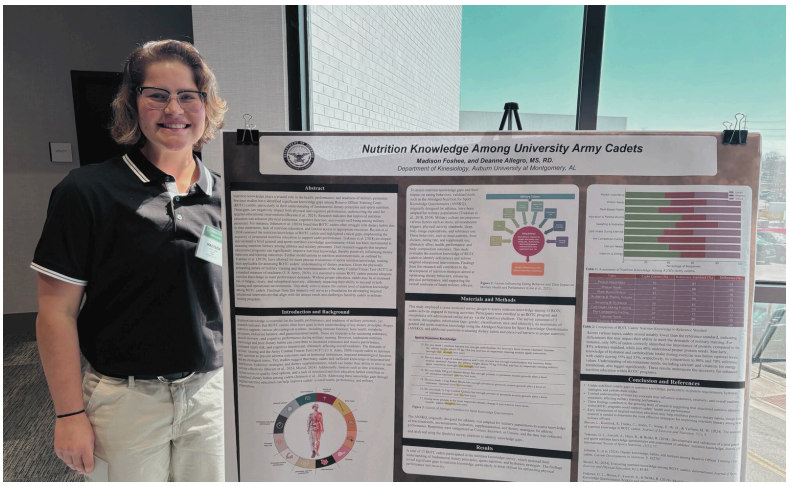
AUM

EXPERIENTIAL EDUCATION AND ENGAGEMENT CENTER

Celebration of Research, Creative Activity, and Community Engagement



Message from the Provost

Greetings to the AUM Community,

It is truly a pleasure to welcome you to the 5th Annual Celebration of Research and Creative Activity! It is of the essence to celebrate our undergraduate and graduate students' achievements and acknowledge their milestones with heartfelt appreciation. This celebration gives our cherished students an opportunity to share their research university-wide with research posters and creative activity exhibits!

The Office of the Provost has vigorous goals for AUM in the areas of research, creative activity, and community engagement benefitting faculty, staff, students, and our local community. AUM's strategic plan includes a purpose to enhance a research culture and investigative community supporting quality teaching and educational programs. In support of this aim, AUM secured a National Institutes of Health (NIH) grant award in the amount of $625,535 to build our research enterprise's capacity and infrastructure over three years, and to host various research events featuring speakers from NIH and other experts from premier research institutions. As a result, more faculty and students are engaged in funded research and collaborations. Significant efforts have been made to empower our faculty and staff to be more aggressive and successful in receiving awards from top external funding agencies. As a result, faculty and staff submitted a total of 36 grants/contracts proposals in the amount of $16,363,220 in fiscal year 2024 with the support of the Office of Sponsored Programs and Research (OSPR). Dedicated to expanding the research enterprise at the university by supporting and enabling faculty and staff, OSPR has undergone significant expansion.

Additionally, AUM has increased its support of faculty and students monetarily to support research-related efforts through its Grants-in-Aid Program, Graduate Student Research Advisory Committee, and the Undergraduate Research Council Committee. Experiential Education and Engagement Center (EEEC) has reported the funding of 101 faculty research projects in the amount of $298,787 (mini-grants) and has provided 183 students with scholarships for directed research/internship courses in the amount of $86,021 since Spring 2021. The results of our research, creative activity, and community engagement endeavors are positively impacting society and our economy, and is being shared nationally through various platforms!

Congratulations to all participants! Thank you greatly for your valuable contributions to our research goals!

Go Warhawks!

Mrinal M. Varma, Ph.D.

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EXPERIENTIAL EDUCATION AND ENGAGEMENT CENTER

A Message from the Experiential Education and Engagement Center

Thank you for participating in and attending the 2025 Celebration of Research, Creative Activity, and Community Engagement. This event was made possible thanks to the vision, dedication, and support of the Provost and Senior Vice Chancellor, Dr. Mrinal Varma.

We are proud to recognize the outstanding efforts of our students and faculty, who have worked diligently to showcase their findings and creative works. Under the mentorship of dedicated faculty members, students from across all colleges and departments have contributed work that exemplifies the spirit of inquiry, innovation, and community impact.

