UAS) can photograph an entire field in minutes, but turning that imagery into accurate counts remains difficult. This work presents a deep learning workflow that detects and counts three agricultural targets in UAS imagery: cattle, watermelons, and pumpkins. Each target poses a different challenge. Cattle vary in shape and posture, so we trained an instance segmentation model on hand-drawn polygon annotations. Watermelons and pumpkins are small, often partly hidden by leaves, and can number in the hundreds per image. Downscaling a 50-megapixel frame to a standard input size would shrink a 20-pixel pumpkin to only a few pixels. To avoid this, each frame is divided into overlapping 640×640 tiles at native resolution for training. At inference, tile predictions are mapped back to frame coordinates, and boxes cut off by tile edges are removed. Non-maximum suppression then merges duplicates, giving a single count per frame. Datasets are split by capture order rather than at random, so overlapping, near-identical frames never appear in both training and test sets. All models are evaluated on held-out data using precision, recall, mean average precision, and per-frame count error. The resulting pipeline offers a practical, reusable approach to automated agricultural monitoring from UAS imagery.

Drone Detection with Acoustic Sensor
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
High School Student(s): Sinan Sarihan, Evan Yang & Zihong Chen

Graduate Student: Owais Ahmed
Research Mentor: Adeel Khalid

Unmanned aerial vehicles are difficult to detect by radar or by vision at low altitude and short range, yet any rotor-driven airframe radiates a harmonic blade-passing and propulsion system signature. Acoustic sensing is passive, requires no cooperation from the target, and is independent of illumination, so it operates unchanged at night and in low visibility. This paper presents the sensing front end of such a system: a single seven-element MEMS microphone array reporting bearing and a coarse range bin in real time. Because published dimensions for this array proved inconsistent with the unit under test, its geometry is recovered experimentally, giving a ring radius of 32.9 mm (more than 30% below the cited value) and an implied bearing accuracy near 2°. A steered-response power estimator on that geometry recovers measured rotation angles to 3.09° RMS at 1.5 ms per frame. Controlled experiments identify direct-to-reverberant ratio, not received level, as the binding constraint indoors: bearing collapses between 0 dB and −6 dB and time-averaging does not recover it, while received level saturates beyond 4 m and is therefore a weak range cue. Detection uses pretrained audio embeddings with a linear head, trained on 12.9 hours of audio from which the same network first removes speech and music. On videos held out of training it reaches 0.80 balanced accuracy across multirotor, piston and turbine aircraft, and held-out music is never reported as an aircraft; machinery with rotating fans remains the principal confuser.

Forecasting the Trajectory of an Observed Drone
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Graduate Student: Hamza Ali Khan
Undergraduate Student: Jason Yu
High School Student(s): Aaron Mok, Tanish Uchula & Sinan Sarihan
Research Mentor: Adeel Khalid

Detect-and-avoid and UAS traffic management systems must anticipate where a non-cooperative drone will be seconds ahead, yet most UAV trajectory predictors are developed on cooperative telemetry such as GPS logs or ADS-B rather than on tracks extracted from a camera. This paper presents an open, end-to-end pipeline that detects an observed drone in video, tracks it with a persistent identity, compensates for the observer's own camera motion, and forecasts the target's image-plane trajectory at horizons of 0.5, 1, 3, and 5s. A YOLO11s detector fine-tuned on a sequence-disjoint re-split of the LRDDv2 dataset finds the drone in 71.8% of frames across six public long-range test clips, twice the rate of the best publicly available checkpoint; we also show that the dataset's published random split leaks every source video across partitions and inflates mAP@50 from 0.725 to 0.959. Forecasters from three families are compared on UAS flight footage by average displacement error, with paired block-bootstrap confidence intervals: classical filters (Holt linear-trend smoothing and a constant-velocity Kalman filter), zero-shot time-series foundation models (Chronos-2 and TiRex-2), and learned models (a GRU mixture-density network and a leapfrog diffusion model). Because rotary-wing drones fly near-linear segments while fixed-wing aircraft fly sustained banked turns, we also propose a combined forecaster that pairs Holt smoothing with a bank-angle interacting multiple model (BankIMM), using each where it is strongest. At a 1s horizon, Holt reaches 7.3px on a clean cruise clip, where the GRU is 2.7 times worse. The foundation models match the classical baselines overall and beat them significantly on individual clips, but no single forecaster wins on every clip. With limited real data, the classical baseline remains the bar that learned forecasters must clear.

Human Detection from Aerial LIDAR
In-Person Poster Presentation (Event Center, Poster #16)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Graduate Student(s): Owais Ahmed, Muhammad Areeb & Hamza Ali Khan
High School Student: Takara Cannon
Research Mentor: Adeel Khalid

Detecting humans from an aerial viewpoint can support search and rescue, situational awareness, and monitoring in areas that are difficult to access from the ground. This paper presents a UAV-based approach for human detection using three-dimensional LiDAR point clouds. A drone-mounted LiDAR sensor is used to collect an aerial dataset, capturing human targets and their surrounding environment as spatial measurements. The collected point clouds are annotated through a clustering-assisted labeling process and used to train a 3D object detector to identify and localize humans. Unlike image-based detection, this approach uses the geometric structure of the scene and directly provides target locations in three-dimensional space. Aerial human detection presents challenges because the number and distribution of points on a person vary with flight altitude, sensor-to-target distance, viewing angle, and occlusion. The proposed workflow connects aerial data collection, clustering-assisted annotation, and detector training to support the development of human detection models for drone-mounted LiDAR. This work establishes a foundation for automated aerial human localization, with potential applications in emergency response and UAV-assisted reconnaissance.

Live 3D Modeling of Scenes via UAV
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 9:00am - 9:45am
Graduate Student(s): Owais Ahmed, Hamza Ali Khan & Muhammad Areeb
Research Mentor: Adeel Khalid

Feed-forward 3D reconstruction models recover camera poses and dense geometry from video in a single network pass, putting indoor mapping within reach of a consumer drone and a laptop. To bound memory, streaming variants reconstruct long sequences in overlapping windows and stitch them one after another, causing alignment errors to accumulate and drift to grow. Robotics addresses this problem by recognizing revisited places and optimizing the trajectory globally, but feed-forward models typically provide neither a pose graph nor place recognition, and retraining them is beyond most adopters. This paper presents an approach that keeps the reconstruction network frozen and operates entirely on its outputs. It expands an alignment estimator found to use only a single shared frame at each window boundary, constructs a pose graph with constraints between non-overlapping windows obtained by using the reconstruction network itself as a relative-pose sensor, and identifies potential revisits from visual appearance rather than drifted position estimates. On the TUM RGB-D benchmark, absolute trajectory error decreases by 59%, from 0.138 m to 0.057 m, while relative pose error over a fixed interval remains nearly unchanged, indicating that the improvement primarily reduces accumulated drift rather than changing local geometry. On an indoor drone flight processed entirely on a laptop GPU with 8 GB of memory, rotation error at window boundaries decreases by 45%, and measured loop violation falls from 2.39° to 0.82°.

Number Plate Recognizer Framework from Aerial POV
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Graduate Student(s): Owais Ahmed, Muhammad Areeb & Hamza Ali Khan
Research Mentor: Adeel Khalid

Locating one specific vehicle in a large surface parking lot is a slow, manual task. This paper presents an uncrewed aerial vehicle (UAV) pipeline that flies a boustrophedon (zig-zag) coverage path over a lot, reads license plates, identifies the issuing U.S. state from the plate legend, and raises an alert when a plate matches a supplied watchlist. The perception chain couples a YOLOv8-nano vehicle detector, ByteTrack identity association, a YOLO11-nano plate localizer, and a PaddleOCR text recognizer, with no task-specific training. Two contributions are emphasized. First, plate strings are not taken from a single observation: each tracked vehicle accumulates confidence-weighted votes across frames, and the running winner is reported. On 4K roadside video this recovered a plate that a 12-frame excerpt read incorrectly, and it rejected character confusions (G ↔ 6, B ↔ 8, 7 ↔ Z) that a single-frame reading accepted. Second, the issuing state is recovered from the same optical character recognition pass by fuzzy-matching the non-serial text lines against state names, mottoes, and plate URLs, requiring no additional model. Benchmarks give 20 of 22 plates read on oncoming 1440 × 960 traffic video and 7 of 8 on 4K video. On four 64-megapixel stills captured by a Skydio X10 over a

university parking lot, 5 of 6 detected vehicles were read and one was attributed to Georgia. A ground-sample-distance analysis calibrated against these images shows that the serial requires roughly 3.0 mm/px whereas the state legend requires roughly 0.5 mm/px, translating into a sixfold increase in survey flight time. This trade, rather than recognizer accuracy, is the binding constraint on aerial plate search. The pipeline also classifies vehicle color and body type without training, runs on a live camera or stream, and was exercised on two aisle-following drone passes over a university lot.

Optimization of Electrohydrodynamic Propulsion for Lighter-Than-Air Autonomous Industrial Monitoring Systems
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Brian Hardy & Gabriel Greenway
Research Mentor: Adeel Khalid

Traditional propulsion systems are often limited by either fuel efficiency and or moving parts, with a relatively shorter operational lifespan without regular maintenance. Meanwhile, ionic propulsion offers a superior fuel economy and requires less maintenance since there are no moving parts. However, as of now there is little to no research on lower atmospheric flight, that is because generally it requires very high voltage (12-100kV) and produces little thrust. However, in our project we plan to experiment on the optimization of ionic engines by implying variable distances, dielectric panels, and variable frequency in order to power a lighter than air blimp. This blimp would patrol factories and use an infrared thermometer to analyze machines' working temperatures. We believe that an ionic blimp approach would result in a higher safety standard than other forms of propulsion, due to the blimps light weight and ability to shut off its internal engines at a moment's notice. Meanwhile, having the ability to reach high and often difficult to reach places for monitoring. This academic year we plan to test bench models with differing materials, spacing, frequency, and DC voltage using a Cockroft-Walton voltage multiplier. Concurrently combining the data from numerous applied research papers on circuit and physical design. Extending the reachability and lifetime of these flying robots, simultaneously promoting safety, and high analyzation efficiency.

Spill Detection on Runways
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 10:00am - 10:45am
High School Student: Joen Lawrence
Graduate Student: Owais Ahmed
Research Mentor: Adeel Khalid

Runway and airport pavement surface spills can disrupt airport operations and create hazards that require timely detection and assessment. This paper presents an unmanned aerial vehicle (UAV)-based approach for detecting runway, taxiway, or ramp spills using aerial imagery and deep learning. A YOLO object detection model is trained on a self-collected dataset to identify visible spills and localize affected regions within images captured from a UAV. The approach combines the mobility and elevated viewpoint of aerial inspection with automated image analysis, providing a means to survey airport surfaces and flag potential spills for further assessment. The self-collected dataset supports model development using imagery relevant to the intended inspection environment. Key challenges include distinguishing spills from visually similar surface features, such as shadows, pavement discoloration, and tire marks, as well as detecting spills whose appearance changes with illumination, viewing angle, and flight altitude. The proposed approach is intended to support airport maintenance personnel by directing attention to suspected spill locations and informing subsequent inspection and cleanup. This work provides a foundation for UAV-assisted airport surface monitoring, with further evaluation needed to establish detection reliability and operational suitability under diverse airport pavement conditions.

Standard Time and Delay Root Cause Analysis of Nursing Skills Tests
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 10:00am - 10:50am

Undergraduate Student(s): Anabelle Jordan, Paris Bingham, Madi Houck, Maryella McCown, Sthefany Ferrer Ortigoza, Ayannah McGee & Kimberly Kaleta
Research Mentor: Robert Keyser

The nursing profession often requires rapid and frequent critical thinking skills in clinical practice. This project applied a systems thinking framework to analyze observed elemental activities in skills tests during a 3rd-year nursing course. With student consent, videos of nursing students performing their skills tests were obtained during Fall 2025 and Fall 2026. Time studies decomposed all elemental activities into 6-10 primary work elements for each skill. Standard times and both the frequency and types of delays were obtained for each skills test. Following the Fall 2025 skills tests, workflow enhancement techniques (interventions) were introduced for the Fall 2026 skills tests. Preliminary findings suggest that these standardized interventions contributed to both the reduction in standard times and the frequency and types of delays encountered by nursing students.

Structure Crack Detection from UAS
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Graduate Student(s): Owais Ahmed, Hamza Ali Khan & Muhammad Areeb
Research Mentor: Adeel Khalid

Visual inspection of concrete infrastructure remains largely manual, making it slow, costly, and dependent on inspector judgment. This paper presents an instance-segmentation approach that localizes surface cracks and recovers their pixel-level geometry, which is a prerequisite for quantitative severity assessment. A YOLO26-s segmentation network is fine-tuned and evaluated on a corpus of 7,183 annotated concrete surface images using a 650-epoch, two-stage progressive-resolution schedule that raises the input from 640 to 1024 pixels. On a held-out test set of 432 images containing 5,173 crack instances, the model attains a detection mAP@0.5 of 0.952 and mAP@0.5:0.95 of 0.862, with a mask mAP@0.5 of 0.809 and mask mAP@0.5:0.95 of 0.464, at 13.5 ms per image. The paper further shows that bounding-box suppression is unsuitable for crack imagery and introduces a mask-proximity consolidation step that groups fragmented detections into physically coherent crack networks.

The Retrieval of Foreign Object Debris (FOD) Using a Scoop-Mounted Unmanned Ground Vehicle (UGV)
In-Person Poster Presentation (Event Center, Poster #19)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
High School Student: Rania Siddiqi
Research Mentor: Adeel Khalid

Foreign Object Debris (FOD) is any object misplaced or foreign to airport runway, taxiway or ramp surfaces that poses a safety hazard. Presence of FOD poses several challenges. FOD-related aircraft damage causes a significant financial loss. It could cost airports and aircraft industry billions of dollars annually for repairs, loss of property and in worst cases loss of life. The goal of this project is to design and develop a scoop which can be integrated into an Unmanned Ground Vehicle (UGV) to autonomously retrieve FOD from aircraft runways and other surfaces. The team analyzed several alterative ideas for scoop design including standard bucket, rock bucket, skeleton bucket, clamshell bucket, ditch bucket, grab bucket, trapezoidal bucket etc. Once the design is finalized and implemented, this mechanism will help decrease damage caused by debris and increase retrieval accuracy. The project involves designing a scoop attachment for a UGV using SolidWorks CAD modeling and fabricating 3-D printed parts to develop the FOD retrieval mechanism. The researchers intend to evaluate the scoops' ability to retrieve at least 10 different types of debris objects. This research may make easy it easier for the aviation facilities and maintenance by offering a new approach for FOD retrieval and improving their accuracy and time of retrieval. The findings are intended to propel research regarding FOD retrieval by providing accuracy of a scoop-mounted UGV for debris collection. Additionally, the study results can provide a foundation for future research regarding scoop design, FOD collection systems, and UGV integration.

Vision-Based Human and Object Tracking for UAV Following
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 11:00am - 11:45am
Graduate Student: Hamza Ali Khan
Undergraduate Student: Mingxuan Yu
High School Student: Tanish Uchula
Research Mentor: Adeel Khalid

Vision-based following of a person or object by an Unmanned Aerial System (UAS) requires correct target association, valid relative measurements, and timely observations, yet these properties are rarely reported separately. This paper presents two complementary prototypes: human following with a UAS aircraft using person detection, multi-object tracking, and monocular depth, and class-prompted object following in a Gazebo, Robot Operating System (ROS)2, and PX4 simulation. The human path separates image bearing from range validity and adds an independent reference-based apparent-size diagnostic; the object path adds guarded single-target selection above an unchanged multi-object tracker. Preliminary evidence comprises a paired replay of one simulated rover recording and offline analysis of three exploratory UAS recordings. In the rover replay, guarded selection raised correct-target coverage from 87.19% to 99.945% and reduced wrong-target time from 7.689s to zero, although the tracker reported no identifier switches. In the UAS recordings, processed-observation rates over the result windows were 8.03, 6.84, and 2.16Hz; the third window contained 14 intervals longer than 0.5s, totaling 23.476s. These results show that tracker identity and inference speed do not guarantee a correct target or continuous observations, which motivates evaluating target integrity and observation availability separately. Future tasks include physical ranging accuracy, sustained human following, and generalization across object classes.

Department of Mechanical Engineering

Biocompatible Regenerative Bone Scaffolds Incorporating Osteoinductive Nanocomposites
In-Person Poster Presentation (Event Center, Poster #20)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Adam Horn
Graduate Student: Asya Tucker
Research Mentor(s): David Veazie & Eric Mintz

Over 4.5 million bone reconstruction surgeries are performed worldwide each year to repair critical-sized bone defects resulting from trauma, tumor resections, infection, and congenital disorders. While historical interventions relied on rigid fixation or permanent metallic and ceramic implants, the paradigm has shifted toward tissue engineering approaches that facilitate endogenous bone regeneration via bioresorbable 3D scaffolds. While poly(L-lactic acid) (PLLA), polycaprolactone (PCL), poly(hydroxybutyrate) (PHB) and poly(butylene succinate) (PBS) are biocompatible polyesters that can be 3D-printable, unfortunately they are not osteoinductive and release acidic by-products as they degrade. To support this novel bone regenerative approach, this project incorporates calcium carbonate (CaCO3) nanorods of varying loading ratios into these polymers by twin-screw melt extrusion. From a chemistry standpoint, the nanorods are expected to act as a nucleating and reinforcing agent, a source of Ca^2 ions that promotes bone-like mineral formation, and a base that neutralizes acid released during degradation. Furthermore, extrusion-induced alignment of the nanorods yields directionally dependent mechanical and barrier properties that directly influence the matrix degradation kinetics. The addition of nanoparticles also increases the melt viscosity of the host polyesters, enhancing their suitability for additive manufacturing (3D printing). A key contribution to this novel research will be to characterize bioactivity by assessing the Ca^2 release and apatite formation in simulated body fluid, and degradation by mass loss and pH in buffer. By establishing fundamental structure-processing-property relationships, degradation kinetics by thermogravimetric analysis (TGA), crystallinity by differential scanning calorimetry (DSC), mechanical properties from tensile testing, and processing melt viscosity from torsional rheometry, this Vertically Integrated Project (VIP) aims to optimize nanocomposite formulations tailored for both 3D-printed scaffold fabrication and superior bone tissue regeneration.

Comparing Nuclear Reactor Designs: Rated Conversion Performance and Application Tradeoffs
In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student(s): Dylan Previ & Emilio Castaneda
Research Mentor: Eduardo Farfan

This study compares nuclear reactor designs to examine how coolant choice and rated power relate to electricity conversion and applications. The focused research question is: How do published electrical to thermal output ratios differ among the AP1000, Xe-100, Natrium, and BWRX-300, and what design considerations limit interpretation of those differences? The comparison treats reactor technology and modular size as overlapping characteristics rather than mutually exclusive categories. Technical information was compiled from the U.S. Nuclear Regulatory Commission, Department of Energy, and developer documentation. Sources were screened for design versions, thermal and electrical ratings, temperature definitions, and system boundaries. A comparison matrix records coolant, operating temperature, rated output, fuel characteristics, safety approach, and proposed applications. Electrical ratings are identified as gross or net where specified, and unresolved differences are retained as limitations rather than assumed equivalent. Original analysis divides rated electrical output by rated thermal output for each design. Using developer specifications, the calculated ratios are approximately 32.5% for AP1000, based on 1,110 MWe and 3,415 MWt; 40.0% for Xe-100, based on 80 MWe and 200 MWt per module; 41.1% for Natrium, based on 345 MWe and 840 MWt; and 34.5% for BWRX-300, based on 300 MWe and 870 MWt. These preliminary comparisons place Natrium and Xe-100 above the two water cooled designs in output ratio. They do not establish measured operating efficiencies, superior safety, or a causal effect of neutron spectrum. Tables and graphs will connect these calculations with documented design characteristics. Natrium storage assisted peak output will be distinguished from sustained conversion performance. Further analysis will compare operating pressure, fuel requirements, and deployment flexibility. Limitations include heterogeneous reporting conventions, evolving design specifications, and incomplete operational evidence. The study provides a framework for comparing engineering priorities while recognizing that application suitability also depends on cost, licensing, infrastructure, grid, or industrial requirements.

Comparing Nuclear Reactor Thermal Efficiencies with Carnot Benchmarks
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Samuel Marrero-Torres
Research Mentor: Eduardo Farfan

This study examines how operating temperatures relate to theoretical efficiency limits and thermal efficiencies across selected nuclear reactor designs. The research question is: How closely do these reactors approach a calculated Carnot benchmark, and which design characteristics may explain differences? Comparing theoretical bounds with reported performance provides a framework for evaluating temperature advantages without treating ideal efficiency as achievable plant output. Operating temperatures, thermal power, electrical power, and reported efficiencies were compiled from Nuclear Energy Conversion by M. M. El-Wakil. Reactor entries were selected for availability of relevant data. A common heat rejection temperature of 300 K was assumed. Carnot efficiency was calculated as one minus the ratio of heat rejection temperature to heat source temperature, with both expressed in kelvin. Reported plant efficiency was taken directly from Nuclear Energy Conversion or calculated by dividing electrical output by thermal input. Reactor outlet and steam temperatures were identified separately because they represent different locations in the energy conversion system. Original analysis compares each reported efficiency with its calculated benchmark using percentage point differences and ratios of reported to theoretical efficiency. A table will summarize reactor types, temperature definitions, performance values, and assumptions. Commercial nuclear power plants have a theoretical maximum Carnot efficiency limit of about 43% to 47%, while their actual net electrical efficiency typically ranges from 33% to 36%. These ranges indicate variation but do not alone establish which reactor most closely approaches its benchmark. Further analysis will examine associations with coolant temperature, conversion cycle, and auxiliary power requirements where

data permit. Limitations include older published data, potentially inconsistent electrical output definitions, and incomplete cycle parameters. Because heat addition occurs over temperature ranges, the Carnot calculation represents an approximate upper bound rather than a cycle model. The study will also assess gas cooled fast reactors within this comparative framework.