This annual celebration affirms our commitment to fostering a vibrant culture of research and engagement at Auburn University at Montgomery. We hope it serves not only as a platform for recognition but also as a source of inspiration for students to explore new ideas, collaborate with faculty, and participate in research and creative activities in the years ahead.

Experiential Education and Engagement Center (EEEC)

AUM

EXPERIENTIAL EDUCATION
AND ENGAGEMENT CENTER

Celebration of Research and Creative Activity
and Community Engagement
Friday, April 25, 2025
8:30 am – 12:00 pm

Schedule

8:00 am	Poster setup (Goodwyn Lobby, 109, 110 and 112)
8:30 am	Breakfast in Taylor 230
9:15 am	Program begins
	Welcome from the EEEC
	Message from our Provost, Dr. Varma
	Recognition of AUM faculty or staff who have been awarded over $1,000,000 in grants
	Recognition of AUM faculty or staff who have submitted a proposal within the last three years
	Recognition of student researchers
	Community Engagement Recognitions
10:00 am – 12:00 pm	Student Poster Presentations*

*All attendees are invited to join us in Goodwyn Hall Lobby to view student presentations.

Thank you for your support of student research and creative activity at
Auburn University at Montgomery.

Community-Engaged Learners

Jackson Baker

Major: Political Science

Hometown: Tallassee, Alabama

Volunteered with over 500 hours with the Student Veterans of America and Student Affairs.

Iris Guin

Major: English

Hometown: Prattville, Alabama

Engaging with the community, particularly through my three years of service at Shady Street Park in Montgomery and my involvement with the University Honors Program, has been fundamental to how I understand my purpose as a citizen and my identity as a caring and thoughtful individual. Working in a space that serves families and the environment has deepened my belief that who we are is inseparable from what we give. These experiences have shown me that service isn't just something I do but that it's a part of who I am. Academically, they've shaped the way I approach learning; I now seek out ideas that inspire sustainable and critical thinking and imagine more responsible and action-focused futures. Professionally, they've instilled a strong sense of responsibility, leadership, and the importance of listening to a community's needs before acting.

Lisa Henderson

Major: Communication

Hometown: Indianapolis, Indiana

Engaging with my community helped me grow in a lot of ways, professionally, personally and academically. It has made me develop better leadership and team building skills that I can use in

all aspects of my life. I also have made valuable connections and I have gained more empathy for people.

Tasnuva Hossain

Major: Computer Science

Hometown: Montgomery, Alabama

Engaging with the community has enriched me academically by deepening my understanding through real-world perspectives, strengthened me professionally by building leadership and communication skills, and shaped me personally by fostering empathy, resilience, and a strong sense of purpose.

Nathan Lochte

Major: Social Work

Hometown: Wetumpka, Alabama

I have been able to find my way in life because of the organizations I have been given the opportunity to volunteer for. It helped me find Social Work and gave me purpose. It has also given me the opportunity to develop skills, like policy advocacy, and meet people I would have never interacted with previously, including my soon-to-be wife. Thank you, EEEC!

Nixon Mejia

Major: Kinesiology

Hometown: Montgomery, Alabama

Community engagement has contributed to my academic, professional, and personal growth. Academically, I have magnified my understanding of real-world issues and applied classroom learning to practical solutions. Professionally, I have strengthened skills in communication, leadership, and teamwork that are essential in any career. Personally, I have broadened my perspective, increased my empathy, and connected with members in Montgomery. These experiences have helped shape my values and goals in the most powerful way, and for this reason, I encourage others to engage in their community as well.

Devang Patel

Major: Pre-Nursing

Hometown: Birmingham, Alabama

Community-Engaged Leader

TyKeyia Buchannon

Major: Kinesiology

Hometown: Auburn, Alabama

Engaging with the community has helped me grow as a person and overcome a lot as a college student and adult. It helped me look at things differently from different point of views to understand people and life better.