Comparing Supercritical Carbon Dioxide Brayton and Steam Rankine Cycles for Nuclear Power Generation
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Pablo Jr Gonzales
Research Mentor: Eduardo Farfan

This study investigates how turbine inlet temperature and compression requirements affect the net thermal efficiency of supercritical carbon dioxide Brayton cycles compared with steam Rankine cycles for nuclear power conversion. The focused research question is: Under comparable heat source and heat rejection conditions, when does a Brayton configuration provide higher calculated net efficiency than a Rankine configuration? The objective is to evaluate performance through consistent calculations rather than assume that either cycle is universally preferable. Published thermodynamic properties and operating parameters will be obtained from documented property databases, technical reports, and peer reviewed studies. Sources will be screened for specified temperatures, pressures, cycle configurations, and component efficiencies. Comparisons will use defined reactor outlet temperatures, heat exchanger temperature differences, and cooling conditions. Differences in recuperation, pressure losses, and equipment assumptions will be documented. Original analysis will calculate turbine output, compressor or pump input, external heat addition, and net cycle efficiency. The Brayton model will include compressor work; dense carbon dioxide near the critical region does not eliminate compression requirements. The Rankine model will include pumping of condensed liquid rather than compression of steam. Phase change will be represented through thermodynamic properties instead of treated as inherently wasted energy. Sensitivity calculations will vary turbine inlet temperature and component efficiencies, with tables and graphs displaying results and assumptions. The analysis will determine whether any efficiency advantage persists after accounting for auxiliary work and comparable boundary conditions. Published efficiency values will serve as contextual benchmarks, not as comparable experimental results. Limitations include simplified component models, uncertain pressure losses, and incomplete treatment of materials, sealing, corrosion, and equipment cost. The research will identify conditions favoring each modeled cycle and clarify why thermal efficiency alone cannot establish suitability for every advanced nuclear reactor design.

Comparing Thermal Neutron Absorbers: Half-Value Thickness and Practical Material Suitability
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: James Mulcahey
Research Mentor: Eduardo Farfan

This study compares boron-10, cadmium-113, and gadolinium-157 as thermal neutron absorbers using calculated half-value thicknesses and mass per unit area. The focused research question is: Under neutron energy and material assumptions, how much of each absorber is required to reduce neutron intensity by 50%, and how do practical constraints affect material selection? The comparison distinguishes intrinsic absorption performance from suitability for shielding and reactor applications. Published microscopic absorption cross sections will be selected from nuclear data sources at a common neutron energy of approximately 0.025 eV. Sources will be screened for isotope identification, reference energy, reported uncertainty, and traceable provenance. Material densities, isotopic purity, and atomic masses will be documented separately. Where tabulated energies differ, values will not be treated as interchangeable without a justified adjustment. Original analysis will convert microscopic cross sections to macroscopic absorption coefficients using isotope number density. Half-value thickness will be calculated as the natural logarithm of two divided by the macroscopic absorption coefficient. Multiplying thickness by density will provide mass per unit area.

Tables and graphs will compare the three absorbers and identify assumptions. The model assumes homogeneous materials and absorption dominated attenuation, excluding neutron scattering and secondary radiation transport. The draft reports a preliminary boron-10 half-value thickness of approximately 0.014 mm for an assumed pure material. This value requires verification against its selected cross section and density. Equivalent calculations for cadmium-113 and gadolinium-157 are needed before ranking absorption performance. Boron-10 cannot be identified as the most suitable absorber from this result alone. Further evaluation will consider toxicity, isotopic availability, fabrication compatibility, and radiation produced following capture. Limitations include idealized purity, a single neutron energy, and exclusion of realistic geometries and irradiation effects. The study will establish a reproducible comparison framework and explain why minimum absorber thickness and engineering suitability may yield different material rankings.

Cooling Technology and Water Consumption in Nuclear Power Plants and Data Centers: A Comparative Analysis
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Mehriniso Abdumalikova
Research Mentor: Eduardo Farfan

This study examines how cooling technologies and local environmental conditions influence direct water consumption per unit of electricity generated by nuclear power plants or consumed by data centers. The comparison examines water use associated with cooling while distinguishing water withdrawal from water consumption, defined here as water not returned to its original source. The proposed method combines a review of operational data with original calculations. Sources will include government reports, peer reviewed studies, and facility disclosures that identify cooling technology, reporting period, water consumption, and electricity generation or consumption. Records lacking clear system boundaries or compatible units will be excluded from quantitative comparisons. Nuclear facilities will be grouped by cooling configuration, and data centers will be grouped by reported cooling approach. Climate, water source, and regional water availability will provide environmental context. For each eligible record, annual water consumption will be divided by annual electricity generated for nuclear plants or consumed for data centers, producing liters per kilowatt hour. These indicators represent different functions and will therefore be interpreted separately rather than treated as equivalent measures of efficiency. Absolute annual consumption will also be reported. Analysis will compare variation within each sector, evaluate how cooling configurations influence reported values, and examine sensitivity to missing data and inconsistent reporting. Tables and graphs will display calculated indicators, assumptions, and uncertainty. The analysis will test whether cooling technology explains differences in water consumption and whether climate and regional water availability change their environmental significance. The resulting comparison will identify conditions under which cooling alternatives merit further evaluation. This research aims to support discussions of energy infrastructure and computing expansion by presenting calculations, consistent definitions, and explicit limitations rather than assuming that either sector is inherently preferable.

Design and Testing of a Compliant Joint Actuated Elbow Exoskeleton
In-Person Visual Display (Event Center, Poster #1)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Kai Clifford
Research Mentor: Ayse Tekes

In this study, rat dams and their pups were exposed to a limited bedding and nesting model, replicating early maternal stress effects observed in humans. To evaluate how early stress influences AMPA receptor trafficking and memory, adult male and female rats were trained in a fear-conditioning paradigm, pairing a distinct context with mild footshocks. Following behavioral testing, hippocampal tissue from male and female rats was harvested to study regional receptor dynamics. The hippocampus was chosen due to its central role in context-dependent fear learning.

Distance and Shielding Tradeoffs for Radiation Protection Near Lunar Fission Reactors

In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Dale Williams
Research Mentor: Eduardo Farfan

This study evaluates how reactor separation and gamma shielding influence modeled radiation exposure at a hypothetical lunar habitat. The focused research question is: How do separations of 50 and 100 meters, relative to 10 meters, change reactor dose rate, and what shielding thickness and mass per unit area provide an additional 90% reduction in uncollided gamma intensity? The analysis supports comparison of placement and shielding strategies without claiming an astronaut radiation safety assessment. Technical information was compiled from NASA, Department of Energy publications, and nuclear engineering references. Quantitative inputs will be screened for reactor configuration, photon energy, material composition, density, and attenuation coefficients. A reference dose rate at 10 meters will be retained symbolically unless a compatible source estimate is available. Shielding materials will be compared at the same photon energy and transmission target. Original analysis applies inverse square scaling to a point source approximation and exponential attenuation to homogeneous shielding. Linear attenuation coefficients will be calculated from mass attenuation coefficients and density. Required thickness for 10% transmission will be determined, then multiplied by density to obtain mass per unit area. Tables and graphs will display distance reductions, shielding requirements, and assumptions. Preliminary calculations show that increasing separation from 10 to 50 meters reduces the modeled unshielded dose rate to 4% of its reference value, a 96% reduction. At 100 meters, the modeled value is 1%, a 99% reduction. Limitations include finite reactor geometry, neglected terrain scattering, and excluded neutron transport and secondary radiation. Distance also introduces infrastructure and deployment tradeoffs beyond this model. The study provides a calculation framework and identifies source, transport, and occupancy information needed to evaluate combined shielding and placement for lunar missions.

Estimating External Radiation Exposure from Stored Ionization Smoke Detectors
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Will Martin
Research Mentor: Eduardo Farfan

This study evaluates external radiation exposure from storing multiple intact ionization smoke detectors in retail settings. The focused research question is: What annual external photon dose is estimated for a worker near 150 to 200 detectors under distances, storage arrangements, and occupancy assumptions? The project distinguishes ionization detectors containing americium-241 from photoelectric detectors and avoids treating detector count alone as an exposure model. Americium-241 primarily emits alpha particles and also emits low energy photons. Technical information will be obtained from Nuclear Regulatory Commission reports, radionuclide data, and detector specifications. Sources will be screened for activity per device, detector construction, exposure geometry, and dose quantity. Published residential exposure estimates will provide context rather than serve as transferable workplace measurements. Original analysis will combine photon measurements from an intact detector with a storage geometry model. Measurements will include background subtraction, instrument calibration information, counting uncertainty, and source distance. If the detector signal cannot be distinguished from background, results will be reported as an upper bound based on measurement sensitivity. Annual exposure estimates will use an occupancy schedule of 40 hours weekly and a stated number of working weeks. Tables and graphs will compare detector counts, distances, and occupancy scenarios. The preliminary study proposes an estimate of 0.004 mSv annually, but this value has not been validated through measurements or a consistent geometry calculation. It should not be described as a maximum exposure. A comparison with a 1 mSv annual reference value would place this estimate at 0.4%, without establishing regulatory compliance. Limitations include uncertain packaging attenuation, distributed source geometry, and differences between measured dose rate and effective dose. Damaged detectors and internal contamination are outside the study scope. The research will assess whether measurable external

exposure occurs under defined storage conditions and identify the evidence needed to support a worker exposure estimate.

Evaluating Cybersecurity Risks and Protective Controls in Nuclear Power Plant Digital Systems
In-Person Poster Presentation (Event Center, Poster #5)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Hunter Welch
Research Mentor: Eduardo Farfan

This study examines how cybersecurity controls address risks associated with legacy software, personnel access, and third-party software updates in nuclear power plant digital systems. The focused research question is: How do documented protective measures differ across these three risk categories, and what evidence supports their effectiveness? The project evaluates available information without assuming that a cyber intrusion necessarily compromises reactor safety or that software age alone determines vulnerability. Technical information will be compiled from Nuclear Regulatory Commission publications, cybersecurity standards, government advisories, and peer reviewed studies. Sources will be screened for relevance to nuclear facilities, publication date, documented evidence, and distinctions between administrative networks and systems supporting plant operations or safety. Hypothetical scenarios will be identified separately from reported incidents. Claims lacking technical support will be excluded from the comparative assessment. Original analysis will use a structured matrix to compare risk categories against controls such as network segmentation, access management, software change verification, monitoring, and incident response. Each record will be classified by affected system, potential consequence, documented safeguards, and evidence limitations. A predefined scoring rubric will assess the completeness of published control descriptions rather than assign unsupported probabilities of compromise. Tables and graphs will summarize coverage and identify recurring gaps in publicly reported information. The study will test whether reported weaknesses reflect technology limitations, implementation practices, personnel processes, or combinations of these factors. Limitations include restricted access to facility details, inconsistent public reporting, and the inability to verify controls through direct testing. The project will identify priorities for further investigation while distinguishing information gaps from demonstrated security deficiencies. Its contribution is a comparison of documented risks and safeguards that supports informed discussion of cybersecurity and reliable nuclear plant operation.

Evaluating Electron Beam Welding for Time and Cost Reduction in Small Modular Reactor Pressure Vessel Fabrication
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Shiv Dutta
Research Mentor: Eduardo Farfan

This study investigates how electron beam welding compares with submerged arc welding in welding time and estimated fabrication cost for a defined small modular reactor (SMR) pressure vessel joint. Manufacturing nuclear components requires processes that balance productivity, quality, and qualification requirements. The research evaluates whether faster welding can reduce fabrication costs under stated assumptions. Published fabrication timelines, defect information, and material costs were compiled from Electric Power Research Institute and Sheffield Forgemasters sources. Quantitative comparisons require compatible material specifications, joint dimensions, and definitions of processing time. Records are screened for these characteristics, and differences in welding processes or reporting boundaries are documented. Welding time is evaluated using process specific productivity estimates; labor and repair costs are combined to estimate fabrication costs. The zero preheat assumption is treated as a modeling condition requiring justification, rather than a universal property of electron beam welding. Tables compare processing hours, cost components, assumptions, and excluded activities. The preliminary model estimates welding times of 180 hours for the conventional process and 3.5 hours for electron beam welding, corresponding to approximately 98% less welding time. It also estimates a 42% reduction in factory fabrication costs. These figures remain conditional on verification of the records and consistent accounting boundaries. Reduced

welding duration alone does not establish equivalent savings in total vessel manufacturing. Interpass cleaning and postweld heat treatment are evaluated separately; their elimination cannot be assumed without supporting metallurgical and qualification evidence. The analysis suggests that electron beam welding warrants further evaluation as a means of reducing selected fabrication activities. Limitations include excluded equipment investment, uncertain repair allowances, and unresolved applicability of qualification requirements to the modeled joint. Welding improvements also do not directly resolve forging capacity constraints. The study provides a transparent comparison framework for assessing potential savings while identifying evidence needed before manufacturing conclusions.

Evaluating Industrial Computed Tomography for Dimensional Measurement and Internal Defect Detection

In-Person Poster Presentation (Event Center, Poster #10)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Noah Zenn
Research Mentor: Eduardo Farfan

Industrial computed tomography (CT) offers a nondestructive approach to examining internal structures and measuring manufactured components. However, its practical value requires comparisons with established inspection methods rather than reliance on advertised scanner capabilities. This study asks: How do CT measurements compare with coordinate measurement machine (CMM) measurements for accessible features, and what additional information does CT provide about internal geometry and porosity in the same component? The investigation combines a review of manufacturer specifications with a case study conducted in collaboration with the Applied Technical Services CT laboratory. Sources have been selected based on their relevance to industrial metrology, clearly stated measurement conditions, and availability of information on resolution and measurement uncertainty. Manufacturer specifications will provide context rather than serve as evidence of achieved accuracy. For a selected component, repeated CT and CMM measurements will be compared for external dimensions accessible to both methods. Differences will be calculated in absolute units and as percentages of reference dimensions. Repeatability and reported uncertainty will be evaluated separately from image resolution. CT data will also be analyzed to characterize internal features, estimate porosity volume fraction, and document defect locations. Results will be summarized in tables and annotated images, with scanning conditions, material characteristics, and reconstruction settings recorded to support reproducibility. The analysis will determine whether observed dimensional differences fall within relevant tolerances and identify information unavailable through external measurements alone. This comparison will clarify where CT can complement conventional metrology and support manufacturing inspection, reverse engineering, and failure analysis. Conclusions will be limited to the selected component and testing conditions, providing a practical basis for selecting inspection methods for comparable industrial applications.

Evaluating Nuclear Microreactors for Remote Communities: Electricity Demand, Cost, and Reliability

In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student(s): Carmen Aglietti & Will Martin
Research Mentor: Eduardo Farfan

Remote communities may face substantial costs and reliability challenges when connecting to distant electrical grids. Nuclear microreactors offer a potential local energy source, but compact size alone does not establish economic feasibility or continuous electricity availability. This study asks: Under what electricity demand, reactor utilization, and grid connection cost conditions could a nuclear microreactor economically supply a remote community? The study develops a comparative scenario analysis using published reactor cost estimates, plant specifications, and electricity price data from Idaho National Laboratory and the U.S. Energy Information Administration. Sources are selected for transparent assumptions and clearly defined cost boundaries. Thermal output is converted to electrical output using documented conversion efficiencies. Annual generation is calculated from electrical capacity and capacity factor, while community demand determines how much electricity

can actually be used. Microreactor scenarios will include capital investment, financing, fuel, operation, maintenance, decommissioning, and backup electricity. Grid scenarios will include purchased electricity and annualized connection costs. Sensitivity calculations will examine demand, capacity factors, construction cost, and financing assumptions. Results will be organized in tables and graphs identifying cost differences and potential breakpoints. A preliminary calculation using the draft's assumed microreactor cost of $160/MWh and grid electricity benchmark of $135.40/MWh yields a difference of $24.60/MWh, approximately 18.2%. These values are illustrative rather than directly comparable project estimates: the reactor value depends on deployment assumptions, and the grid benchmark excludes extending service to a remote location. The comparison therefore establishes a starting cost gap rather than demonstrating that microreactors are economically unsuitable. Likewise, thermal power per acre does not directly measure usable electrical supply. The study concludes that feasibility requires matching reactor output to community demand and comparing complete electricity supply costs. Further analysis will determine whether avoided grid extension costs offset the preliminary premium and what backup capacity is needed during reactor outages.

Evaluating Steam Superheating in BWR Power Cycles: Efficiency Gains and Engineering Constraints
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Luke Whitcomb
Research Mentor: Eduardo Farfan

This study evaluates whether steam superheating can improve the modeled thermal efficiency and turbine exhaust quality of a boiling water reactor (BWR) power cycle. The focused research question is: Under consistent pressure, condenser, and component assumptions, how does an added superheating stage change net cycle efficiency when its heat input is included? The analysis distinguishes thermodynamic performance from the engineering feasibility of modifying a reactor. BWR operating parameters and steam property data were combined with a Rankine cycle model. Sources will be documented by reactor configuration, pressure, temperature, property formulation, and component efficiency assumptions. Baseline and superheated cases will use consistent condenser conditions and accounting boundaries. The location and energy source of superheating will be specified because external heating and in-core heating introduce different plant integration and material challenges. Original analysis calculates turbine work, pump work, total heat addition, net electrical output, and turbine exhaust quality for both cases. Efficiency is defined as net work divided by total heat supplied, including superheating energy. Tables and graphs will compare performance and sensitivity to superheat temperature and turbine efficiency. Preliminary model results indicate an efficiency increase from 32.1% to 40.3%, an improvement of 8.2 percentage points. Calculated exhaust quality increases from 86.0% to 94.3%, corresponding to a reduction in moisture fraction from 14.0% to 5.7%. These results require confirmation against model inputs and heat accounting. Higher exhaust quality suggests reduced moisture exposure but does not independently demonstrate reduced erosion or longer turbine service life. Limitations include simplified component behavior, unspecified superheating conditions, and incomplete treatment of pressure losses, auxiliary loads, and materials performance. In-core implementation would require assessment of fuel, cladding, structural materials, and safety implications. The study identifies cycle benefits while explaining why modeled improvements alone do not establish retrofit practicality, economic attractiveness, or commercial reactor suitability.

Expanding Nuclear Reactor Monitoring with Digital Twins and Virtual Sensing: Applications, Benefits, and Limitations
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Danny Tram
Research Mentor: Eduardo Farfan

Physical instrumentation supports nuclear reactor monitoring, but sensor accessibility, calibration drift, and maintenance requirements can constrain measurements. A digital twin is a virtual, data-driven replica of a physical object, system, or process that continuously updates using real-time information. Digital twins integrate computational models with operating data, while virtual sensors estimate quantities from available measurements. This project asks: how accurately can virtual sensing estimate reactor coolant temperature when a physical temperature measurement is unavailable, and how does validation quality influence confidence in those estimates? The study combines a structured literature review with a quantitative comparison of published validation results. Peer reviewed studies and national laboratory reports will be selected when they identify the monitored variable, reference measurements, testing conditions, and numerical prediction errors. Nuclear Regulatory Commission publications provide context for uncertainty and regulatory considerations. Studies using experimental or operating measurements will be distinguished from those validated exclusively against simulations. For eligible datasets, estimated temperatures will be compared with reference temperatures using mean absolute error, root mean square error, and maximum absolute error. Where numerical data permit, errors will also be normalized by the reported temperature range. Results will be organized in a comparison table documenting model type, sensor inputs, validation source, operating conditions, and uncertainty reporting. Comparisons will be restricted to similar conditions; incompatible metrics will not be combined. Initial source examination identifies a distinction between demonstrating estimation capability and establishing suitability for reactor applications. Published work describes virtual sensing and digital twin approaches. The project's contribution will be a reproducible evaluation of monitoring performance and the evidence supporting it, extending beyond a descriptive survey. The analysis will examine whether reported accuracy persists during changing operating conditions or sensor loss. Conclusions will address applicability and validation gaps without treating virtual sensors as replacements for required instrumentation.

Insensitive Explosives (Reactive Materials) for Direct-Hit (Blast) or Fragmenting Warheads
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Ethan Huang
Research Mentor: David Veazie

Reactive Materials (RM's) are nonexplosive solid materials that remain chemically inert(insensitive) until subjected to a sufficiently strong stimulus, potentially increasing the lethality of direct-hit (blast) or fragmenting warheads. High density RM's could be strong enough to act as structural components for penetration, be sufficiently stable to survive handling and launch, and burn upon impact. Projectile casings partially substituted with such materials have therefore greater damaging effects than inert ones, with a potential lethality increase of 2-4 times that of inert steel. Low-density intermetallic RM's may partially substitute high explosives in fragmenting warheads because they are chemically inert but sufficiently unstable enough to reliably ignite immediately after detonation. Reactive materials considered for military projectiles are similar to insensitive high explosives; they are composed of nonexplosive solid materials that remain insensitive until subjected to a sufficiently strong stimulus. Typical reactive materials, including thermites, intermetallic compounds, metastable intermolecular composites, and hydrides are capable of highly exothermic combustion but are not capable of detonating. In this Vertically Integrated Project (VIP) study, a computational framework involving viscoplasticity with micromechanics is incorporated to understand the sensitivity of microstructural features measured from Electron Backscatter Diffraction (EBSD) techniques, which is a good technique to characterize crystallographic texture. This was accomplished using a specific exothermic stoichiometric compound of Ni+Al processed from isostatic compression and swaging of microscale powders and simulating the evolution of the crystallographic texture from EBSD by incorporating the viscoplastic formulation in axial compression and equal channel angular extrusion (ECAE) to model compaction and swaging, respectively. The ultimate goal is to predict the shock response of various exothermic stoichiometric compounds, thereby connecting the process-specific features to the performance and providing for a possible optimum microstructural condition.