Community-Engaged Faculty

Paul Arrington

Hometown: Montgomery, Alabama

I have a responsibility as a teacher to not only teach my student the curriculum associated with UNIV, but to help them see the ways in which they can engage with their community to bring about positive change. Whether it is a field trip to the EJI Legacy Sites, a service trip to Shady Street, or attending a CRCV speaker event, community engaged learning is all about taking learning out of the classroom and using the community as a learning space. I have learned a great deal about the city of Montgomery and the River Region through the various community activities of which I have been a part, and I am a much better teacher because of those experiences.

Djuana Duncombe-Paden

Hometown: Montgomery, Alabama

My teaching of UNIV 1000, a First Year Experience course, has greatly impacted my academic, professional, and personal interaction with the community. It increased my understanding of student development and civic education in connection to higher education, which has an academic impact. Professionally, it enhanced my leadership, mentoring, and communication skills in assisting students with transitioning to college and promoting civic engagement. Personally, I have enjoyed seeing students transform into socially responsible active citizens and it reinforces my lifelong commitment to service and community involvement.

Jennifer Go

Hometown: Memphis, Tennessee

As an instructor, I think it's important that we have the same civic-mindedness and curiosity that we instill in our students because it's a great opportunity to learn from others. Being engaged with the community has helped me connect with students, faculty and staff, and members of our local Montgomery community and pushes me to continue learning, so that I can improve as an instructor, mentor, and person.

Thaddeus Hoffman

Hometown: Tuskegee, Alabama

As a UNIV First Year Experience Lecturer and Student Success Mentor, and a proud member of Phi Beta Sigma Fraternity, Inc., community engagement is at the heart of everything I do. My background in community outreach and support services has deepened my passion for connecting students with real-world resources and opportunities. It shapes my growth as an educator and allows me to show students how service and connection can create lasting impact.

Community-Engaged Staff

Onisha Murray

Hometown: Montgomery, Alabama

Engaging with the community has allowed me to professionally and personally by making me more aware of my surroundings and how I can lend a helping hand.

Scott Sterling

Hometown: Montgomery, Alabama

Volunteering with organizations across Alabama has helped me better understand the challenges our community faces and has allowed me to connect with a variety of individuals driving positive change throughout the state.

Research and Creative Activity Abstracts

Social Media and Creativity

Presenter(s):
Nandini Bolekar (Management Information Systems)

Faculty Mentor(s):
Jongheon Kim

Social media's role in fostering creativity has become increasingly significant in our digital age. This study delves into how social networking sites (SNS) shape individual creativity by examining user characteristics and knowledge transfer dynamics. Analyzing 220 SNS users' survey responses using structural equation modeling, we found that users' social interactions and relationships positively influence knowledge sharing and collective collaboration. Interestingly, social influence showed a unique correlation, specifically with knowledge sharing. By introducing SNS user playfulness as a moderating factor, we uncovered new insights into how knowledge transfer mechanisms affect individual creativity. Our findings provide valuable guidance for SNS practitioners looking to cultivate more creative user environments and enhance the creative potential of their platforms.

Does Kudzu's Soil Microbiome Improve Drought Tolerance in Crops?

Presenter(s):
Darlyn Bravo (Psychology)
Brittney Smith (Environmental Science)

Faculty Mentor(s):
Claudia Stein

Ensuring food security for the growing human population under global change is a daunting challenge our society is facing. Drought is undoubtedly one of the major abiotic stresses to crop productivity. One promising avenue is the use of plant growth-promoting microbes (PGPM) as bio-fertilizers. We are investigating the potential of extracting PGPM's from the invasive legume kudzu (Pueriara montana var. lobata). Kudzu is one of the fastest growing and most noxious invasive plants in the US. Results from previous experiments indicate that root endophytes associated with kudzu can have a growth promoting effect on some plant species. Furthermore, kudzu is also known for its ability to endure water stress and soil microbes have been shown to positively influence water regulation for other plants, we propose that kudzu's drought tolerance is mediated via the soil microbiome.