Investigating the Degradation Mechanisms of Manganese Dioxide Cathodes for Zinc-Ion Batteries

In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): LeaNora Brown & Jamari Maxime
Graduate Student(s): Ryan Gouafong, Seth Freiman & Duy Pham
Research Mentor: Ashish Aphale

Aqueous Zinc-Ion Batteries (ZIBs) are currently being researched as an alternative to the traditional lithium-ion batteries due to the low cost, safety and abundance of zinc. Manganese dioxide (MnO2) has also been researched heavily as a cathode candidate in ZIBs due to abundance and low cost. However, the main issue is that long-term cycling stability is not sustainable enough for real-world applications due to the complex degradation of the MnO2 cathode occurring through four main paths namely; material dissolution in electrolyte, high volumes of microfractures, irreversible phase transformations, and parasitic side reactions which results in rapid capacity fades even at low cycling volumes. This study's objective is to provide experimental backing to the current understanding of these degradation mechanisms, which is still lacking. To evaluate this, 2032-type ZIB coin cells were assembled using the prepared MnO2 cathode, zinc foil anodes, and ZnSO4 electrolyte. Physical and electrochemical characterization analysis techniques are used. They include; galvanostatic charge-discharge (GCD) to test fabricated device capacity and long-term performance, electrochemical impedance spectroscopy (EIS) to evaluate the resistive behavior of our material and device, scanning electron microscopy (SEM) to study material morphology evolution caused by degradation. Preliminary results show an increase in overall device impedance, high microfracture volumes, and surface morphology changes which could all be linked to the rapid capacity fading observed. More work needs to be done through more thorough analysis to confirm or refute our formed hypotheses.

Microreactor Radiation Protection: Modeling Accident Doses at Two Receptor Distances
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Pablo Jr Gonzales
Research Mentor: Eduardo Farfan

Nuclear microreactors are compact systems designed to generate 1–20 megawatts of thermal power (MWth). Their small size and flexible deployment make them energy sources for remote communities and industrial facilities. This study examines how microreactor deployment conditions influence radiation protection assessments of the workers and public. The central research question evaluates how estimated accident doses differ at receptor distances of 100 and 300 meters under specific release and meteorological assumptions and identifies which exposure pathways drive those differences. These distances serve as comparison locations, not exclusion zones or safety boundaries. Technical information will be compiled from microreactor design documentation, radiation protection guidance, and atmospheric dispersion studies. Sources will be screened for reactor configuration, radionuclide inventory, assumed release fractions, release duration, meteorological conditions, and receptor definitions. Studies lacking source terms or dose conversion assumptions will provide background rather than quantitative inputs. Normal operation and hypothetical accident conditions will be assessed separately. The original analysis will combine documented source terms with a consistent atmospheric transport and dose calculation framework. Estimated inhalation and external exposure contributions will be calculated at both distances using stated occupancy and exposure durations, with additional pathways evaluated where supported by data. Sensitivity analysis will vary release assumptions and weather conditions to identify parameters controlling dose estimates. Tables and graphs will summarize calculated doses, pathway contributions, assumptions, and uncertainty. The analysis will test whether distance alone explains modeled exposure differences or whether release characteristics and meteorology dominate under selected scenarios. Results will not be interpreted as evidence that nearby residents require routine individual radiation screening. Limitations include simplified dispersion, uncertain accident source terms, and incomplete treatment of buildings, terrain, and protective actions. This study identifies information needed to evaluate environmental monitoring and emergency planning for deployments, offering a comparison of modeled exposure conditions to inform radiation protection discussions.

Modeling Xenon-135 Responses to Reactor Power Changes: Implications for Radioxenon Surveillance
In-Person Poster Presentation (Event Center, Poster #6)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Larisa Prieskorn
Research Mentor: Eduardo Farfan

This study investigates how reactor operating conditions affect modeled xenon-135 inventories and their potential relevance to interpreting atmospheric radioxenon measurements. The focused research question is: How do predicted xenon-135 time histories differ among selected reactor technologies during steady operation, a reduction to 50% power, and shutdown? The project examines whether reactor characteristics provide useful context for surveillance interpretation without assuming that atmospheric measurements uniquely identify a reactor or operating state. Published reactor specifications and nuclear data will be selected from technical reports, evaluated databases, and peer reviewed studies. Sources will be screened for reactor type, thermal power, neutron flux assumptions, fission yields, decay constants, and neutron absorption data. A consistent comparison framework will document differences in fuel composition, reference conditions, and parameter uncertainty. Each scenario will begin with a defined operating history, including an assumed equilibrium state before the power transition. Original analysis will solve coupled iodine-135 and xenon-135 inventory equations incorporating direct fission production, iodine decay, xenon decay, and xenon neutron absorption. Results will be normalized by thermal power or fission rate where appropriate to distinguish reactor scale from modeled kinetics. Time series graphs and comparison tables will display inventories, transition responses, and sensitivity to uncertain parameters. Changes in neutron flux will be specified consistently for each modeled operating condition. The analysis will test whether differences among reactor assumptions produce distinguishable inventory patterns and whether those differences remain meaningful under parameter uncertainty. Limitations include simplified neutron flux representation and exclusion of fuel retention, release pathways, processing delays, and atmospheric transport. Consequently, calculated core inventories cannot be interpreted directly as concentrations in air samples. The study will develop reactor inventory baselines and identify additional release and transport information needed before evaluating their usefulness for atmospheric nuclear surveillance applications.

Observations of Milli Scale Robotics and The Effects of Precession Angle on Movement
In-Person Poster Presentation (Event Center, Poster #22)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student(s): Michael Conley & Scott Eyre
Graduate Student: Yanni Giannareas Anyfanti
Research Mentor: Dal Hyung Kim

Magnetic microrobots are commonly designed to swim at low Reynolds numbers, often inspired by bacterial flagella. These robots are typically either pulled by magnetic field gradients or driven by magnetic torque in rotating or oscillating fields, relying on chiral or asymmetric shapes to convert rotation into forward motion. At the millimeter scale and at high actuation frequencies, however, robots operate at intermediate Reynolds numbers, where both inertial and viscous forces are significant. Few studies have examined how the precession angle affects the swimming speed of achiral, uniformly shaped robots in this regime. The goal of this research is to characterize the relationship between the forward speed and precession angle of a flexible, millimeter-scale magnetic robot ("millirobot") as the rotational frequency increases. Understanding this relationship can inform the design and control of small-scale robots operating at intermediate Reynolds numbers. A rectangular millirobot with a magnetic head and a passive, non-magnetic flexible tail is placed in a chamber of distilled water. A Helmholtz coil applies a rotating magnetic field with a constant magnitude of 18 mT, which the magnetic head follows synchronously. At rotational frequencies of 36–84 Hz, the millirobot rotates about its longitudinal axis while precessing and swims headfirst. The motion is recorded from the side with a high-speed camera at 5000 fps and analyzed to determine the precession angle, rotational frequency, and forward velocity. The millirobot reaches its peak speed at 48 Hz, where the precession angle is in a set band of 57° – 15°. Above 48 Hz, the precession angle

decreases, and the speed decreases gradually. These results suggest that the precession angle strongly influences propulsion at intermediate Reynolds numbers and that a precession angle in a set band of 57° – 15° maximizes forward speed for this design.

Power Scaling and Heat Rejection Requirements for Deep Fission Underground Reactors
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Dale Williams
Research Mentor: Eduardo Farfan

This study examines how reactor count affects electrical generation, thermal power, and heat rejection for Deep Fission's proposed underground nuclear reactor concept. Deep Fission's Gravity Nuclear Reactor is a small modular pressurized water reactor (PWR) designed to operate approximately one mile underground, providing low-carbon electricity. The research question is: How do power generation and heat removal requirements change between installations of 20 and 100 reactor modules? The objective is to quantify energy flows and evaluate how increasing reactor count affects thermal management. Developer specifications describe each module as producing 15 MWe. The analysis assumes a thermal efficiency of 33%, which is a modeling assumption rather than verified reactor performance. Calculations determine total electrical output by multiplying reactor count by module output. Thermal power is calculated by dividing electrical output by efficiency, while heat rejection is determined by subtracting electrical output from thermal power. Tables and graphs will compare these results. Preliminary calculations show that 20 reactors generate 300 MWe, require approximately 909 MWth, and reject 609 MW of heat. For 100 reactors, electrical output increases to 1,500 MWe, thermal power reaches approximately 4,545 MWth, and heat rejection increases to 3,045 MW. These results demonstrate that increasing reactor count fivefold increases electrical generation and heat rejection proportionally under constant efficiency assumptions. Limitations include uncertainties in reactor efficiency, cooling requirements, geological conditions, and underground heat transfer. The analysis does not evaluate cooling system performance or overall site feasibility. This research highlights the importance of thermal management when scaling underground nuclear installations and identifies additional engineering considerations needed for future deployment.

Process Heat and Electricity Tradeoffs in a 15 MWth Nuclear Microreactor
In-Person Poster Presentation (Event Center, Poster #7)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Trace Wright
Research Mentor: Eduardo Farfan

Nuclear microreactors offer zero emission energy that is easily transportable, self-regulating, and constructed in a factory reducing waste involved with onsite construction. However, how effectively these systems can supply process heat while generating electricity is paramount to their role in decarbonization. This project studies a 15 MWth microreactor with the goal of answering how varying thermal extraction temperatures quantitatively deteriorate electrical capacity and off grid power potential. By utilizing specifications from the Department of Energy and published Brayton power cycle research, thermal and cycle data for a 15 MWth microreactor were collected. A thermodynamic energy balance is then applied across the microreactor at three distinct points, these points including, "before the turbine (600℃), between the turbine and regenerator (370℃), and after the regenerator (192℃)" (Pakkebier et al.). The electrical output was calculated at each point, and the resulting loss in household electricity was determined. Preliminary calculations show that if 5 MWth of high-grade process heat is diverted before the turbine which is at 600℃, it reduces electrical generation by 33.3% and drops capacity from 5.0 MWe to 3.33 MWe. On the contrary, low grade heat after the regenerator at 192℃ yields up to 4.2 MWth of thermal energy with minimal electrical penalty, preserving the 5.0 MWe output. In conclusion, these findings indicate that although high temperature processes create an electrical penalty, low grade waste heat recovery compensates by capturing usable thermal energy while completely preserving baseline electrical capacity for the

local grid. This trade-off provides critical insight into microreactor deployment in decentralized hybrid energy systems.