Why Did Edwards, a Democrat, Win the Louisiana 2015 Gubernatorial Election and Then Get Reelected in 2019?

Presenter(s):
Tyler Bridgewater (Political Science)
Jalen Calhoun, Sydni Free, Jackson Baker (Political Science), and Quaysean Turner (Public Administration)

Faculty Mentor(s):
Andrew Cortell

In the Louisiana political landscape, the Republican Party reigns supreme in statewide elections. A Democrat had not held a statewide office since 2008 in Louisiana, coming into the 2015 Louisiana gubernatorial election. In 2015, Louisiana held an election for the governor's seat that ended with a runoff election that saw State Representative John Bel Edwards face off against US Senator David Vitter where he won. He would go on to win reelection in the 2019 election against Republican challenger Eddie Rispone. These two results go against the political dynamics of Louisiana that leads to the research question that will be studied in this project: Why did Edwards, a Democrat, win the Louisiana 2015 Gubernatorial Election and then get reelected in the 2019?

2024 Presidential Election

Presenter(s):
Jalen Calhoun (Political Science)

Faculty Mentor(s):
Andrew Cortell

Why Former President Trump won the state of Georgia during the Presidential election of 2024.

Males vs Fluency

Presenter(s):
JaKyra Chambers (Communication Disorders)

Faculty Mentor(s):
Juanita Lloyd

A visual representation of the correlation of males and stuttering.

Low-Cost Tactile Material Classication for Robotic Perception Using Accelerometers and Vibration Sensors

Presenter(s):
Ashwin Kulangara Shaji Chandana (Computer Science)

Faculty Mentor(s):
Olcay Kursun

This study presents a low-cost and accessible tactile sensing platform for material classification in robotic applications. The system integrates a 3-axis accelerometer and a piezoelectric vibration sensor on a custom-built setup, controlled via microcontroller hardware, to detect and classify various surface materials through contact-induced vibrations. The total hardware cost remains under $50, enabling scalable deployment in robotics research and education.

Inspired by recent efforts in tactile signal processing and texture classification [1][2], our system captures vibrational feedback during controlled exploration motions. The collected signals are processed using Fast Fourier Transform (FFT) and time-domain statistical features to build a multi-domain feature set. These features are used to train lightweight classifiers such as Random Forests and Support Vector Machines, which are optimized for embedded deployment. Similar to the approach in [3], our system supports real-time inference, making it suitable for integration with mobile or assistive robotic platforms.

In contrast to more expensive tactile arrays [4], this setup emphasizes simplicity, reproducibility, and performance under constrained computational resources. We are currently developing a labeled dataset of common household and industrial materials, capturing repeatable tactile signatures under consistent motion trajectories. The performance of the system will be evaluated under varying sensor placements and motion speeds, with a focus on robustness and generalization.

Our preliminary results suggest that even minimal hardware configurations can yield high classification accuracy for material recognition, expanding possibilities for tactile perception in autonomous robots. Future extensions will include dynamic feedback during grasping, as explored in [5], and cross-modal learning combining tactile and visual inputs.

Antibacterial Activity of Whole-Cell and Cell-Free Culture Supernatant of a Paenibacillus Species

Presenter(s):
Cameren Cunningham (Biology)
Adrian Lewis (Biochemistry and Molecular Biology), Jecayla Howard (Chemistry) and Madison Foshee (Kinesiology)

Faculty Mentor(s):
Benedict Okeke

The increasing resistance of microbes to antibiotics is a serious public health problem. Antibiotics include natural microbial products, and other synthetic products that inhibit or inactive microbes. They were originally from microbial sources, but synthetic products with similar activity are also as antibiotics. The discovery of the first antibiotic penicillin by Alexander Fleming was a major development in the treatment of microbial diseases with antibiotics. Natural evolution in soil environments can lead to the emergence of unique antibiotic-producing strains. Thus, in this study, we screened microbes isolated from soil samples for antibacterial activity on both Gram-positive and Gram-negative bacteria. One isolate was identified by 16s rRNA gene sequence analysis as Paenibacillus species C21 (99% identical to Paenibacillus polymyxa). Whole cells of Paenibacillus species C21 displayed antibacterial activity against Staphylococcus aureus and Citrobacter freundii. Further studies on the spectrum of antibacterial activity of cell-free culture supernatant of Paenibacillus species C21 are in progress.

EE21 Survey

Presenter(s):
Emily Daniel (Elementary Education)

Faculty Mentor(s):
Nicholas Bourke

The EE21 is a survey designed to measure outcomes for individual participants in EE programs. The online version of the survey was distributed to participating students via an e mail link. Participants completed EE21 one day prior to their visit to the MFS and then completed EE21 again two days after the conclusion of their farm visit. EE21 consists of 32 Likert-type items and two open-ended items. Long term follow-up survey completed 6 months after the farm visit. Sample: The 2023 sample consisted of approximately 40 5th and 6th grade students from public elementary schools in Alabama. Results revealed the EE21 can be successfully utilized by Environmental Education providers to document program impact on visiting students.

CS-Bot at AUM: An AI-Powered Chatbot for Student Support

Presenter(s):
Shivaram Danwada (Computer Science)

Faculty Mentor(s):
Sutanu Bhattacharya

This assistant is an AUM-focused educational chatbot designed to support students across disciplines such as Computer Science, Biology, and other fields. Its primary goal is to help students navigate academic topics more effectively by answering subject-specific questions with context-aware responses. The assistant is also capable of providing faculty-related information, including courses taught, research interests, office hours, and academic achievements — offering a more personalized and structured learning experience. Unlike general-purpose AI chatbots, this assistant is built on a carefully curated academic knowledge base, indexed using FAISS and retrieved via semantic embeddings from MiniLM (a distilled BERT-based model). Responses are generated using Phi-2 (~2.7 billion parameters), a lightweight generative model, as part of a Retrieval-Augmented Generation (RAG) pipeline. This makes the interaction both fast and focused, with answers grounded in academic context. At present, the assistant can address questions from select subject areas and faculty profiles. As development continues, its coverage will grow to include additional departments, research domains, and advanced coursework. The system is modular by design, allowing future enhancements to be added without disrupting the existing experience. By combining structured knowledge with AI-driven RAG techniques, the assistant aims to bridge the gap between classroom learning and real-time academic support.

Investigating Leaf Area as an Invasive Trait of Common Periwinkle

Cody Kilpatrick (Environmental Science)

Claudia Stein

Non-native invasive plant species out-compete native organisms, reducing biodiversity and altering the abiotic environment, causing environmental and/or economic damage in their introduced ranges. Morphological traits like plant size, leaf area, influence the fitness of a plant. Therefore, pre-adaptation to the climate found in a plant's novel range may influence its ability to colonize and establish in a new location. Phenotypic plasticity in morphological traits is another mechanism that can aid plants in colonizing new areas, but many invasive species also have the potential to rapidly evolve once they are exposed to novel environments. We used digitized natural history collections to investigate whether leaf area of Vinca minor differs in their invaded range compared to their native range.
Vinca minor, commonly known as periwinkle, is a perennial evergreen that forms dense and extensive mats along forest floors. It was first introduced into North America in the 1700s as an ornamental and is native to Europe and Western Asia. Our results showed that mean leaf area of Vinca minor was significantly higher in its native range (mean leaf area 348.1 mm2) compared to its invasive range (mean leaf area 295.7 mm2). Having a smaller leaf area in the introduced ranges might indicate rapid adaptation to the new environment, or lower understory

competition. It might also indicate a founder effect, where genetic variability of the initially introduced individuals was low and contained mainly individuals with smaller leaves. Future molecular studies are needed to understand the underlying mechanisms.