Radiation Ready - Development and Analysis of an Interactive Radiation Protection Training Simulator
In-Person Poster Presentation (Event Center, Poster #4)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student: Raul Apa
Research Mentor: Eduardo Farfan

This project examines how radiation protection principles can be translated into interactive scenarios that assess practical decision making in a simulated nuclear power plant. Radiation protection education requires students to apply safety concepts when identifying hazards and selecting appropriate responses. The project addresses this need through the development and analysis of Radiation Ready, an interactive training simulator. The simulator contains ten sequential scenarios covering radiation surveys, the as low as reasonably achievable (ALARA) principle, contamination control, personal protective equipment, abnormal radiation conditions, radioactive waste management, and emergency response. Development followed a consistent analytical process: identify the hazards presented in each scenario, select suitable protective actions, and compare alternative responses against established radiation protection principles. Each scenario was integrated into an interactive system in which students observe a simulated situation, select an action from multiple options, and receive immediate feedback and a performance score. The original contribution is the translation of course concepts into scenario specific decisions and a consistent assessment structure. The completed development and analysis demonstrate that these topics can be organized into ten interactive scenarios linking hazard recognition, protective action selection, and feedback. Radiation Ready provides a framework for examining how students apply health physics and nuclear safety concepts in simulated operational situations. Future classroom use could evaluate response accuracy, identify frequently misunderstood concepts, and investigate whether feedback supports improved decisions. The project establishes a foundation for evaluating applied radiation protection knowledge while identifying the additional data needed to assess educational effectiveness. Its practical value lies in making safety decisions observable and assessable within a structured learning environment.

Radioisotope Selection and Fuel Mass: Modeling Power Output and Retention in Thermoelectric Nuclear Batteries
In-Person Poster Presentation (Event Center, Poster #12)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student: Matthew Jones
Research Mentor: Eduardo Farfan

Radioisotope thermoelectric generators provide sustained electrical power by converting radioactive decay heat into electricity. However, selecting a fuel requires balancing initial power, output retention, fuel mass, and cost. This study asks: how do radioisotope selection and fuel mass affect initial electrical power and power retention over a twenty-year operating period under identical thermoelectric conversion assumptions? The analysis will compare candidate radioisotopes using published half-lives, molar masses, and recoverable decay energies. Sources will be selected for documented provenance, consistent units, and clear treatment of energy deposited as heat. Energy carried away by neutrinos will be excluded. For each isotope, activity will be calculated from the number of radioactive atoms and the decay constant. Thermal power will be estimated by multiplying activity by recoverable energy per decay, and electrical power will be calculated using a common, constant conversion efficiency. Multiple fuel masses will be evaluated, with fuel mass defined as the mass of the radioisotope rather than the complete generator. Exponential decay equations will model output over twenty years. Original analysis will compare initial electrical power per gram, remaining power at selected operating times, and the fuel mass required to meet a common electrical power target. Tables and graphs will display these comparisons alongside assumptions and data limitations. Cost per gram and cost per electrical watt will be assessed only when comparable, traceable cost

information is available. The model predicts that increasing fuel mass proportionally increases electrical output under fixed efficiency, while fractional power retention depends on half-life. These relationships will guide interpretation of the calculated isotope comparisons. The study will provide a framework for evaluating fuel tradeoffs without equating longer half-life with greater electrical power. Limitations include neglected converter degradation, thermal losses, shielding requirements, fuel chemistry, and daughter contributions, which may affect generator performance.

Sensitivity Analysis of Water Inventory and Heat Load in Nuclear Cooling Pools
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 9:00am - 9:45am
Undergraduate Student: Fasih Fasih Ur Rehman
Research Mentor: Eduardo Farfan

Water pools can provide thermal storage for removing decay heat after reactor shutdown. Understanding how pool conditions influence heating time helps interpret the role of water inventory in passive cooling. This study asks: how do water mass, initial temperature, and constant net heat input affect the time required for a hypothetical atmospheric cooling pool to reach boiling? An original calculation study evaluated 27 combinations of water mass (50,000, 100,000, and 200,000 kg), initial temperature (20, 30, and 60°C), and heat input (0.5, 1.0, and 2.0 MW). Published Nuclear Regulatory Commission materials supplied context for passive nuclear cooling, while National Institute of Standards and Technology water data supported a specific heat approximation of 4.18 kJ/(kg·K). Sources were selected for their relevance to passive cooling concepts and publicly accessible thermophysical data. Scenario inputs were illustrative rather than specifications or measurements from a licensed reactor. Lumped energy balance calculated heating time as water mass multiplied by specific heat and temperature rise, divided by heat input. The model assumed uniform water temperature, atmospheric boiling at 100°C, constant heat input, and no heat losses, replenishment, or evaporation before boiling. Preliminary results showed that 100,000 kg of water initially at 30°C reached boiling in 8.13 hours under 1.0 MW. Doubling water mass increased this time to 16.26 hours, whereas doubling heat input reduced it to 4.06 hours. Increasing initial temperature to 60°C shortened the baseline time to 4.64 hours, a 42.9% decrease. Across all scenarios, calculated times ranged from 1.16 to 37.16 hours. The findings demonstrate that water inventory and initial temperature determine available thermal storage, while heat input determines its depletion rate. This sensitivity analysis extends published information into quantitative comparisons. However, boiling marks the model endpoint, not cooling failure; changing decay heat, circulation, evaporation, and replenishment require analysis before assessing reactor cooling endurance.

Steam Generator Tube Degradation: Materials, Mechanical Damage, and Implications for Extended Operation
In-Person Poster Presentation (Event Center, Poster #3)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student: Jesse Salazar
Research Mentor: Eduardo Farfan

Steam generator tubes separate primary reactor coolant from the secondary system in pressurized water reactors, making their integrity important to plant safety and reliability. This study asks: How do degradation mechanisms differ between earlier tubing and replacement designs using thermally treated Alloy 690, and what do these differences imply for managing components during extended plant operation? The analysis distinguishes improvements in corrosion resistance from remaining mechanical degradation concerns. Technical information was compiled from Nuclear Regulatory Commission reports, Electric Power Research Institute guidance, NEI 97-06, and peer-reviewed journal articles. Sources were selected for tube materials, support configurations, operating chemistry, inspection findings, and documented degradation mechanisms. Records lacking component or mechanism information were retained for background rather than direct comparison. The contribution is a structured analysis of published cases rather than a narrative summary. A comparison matrix classifies each case by material, support design, chemistry conditions, corrosion or mechanical damage, and reported operational consequences. Where compatible numerical records

are available, affected tube fractions and plugging percentages will be calculated using documented inspection denominators. Tables will distinguish observed findings from proposed explanations and identify missing information. The reviewed literature indicates that earlier tubing experienced primary water stress corrosion cracking, outside diameter stress corrosion cracking, and support related denting. Replacement designs incorporating Alloy 690 and improved supports and chemistry show reduced corrosion susceptibility. However, vibration, fretting, and wear remain concerns. The San Onofre Nuclear Generating Station experience demonstrates that replacement components can develop mechanical damage despite material improvements. These findings don't establish comparative failure rates or prove reliability through 80 years. Limitations include inconsistent reporting, differing operating histories, and limited exposure time for newer components. The study identifies inspection, chemistry management, and thermal hydraulic design evaluation as complementary priorities. Its results will inform aging management discussions without equating plant license duration with component lifetime.

ZK60–BN Nanocomposites for Biodegradable Implants: From Powder Processing to Performance
In-Person Poster Presentation (Event Center, Poster #18)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Graduate Student: Mohamed Morsi
Undergraduate Student(s): Ben Anderson, Lucas Lebron & Mathew Duque
Research Mentor: Hamdy Ibrahim

Magnesium alloys are attractive for temporary orthopedic implants because they combine low density with biodegradability; however, their clinical use remains limited by the challenge of maintaining sufficient mechanical integrity while controlling corrosion. Prior work from our group on acoustically mixed ZK60 reinforced with 0.5 vol.% boron nitride (BN) and 0.5 vol.% silicon carbide showed an approximately 5% increase in Vickers hardness, from 60.29 to 63.05 HV, but also a substantial decrease in electrochemical resistance from 870 to 122 Ω/cm², indicating a significant strength–corrosion tradeoff. This study investigates the isolated effect of BN concentration and develops an additive-manufacturing-relevant powder-processing route for ZK60–BN nanocomposites. Atomized ZK60 powder (50–100 µm) will be reinforced with h-BN nanoparticles (45–80 nm) at 0, 1.0, 1.5, and 3.0 vol.% using resonant acoustic mixing at 90 G for 4 min and 60% container fill. Powder characteristics, including flowability, apparent density, tap density, skeletal density, particle-size distribution, morphology, and BN dispersion, will be evaluated before consolidation. The powders will then undergo rapid hot compaction at 250°C for 5 min under a 6-ton load. The resulting nanocomposites will be characterized through density and porosity measurements, Vickers microhardness, compression testing, SEM/EDS, XRD, immersion testing, potentiodynamic polarization, and electrochemical impedance spectroscopy. The optimum BN concentration will subsequently be compared between rapid hot compaction and conventional argon sintering at 500°C for 6 h, followed by selected biological and surface-response assessments. This work aims to clarify how BN content and consolidation route influence powder processability, densification, mechanical performance, and degradation behavior, supporting the development of biodegradable magnesium implants and future powder-based additive manufacturing applications.

Department of Robotics and Mechatronics Engineering

A Robotic Hand with Integrated Vital Sign Monitoring
Virtual Presentation (Session B)
Friday, November 20, 2026, 1:00pm - 2:00pm
Join the Teams Meeting
Undergraduate Student: Daksh Garg
Research Mentor: Razvan Voicu

This research presents the design, fabrication, and evaluation of a sensor-integrated robotic hand for multimodal vital sign monitoring. The proposed robotic hand is used for heart rate, body temperature, and oxygen saturation measurement through sensor integration on the fingertips. The collected data is processed using a embedded unit for real-time analysis. The proposed components are fabricated

using 3D printing technology for maximum structural efficiency and modularity. In addition to the design and construction of the robotic hand, other research activities are focused on the calibration and validation of the proposed system and the integration of machine learning algorithms for better interpretation.

Initial Design and Development of KSU-Sat
In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 11:00am - 11:45am
Undergraduate Student(s): Tristen Whittier, Zayd Wahab, Felix Arockiaraj & Andrew Roper
Graduate Student: Aaditya More
Research Mentor: Cary Chun

In their smallest format, the 1P PocketQube is a 5-centimeter cubic satellite that provides a low-cost, high-reward mission profile for both scientific and educational missions in space. Additional PocketQube units can be stacked into scalable configurations referred to as 2P, 2.5P, 3P, and so on, to provide additional internal volume depending on mission requirements. The Modular Aerospace and Robotic Systems (MARS) Lab at KSU is currently developing engineering models for a 1P PocketQube called KSU-Sat which may become Kennesaw State's first orbital satellite. The engineering models currently undergoing validation for KSU-Sat have reached a Technology Readiness Level (TRL) of six. This indicates that the prototypes have been shown to operate nominally in a relevant, simulated environment. Major developmental milestones include a mechanical frame, custom PCBs, and an operational Communication and Data Handling (CDH) which includes a dedicated microcontroller, sensors, and digital radio. The primary microcontroller currently under validation in the KSU-Sat design is an ATmega328p, which features 23 I/O pins and 32K bytes of programmable flash memory. Additionally, multiple sensors have been included for recording telemetry data; including a gyroscope, accelerometer, 3-axis magnetometer, and altimeter. Future iterations will include voltage sensors for solar panels and batteries as well as a more advanced Electrical and Power System (EPS). This EPS design will utilize two solar array circuits to charge a 2S lithium-ion battery pack through an MPPT charger. The design will also include cell balancing and overvoltage protection to help manage the battery pack. Final TRL 6 validation may include a drone-based drop test to demonstrate nominal operation of the engineering model in a dynamic environment representative of an orbital rocket launch.

Predictive Stability Control of Quadrupedal Robots Under Dynamic Payloads for Agricultural Applications
In-Person Poster Presentation (Event Center, Poster #9)
Wednesday, November 18, 2026, 12:00pm - 12:45pm
Undergraduate Student(s): Alexandrie McCann, Andrew Roper, Allan Tran & Tobi Dabiri
Research Mentor: Muhammad Hassan Tanveer

Quadrupedal robots such as the Unitree-Go1 frequently operate in complex environments where dynamic payloads and complex maneuvers can introduce instability. This project aims to address this by using motor and imu data from unstable moments to create a predictive algorithm that pre-emptively corrects motor torque to adjust for shifts in payload mass distribution. This work expands upon existing research focused on increasing efficiency and stability for static payloads and creating adaptive gaits for new terrain. The initial dataset captures the robot's behavior during standardized experimental maneuvers; straight-line acceleration and deceleration, sharp turns, spinning, and torso oscillation, under varying payload conditions (no payload, static payload, and dynamic payload). High-fidelity data streams are recorded during each trial, encompassing body IMU (inertial measurement unit) metrics (linear acceleration, angular velocity and acceleration, and orientation), organized leg and joint states, foot force data, and 3D motion-capture tracking data. By systematically varying experimental conditions and payload configurations, this research isolates payload-related behavioral shifts from normal trial-to-trial variations. The resulting findings and organized dataset establish baseline stability ranges that characterize normal robot performance and stability thresholds. Analyzing these findings isolates the foot path error caused by payload weight and movement allowing us to create a mathematical model relating shifts in payload weight to foot

placement error. The final mathematical model will be used to train a predictive algorithm capable of altering motor torque to correct for immediate foot path errors. The goal of this model is to increase the stability of quadruped robots under dynamic loads allowing for increased use cases in agriculture and other applicable industries.

Trajectory Forecasting for Floating Debris in Waterways
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 10:00am - 10:50am
Undergraduate Student: Saam Haghighat-Grami
Research Mentor: Matthew Marshall

This project created an object debris trajectory forecasting system using machine learning. The purpose was to predict future locations of river debris or trash within waterways with only the input of a fixed USB camera. Machine learning models was created to address waterway's nonlinear nature and changing environment, especially during inclement weather. This will enable future works of autonomous debris retrieval from rivers. With the increased improvement of AI and machine learning, these tools are being used to predict debris future locations and trajectories for large trash spillage, tracking of accumulated polluted items, or search and rescue efforts for people lost at sea. Many of these models are at a macro scale of kilometers or time spanning over hours or days. Other systems use object identification for real time debris collection via surface vehicles. This project takes the machine learning prediction from large maritime applications to real time systems to create accurate river debris predictions for autonomous collection manipulators. The system is composed of 6 machine learning models based on varied inputs of image, Large-scale Particle Image Velocimetry (LSPIV), or both from 1 second of video input and outputs 10 seconds of predictions for debris. Each model is composed of an embedded CNN-LSTM-MLP configuration. The models vary from their inputs such as image input, LSPIV input, or both, and have sub variants of scene images or cropped images of the object. All 6 models achieved greater accuracy than the best "state of the art object tracker, advection slip, LSPIV in average displacement error (ADE). The cropped fusion model was able to have an average of 76.80 pixels compared to the advection slip ADE of 168.97 pixels.

Ultra-Wideband Peer to Peer Localization
In-Person Poster Presentation (Event Center, Poster #2)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student(s): Bryson Long, Saam Haghighat-Grami, Anthony Flores & Emmanuel Allen
Research Mentor: Muhammad Hassan Tanveer

Localization of mobile robotic platforms is a prevalent challenge within the field of mobile robotics. The use of Ultra-Wideband (UWB) radio modules provides a cost effective and considerably robust solution to this challenge. By using the time it takes for a wireless message to propagate between UWB modules, an estimated distance between them may be calculated such that a relative transformation between the local frames of the mobile robotic platforms may also be calculated. In areas where the Global Navigation Satellite System (GNSS) is unable to provide an accurate estimate of a robotic platform's position, a localization method using UWB modules will be used in its place. This project seeks to explore the usage of single agent UAV (Pixhawk 2.4.8 aerial drone) providing GNSS-rooted UWB localization to a single agent UGV (Clearpath Robotic's Husky A200 ground vehicle). The two robotic platforms will be performing a collaborative sensor fusion of their odometries, inertial measurement units (IMU), and LiDAR sensors with the transformation calculated by the distance between UWB modules to provide accurate GNSS positioning from the UAV to the UGV. This allows for accurate GNSS localization when the UGV is indoors, under heavy canopy coverage, and in dense urban areas where access to the GNSS is denied. The efficacy of the UWB localization method will be tested by comparing its results to those produced by an RTK-GPS module on Clearpath Robotic's Husky A200 UGV. Specifically, the difference between the pose estimates of the Husky UGV produced by the UWB localization method and those produced by the RTK-GPS module will be considered a measure of error. Metrics, such as the variability of each frame, will indicate which localization method more accurately estimates the current pose of the mobile

platforms. In this way, the UWB localization method may outperform the RTK-GPS localization method.

Vision-Guided Robotic Harvesting with Adaptive Force Control for Small-Scale Agriculture
In-Person Poster Presentation (Event Center, Poster #13)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student(s): Reese Pieroni, Sheraz Saudagar & Jean Marco Lo Monaco Borges
Research Mentor: Muhammad Hassan Tanveer

While robotic harvesting technology has advanced rapidly for industrial agriculture, small family farms, which comprise 86% of all U.S. farms, lack affordable access to automated solutions. Existing robotic harvesting frameworks often struggle to balance versatility with cost and efficiency, relying on energy intensive pneumatic actuators, restrictive wired mechanisms, or rigid single-fruit designs. To bridge this gap, this paper proposes a cost effective and energy efficient robotic harvesting framework capable of identifying and grasping a diverse range of agricultural produce. The methodology centers around a single-actuated end-of-arm tool (EOAT) integrated with a vision based perception and control pipeline. A custom trained YOLO object identification model classifies the target fruit, enabling a ROS 2 architecture to generate a fruit-specific kinematic harvesting path. During the grasp, force sensors dynamically regulate the tool's actuation, applying an optimal, pre-calibrated force tailored to the identified fruit. By combining adaptive force control, intelligent path planning, and a low power mechanical design, this framework presents a scalable, mass producible solution optimized for the variable harvesting demands of small scale farming operations.

Wellstar College of Health and Human Services

Department of Exercise Science and Sport Management

The Influence of Contraction Intensity on Torque Steadiness and Motor Unit Firing Variability in Older Adults
In-Person Oral Presentation (Wilson Student Center, Ballrooms)
Thursday, November 19, 2026, 2:00pm - 2:50pm
Graduate Student(s): Zykearia Dean, Kayla Anderson & Sean Gamache
Undergraduate Student(s): Jabari Bempah & Caleb Offutt
Research Mentor: Garrett Hester

PURPOSE: Torque steadiness (TS) is an important index of neuromuscular control in older adults (OAs). Evidence regarding the effect of contraction intensity on TS for the knee extensors (KEs) in OAs is mixed. Motor unit discharge rate variability (MUDRV) may be a contributing factor. The purpose of this study is to determine the effect of contraction intensity on TS and MUDRV for the KEs in OAs. METHODS: Seventeen, untrained OAs (72.4±4.70 yrs) volunteered for this study. Testing included submaximal isometric KEs using an isokinetic dynamometer following determination of maximal voluntary isometric (MVIC) strength. Isometric contractions were performed for a 10-s duration at a low (30% MVIC) and higher (70% MVIC) intensity in randomized order. A template was displayed, and subjects were instructed to "trace the plateau to their best ability" during the contractions. Surface electromyographic signals were recorded for the vastus lateralis using a 5-pin sensor and decomposed to identify individual MU trains. The coefficient of variation was determined for torque and the MU inter-pulse intervals for the middle 5-s portion of the plateau, representing TS and MUDRV, respectively. The sample size for MUDRV was ten, as only contractions with at least five MUs recorded and at least 90% accuracy were included in the analysis. Wilcoxon signed-rank tests were used to compare TS and MUDRV between the 30% and 70% MVIC contractions. RESULTS: TS was similar (p=0.246; d=0.30) at 30% (2.45±1.06%) and 70% (2.83±1.14%) MVIC. MUDRV was also similar (p=0.646; d=0.16) at 30% (23.81±2.93%) and 70% (23.75±1.61%) MVIC. CONCLUSIONS: TS does not appear to differ between low and higher intensities. This is at least in part due to the variability in MU firings not differing between intensities. Future research should consider comparing lower intensities and testing other muscle groups as findings may vary based on these factors.

Department of Health Promotion and Physical Education

An Exploration of the Haitian Community's Patterns of Treatment During the Flu Season
In-Person Poster Presentation (Event Center, Poster #11)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Brad Guillaume
Research Mentor: Sabrina Cherry

During the flu season Haitian communities use traditional and culturally passed down remedies. Existing research has explored the Haitian community's health care access, disease management and cultural health beliefs (e.g., Coreil et al., 2007; Jean-Francois et al., 2018; Marcelin et al., 2021). However limited research directly examines the Haitian community's response to acute respiratory illnesses such as the flu and the common cold that are much more prevalent in the colder months. Therefore, our research seeks to fill this gap by exploring these patterns of resorts and thresholds of symptoms that induce the decision to seek traditional forms of care, as well as pinpoint the most optimal unified care model that intersects traditional practices with western medicine to maximize the best health outcomes. As student principal investigator, I am imploring a qualitative research design, which will provide a different perspective than research done exclusively using quantitative methods. We are gaining information from various narratives of lived experiences that some quantitative methods tend to miss out on. Our research method of structured interviews provide insight to the

decision-making process Haitian community members followed when treating illness. Members showed a clear pattern as they relied on generationally passed remedies for comfort when symptoms first arrived. However, moving towards western medication, doctors, and clinics only came when symptoms worsened. By mapping out these decision-making habits, this study adds key evidence to existing public health research giving guidance to healthcare workers who seek to understand patient choices in building trust with the Haitian community which can lead to better care during the flu season. This also gives insight into the benefits of their traditional methods and balancing it with western medication to maximize health outcomes.