Nutrition Knowledge Among ROTC Cadets

Presenter(s):
Madison Foshee (Kinesiology)

Faculty Mentor(s):
Deanne Allegro

Nutrition knowledge plays a crucial role in the health, performance, and readiness of military personnel. Previous studies have identified significant knowledge gaps among Reserve Officer Training Corps (ROTC) cadets, particularly in their understanding of fundamental dietary principles and sports nutrition. These gaps can negatively impact both physical and cognitive performance, underscoring the need for targeted educational interventions (Boyum et al., 2024). Research indicates that improved nutrition education can enhance physical endurance, cognitive function, and overall well-being among military personnel. For instance, Johnson et al. (2024) found that ROTC cadets often struggle with dietary habits due to time constraints, lack of nutrition education, and limited access to appropriate resources. Boyum et al. (2024) assessed the nutrition knowledge of ROTC cadets and highlighted critical gaps, emphasizing the necessity of structured nutrition education to support cadet performance. Trakman et al. (2018) developed and validated a brief general and sports nutrition knowledge questionnaire, which has been instrumental in assessing nutrition literacy among athletes and military personnel. Their research suggests that targeted educational programs can significantly improve nutrition knowledge, thereby positively influencing dietary behaviors and training outcomes. Further modifications to nutrition assessment tools, as outlined by Trakman et al. (2019), have allowed for more precise evaluations of sports nutrition knowledge, making them applicable for assessing ROTC cadets' understanding of dietary practices. Given the physically demanding nature of military training and the implementation of the Army Combat Fitness Test (ACFT) as a standard measure of readiness (U.S. Army, 2020), it is essential to ensure ROTC cadets possess adequate nutrition knowledge to meet performance demands. Without proper education, cadets may be at increased risk of fatigue, injury, and suboptimal recovery, ultimately impacting their ability to succeed in both training and operational environments. This study aims to assess the current level of nutrition knowledge among ROTC cadets. Findings from this research will serve as a foundation for developing targeted educational interventions that align with the unique needs and challenges faced by cadets in military training programs.

Antioxidant Activity of Lactic Acid Bacteria and Yeasts Selected from Local Fruits and Vegetables

Presenter(s):
Madison Foshee (Kinesiology)
Adrian Lewis (Biochemistry and Molecular Biology), Cameren Cunningham, Tikayla Barker, and Kayla Stojak (Biology)
Jecayla Howard (Chemistry)

Faculty Mentor(s):
Benedict Okeke

Lactic acid bacteria (LAB) and yeasts are important industrial organisms because of their probiotic and fermentation qualities. Strains of LAB can have antioxidant or antibacterial effects. Antioxidants mitigate oxidative damage and play crucial roles in promoting health and preventing disease. Certain yeasts produce carotenoid pigments that have potential industrial applications. This study focused on potential antioxidant and antibiotic activity of lactic acid bacteria and yeast isolated from local fruits and vegetables collected from farmers markets in Montgomery, AL. Selected LAB and yeasts were identified using 16S rRNA gene sequence and the ITS DNA sequence, respectively. Identified isolates include BLU1 (Latilactobacillus sakei 100 % similarity), BLU 2 (L. Sakei 100% similarity), BLA1 (Paenibacillus ourofinensis 100 % similarity), BLUY2 (Sporobolomyces pararoseus 100% similarity), PINY2 (Rhodotorula mucilaginosa 100% similarity), OKRY2 (S. pararoseus 100% similarity) and RPY1 (S. pararoseus 100% similarity). DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging assays indicated that isolates BLU1, BLU2, PINY2, PPY2 and TOMY1 displayed antioxidant activity. BLU1 and BLU2 exhibited the highest antioxidant activities, with DPPH scavenging rates of 22.52% and 37.72%, respectively. BLU2 displayed strong antibacterial activity against Citrobacter freundii. Future directions include a comparison of the antioxidant effects of the lactic acid bacteria strains with antioxidants.

Why Has the Republican Party Maintained Control of Florida's State Government for the Past 30 Years?

Presenter(s):
Sydni Free (Political Science)

Faculty Mentor(s):
Andrew Cortell

A look into why Florida, a notorious battleground state, has had a Republican state government since the late 1990's. Examines several theories that contribute to studies on partisan control.