Beyond the Barriers to Care
In-Person Poster Presentation (Event Center, Poster #25)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student: Angel Adu
Research Mentor: Robert Fairman

Healthcare access is more than location and provided services. Quality of care, financial barriers, mental health, education status, and additional health factors may influence the desire for people to want to seek care. Looking at the 2023 Behavioral Risk Factor Surveillance System(BRFSS) national telephone survey, the analysis used self-reported responses to examine the association between socioeconomic and health behaviors and risks to utilization among women in both Georgia and the U.S. Preliminary analyses of Georgia data identified statistically significant associations between education level and cost-related barriers(p-value <0.0001), as well as depression status and cost-related barriers (p-value <0.0001). Further research and analyses are being conducted to understand how common barriers affect healthcare-seeking behaviors and the consistency of these relationships at the statewide vs. nationwide level.

Wellstar School of Nursing

Barriers to Undergraduate and Graduate Nursing Students' Participation in Professional Conferences and Scholarly Activities
In-Person Poster Presentation (Event Center, Poster #8)
Wednesday, November 18, 2026, 4:00pm - 4:45pm
Undergraduate Student: Aliyah Johnson
Research Mentor: Kawther Hamash

Background: Participation in professional conferences and scholarly activities enhances nursing students' professional development, confidence, research skills, and ability to apply evidence-based practice. Despite these benefits, undergraduate nursing students often encounter barriers that limit their engagement. Identifying these challenges is important for improving access to scholarly opportunities and fostering professional growth. Research Question: What barriers prevent undergraduate nursing students from participating in or presenting at professional conferences? Method: A descriptive cross-sectional study surveyed 99 nursing students aged 18 years or older using an anonymous Qualtrics questionnaire. Data were analyzed using descriptive statistics, including frequencies, percentages, and means. Results: Of the 99 nursing students surveyed, 86.9% had never attended or presented at a professional nursing conference, and 79.8% had never been approached by faculty about research opportunities. Major barriers included time constraints (63.6%), lack of awareness of conference opportunities (57.6%), and limited presentation experience (37.4%). Despite limited engagement, 81.8% recognized the importance of conferences for professional development, and 64.6% expressed interest in future participation. Discussion: Several barriers contributed to the low participation of nursing students in scholarly activities. Time constraints, lack of awareness of conference opportunities, and insufficient preparation were the most frequently reported challenges. Additionally, many students lacked knowledge regarding the process of conference presentations. Despite these obstacles, students demonstrated positive attitudes toward conference participation and recognized its value for professional growth. Faculty-led initiatives, conference preparation workshops, and structured mentorship programs may help reduce perceived barriers and increase student engagement. Conclusion: Although most nursing students had little

prior experience with research dissemination and conference participation, a majority recognized its professional value and expressed interest in future involvement. These findings highlight the need for increased faculty mentorship, awareness initiatives, and integration of research opportunities into nursing curricula to help students overcome barriers and engage in scholarly activities.

Beyond the Screen: Uncovering Links Between Texting and Drinking Among Adolescent Drivers
In-Person Poster Presentation (Event Center, Poster #21)
Wednesday, November 18, 2026, 3:00pm - 3:45pm
Undergraduate Student(s): Sade Adeyemo & Sharon Pradeep
Research Mentor: Melissa Osborne

Motor vehicle crashes remain a leading cause of unintentional injuries and fatalities among youth in the United States. Studies have shown that texting or emailing while driving has contributed to the increase in risk of crashes. In 2021, drivers 20 and under made up 8.5% of total drivers in total fatal crashes and 12.6% of drivers in all crashes despite only making up 5.1% of licensed drivers in the United States. Understanding and evaluating target groups and the reasons behind injuries and fatalities will help further preventative measures. Previous literature has suggested the correlation between alcohol abuse in teens with the misuse of handheld phones while driving. Therefore, the objective of this study is to evaluate the relationship between texting while driving and alcohol-impaired driving among U.S. high school student drivers. A cross-sectional analysis was conducted using data from the 2023 Youth Risk Behavior Survey (YRBS) data. U.S high school students in grades 9-12 were the study population, and it was restricted to students who reported operating a motor vehicle in the 30 days prior to the survey (N =7,902). Our findings demonstrate that texting while driving and drinking while driving among U.S high school students has a statistically significant, but weak relationship. Among those who drove, 5.6% of them drank while driving, and 18.6% of them texted while driving. There was a weak but statistically significant relationship between drinking while driving and texting while driving, χ^2 (1, N = 7,902) = 352.28, p <.001, φ = .21. Analysis of the YRBS data reveals that there is a small correlation between students who drink and drive and text and drive. Despite the low correlation, public health initiatives must move beyond single-issue campaigns and adopt integrated strategies to target multiple dangerous driving behaviors.

Electronic Bullying and Suicidal Ideation: A Study of Prevalence and Association of Sexual Minority U.S. High School Students
In-Person Poster Presentation (Event Center, Poster #15)
Wednesday, November 18, 2026, 1:00pm - 1:45pm
Undergraduate Student(s): Maria Maldonado & Jabari Bempah
Research Mentor: Melissa Osborne

Suicidal ideation remains a significant concern among adolescents, with rates showing little improvement internationally and potentially worsening in the United States (Van Meter et al., 2023). Previous research has linked electronic bullying victimization to negative psychological outcomes, including increased stress, loneliness, and reduced self-esteem (Ho & Nguyen, 2025). These concerns are particularly important among sexual minority adolescents, who report higher rates of poor mental health and suicide-related behaviors compared to their heterosexual peers (Youth Risk Behavior Survey, 2023). This study aims to examine the prevalence of electronic bullying and suicidal ideation and their association among U.S. high school students identifying as sexual minorities. Data from the 2023 Youth Risk Behavior Survey (YRBS) were analyzed. Sexual minority students were defined as those identifying as gay or lesbian, bisexual, questioning, or describing their sexual identity in some other way (N=4,346). Descriptive statistics determined the prevalence of electronic bullying victimization and seriously considering attempting suicide during the past 12 months. A chi-square test of independence was conducted to examine the association between these variables. Among sexual minority students, 25.3% reported experiencing electronic bullying during the past 12 months. Of those who experienced electronic bullying, 61.6% seriously considered attempting suicide, compared to 35.5% of those who did not experience electronic bullying. A chi-square test of independence revealed a statistically significant association between electronic bullying and suicidal

ideation, $\chi^2(1, N = 4,221) = 223.95, p < .001$. The results imply a need for greater mental health resources centered around media usage among adolescents. Online harassment is a relatively new issue, and with that novelty may come a learning period regarding how sexual minority adolescents could cope with electronic negative experiences. Potential future applications include developing guidelines for social media use and responding to electronic bullying to support adolescent mental health.

Examining Protection Motivation for Handgun Ownership and Previous Firearm Exposure: A Descriptive Analysis of U.S. Handgun Owners
In-Person Poster Presentation (Event Center, Poster #17)
Wednesday, November 18, 2026, 2:00pm - 2:45pm
Undergraduate Student(s): Allison Martinez & Melissa Linares Moreno
Research Mentor: Melissa Osborne

Firearm injury is the leading cause of death for children ages 0-17 in the United States. Personal protection is the most commonly cited reason for ownership. According to a 2023 survey, 72% of U. S. firearm owners report that protection is a major reason for ownership. Experiences with firearm-related violence, either directly or through family members and friends, may influence individuals' perceptions of personal safety and contribute to protection-oriented motivations for ownership. However, the relationship between prior firearm-related exposure and identifying protection as the primary reason for handgun ownership remains unclear. This study aims to investigate whether prior firearm-related exposure is associated with identifying protection as the most important reason for handgun ownership among U.S. adults who own a personal handgun. We utilized data from the National Firearm Attitudes and Behavior Study, a cross-sectional national survey. The survey used website and paper-based surveys measuring multiple dimensions of gun ownership and safety. The sample included a nationally representative sample of U.S. adults aged 18 and older. We observed the subsample of respondents who owned a personal handgun (n= 2,726 n= 2,726). Using IBM SPSS Statistics, we ran a chi-squared test of independence to examine the association between firearm-related experience and ownership for personal protection. Preliminary results indicate that 83.7% (n=2281) of handgun owners identified protection as the most important reason for ownership. However, a chi-squared test revealed no statistically significant association between reporting protection as a primary motivation and having been threatened by a firearm (df=1, n=2283) =0.636, p=0.425df=1, n=2283=0.636, p=0.425. Protection was a common motivation among handgun owners, regardless of whether they had been threatened with the firearm. Injury prevention initiatives should address protection motivations broadly rather than owners with history of direct threats. Interventions should frame secure storage as a tool that supports, rather than conflicts with protection goals.

Sense of Safety: Firearm Storage Practices in Relation to Childhood Adversity
In-Person Poster Presentation (Event Center, Poster #14)
Wednesday, November 18, 2026, 10:00am - 10:45am
Undergraduate Student: Brianne Opoku-Agyemang
Graduate Student: Lily Reimann
Research Mentor: Melissa Osborne

Firearm-related injuries are the leading cause of death among children and adolescents in the United States. Therefore, understanding the factors influencing firearm storage practices is crucial to child safety. Adverse Childhood Experiences (ACEs) could shape an individual's understanding of danger and protection, potentially influencing storage practices. This study examines the association between two parental ACE indicators, witnessing physical violence and experiencing physical abuse, and firearm storage practices. We hypothesize that exposure to parental violence is associated with firearm storage practices among U.S. adults. This cross-sectional study utilized data from the 2025 Behavioral Risk Factor Surveillance System (BRFSS). Among 47 participating states, only Indiana included items assessing both ACEs and firearm storage. The sample included 5,410 participants, with the analyses restricted to firearm owners (n=1992). Descriptive statistics summarized the dichotomized variables, and chi-square tests assessed associations between ACEs and firearm

storage practices using IBM SPSS Statistics. A statistically significant association was found between loaded firearms in the home and being physically hurt by a parent in childhood, excluding spanking, χ^2 (1, N = 1857) = 19.978, p <.001. No statistically significant association was found between loaded firearms in the home and witnessing parental physical violence, χ^2 (1, N = 1848) = 1.422, p = .233; firearms being unlocked and witnessing parental physical violence, χ^2 (1, N = 749) = .000, p = .999; or keeping firearms unlocked and being physically hurt by a parent in childhood, excluding spanking, χ^2 (1, N = 753) = .613, p = .434. Findings suggest that direct childhood experiences of violence may be associated with loaded firearm storage practices, while witnessing parental violence was not associated with the examined practices. Although existing literature has explored relationships between ACEs and firearm storage, evidence remains mixed. Further exploration may help inform injury prevention strategies that account for individuals' lived experiences.

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