Multi-Year Amphibian Sampling for Batrachochytrium Dendrobatidis and B. Salamandrivorans In a Tributary of The Tallapoosa River, Alabama

Presenter(s):
Kyla Garcia (Environmental Science)
Nathan Lochte (Social Work)

Faculty Mentor(s):
Maria Breitman and
Justin Bagley

Amphibians are susceptible to various diseases, including chytridiomycosis, a severe disease of keratinized skin tissues that poses a major threat to amphibians. About 10 years ago, some European salamanders have been lethally affected by the chytrid Batrachochytrium salamandrivorans (Bsal); this fungus is expected to invade North America and affect our amphibians negatively. Luckily, multiple organizations have been working together towards screening North America to act immediately when a positive Bsal is discovered. This network (SNAPS) relies on undergraduate students at 60+ institutions, to conduct the field sampling. AUM students have participated in SNAPS for the last 3 years. We have written the first SNAPS paper including students, and it is now accepted for publication reporting our findings (no Bsal yet in North America); it is worth noticing that 30+ AUM students are co-authors in this publication. SNAPS at AUM includes 8-15 undergraduate students every spring. Here we present results of our recently accepted paper.

AI-Based Detection of Coliform Colonies For Water Quality Monitoring

Presenter(s):
Abria Gates (Computer Science)
Shivaji Mallela (Computer Science)

Faculty Mentor(s):
Olcay Kursun

Water contamination by pathogenic microorganisms such as bacteria and viruses poses a significant public health risk globally. Indicator organisms like Escherichia coli and other coliform bacteria, typically originating from fecal contamination, are essential for assessing water quality. Traditional detection methods for coliform bacteria are costly, labor-intensive, and time-consuming. This study explores advanced artificial intelligence (AI)-based approaches, specifically utilizing computer vision and image processing techniques, for the automated recognition and classification of bacterial colonies on solid culture media. An image dataset, including data collected at AUM, comprising snippets of bacterial colonies such as E. coli, Citrobacter freundii, Enterobacter aerogenes, and Klebsiella pneumoniae was analyzed. Colony detection and segmentation were performed using YOLO, supplemented with comparisons using ImageJ. Feature extraction was carried out through Histogram of Oriented Gradients (HOG), Local Binary Patterns (LBP), and Convolutional Neural Networks (CNN) with transfer learning. Classification accuracy was evaluated using Support Vector Machines (SVM), Random Forests, and CNN models. Results demonstrated improved accuracy in colony recognition and species-level classification with CNN-based transfer

learning. This study shows the potential of AI-driven techniques to streamline and enhance microbial water quality monitoring. While simpler feature extraction methods showed effectiveness, as future work we will show that neural networks are more versatile when handling color images and incorporating additional metadata as inputs.

The Effect of Infertility Mandates on Women's Fertility

Presenter(s):
Luke Hollon (Economics)

Faculty Mentor(s):
Agnitra Roy Choudhury

Infertility has become increasingly common in developed countries as women delay childbearing. Infertility is an issue that affects over 6 million women within the United States. There are currently fifteen states that have enacted policies mandating various levels of insurance coverage for infertility and invitro fertilization treatments. In this paper, I utilize data obtained from IPUMS USA which aggravated data from the America Community Survey, and I use population estimates to estimate the effect that state-level insurance mandates had on women's fertility rates. We are analyzing the states that have added or altered their infertility mandates during our sample period. Our sample period is from the years 2008-2023. Utilizing a difference in difference approach. We examine variations in the enactments of insurance mandates across both state and time, and examine how different populations may have been disproportionally affected by state-level mandates. My results suggest that state mandates for infertility coverage did not have a statistically significant effect on women's fertility.

The Inflation-Unemployment Nexus in Labor-Intensive Economics

Presenter(s):
Kayla Holmes (Applied Economics)

Faculty Mentor(s):
Agnitra Roy Choudhury

This paper investigates how labor intensity shapes the relationship between unemployment and inflation during periods of rising inflation across countries. It focuses on whether economies with more labor-intensive production exhibit a stronger Phillips Curve trade-off, where inflation and unemployment move inversely. The study also explores how structural differences, such as labor versus capital intensity, affect inflation dynamics, especially when inflation expectations are considered. Empirical analysis reveals that expectations, particularly in the United States, are a stronger and more consistent driver of inflation than the unemployment gap. Nonetheless, the intensity of production remains crucial, suggesting that the strength of the inflation-unemployment link varies with an economies' structural makeup. By blending theory with cross-country data, this research refines the Phillips Curve framework to reflect modern global labor market realities.

The Ripple Effect: How Racism and Segregation Engineered the School-to-Prison Pipeline

Presenter(s):
Jakyrah Johnson (Criminal Justice)

Faculty Mentor(s):
Brett Lehman

The school-to-prison pipeline describes how disadvantaged students, especially Black students, are funneled from underfunded schools into the criminal justice system due to harsh disciplinary policies, lack of resources, and systemic neglect. This topic is significant because education should be a pathway to success, not incarceration. The research to be presented involves a case study of two schools in Greensboro, Alabama - a small town with a history of racial segregation in its education system. One is a traditional public high school serving a predominantly Black population. The other is a private school serving predominantly white students. The case study research will explore funding disparities, discipline policies, and community perceptions of both schools in order to shed further light on the school-to-prison pipeline in Greensboro.

Dramaturgy Casebooks: John Logan's Red and We Meet at Ralph's by J. Harvey Stone

Presenter(s):
Dusti Levy (Communication)

Faculty Mentor(s):
Valeria Winkelman

These two casebooks demonstrate the scope of dramaturgy in today's complex theatrical world, and its evolving role in storytelling and world-building.

Rotenone Inhibits Human Brain Endothelial Cell Migration

Presenter(s):
Hongyu Lin (Chemistry)
Franziska Dempwolf (Chemistry)

Faculty Mentor(s):
Siva Sakamuri

Brain microvascular endothelial cells (BMECs) are critical in maintaining blood flow, blood-brain barrier (BBB) integrity, and neurovascular coupling. These cells regulate nutrient exchange and immune surveillance in the central nervous system (CNS), making their function essential for brain homeostasis. While rotenone, a mitochondrial complex I inhibitor, is widely

known to impair neuronal function and induce oxidative stress, its impact on BMECs remains unexplored.

In this study, we investigated the effects of rotenone on BMEC migration using a wound-healing assay. Human brain endothelial cells (HBECs; Cell Systems, passage 8) were seeded in twenty-four well plates and grown to 100% confluency. A uniform scratch was made, and cells were treated with 0.5 μM rotenone. Phase-contrast images were captured using an ECHO microscope, and wound closure was analyzed with ImageJ. After 12 hours, rotenone significantly impaired cell migration, with a 4.39-fold decrease in wound coverage compared to control (n = 3–4 wells). Mean ± SE wound closure was 4.75 ± 2.45% in controls and 20.9 ± 4.4% in the rotenone group ($p = 0.023$, two-tailed Student's t-test).

Given that rotenone disrupts mitochondrial function and increases reactive oxygen species (ROS), our findings suggest that mitochondrial dysfunction may underlie the impaired migration of BMECs. While rotenone is known to affect neurons and other brain cells, its role in BMEC function has not been previously studied. These results highlight the need for further investigation into how mitochondrial dysfunction in endothelial cells contributes to cerebrovascular pathology.

Aerobic Fitness of Undergraduate Kinesiology Majors as Measured by the Queen's College Strep Test

Presenter(s):
Nathan Lochte (Social Work)
Madison Foshee, Erin Wofford, Sherilyn Briggins, and Bethany King (Kinesiology)

Faculty Mentor(s):
Angela Russell

Purpose: The purpose of this study was to determine the current aerobic fitness level of undergraduate Kinesiology majors. Methods: Thirty-two healthy Kinesiology students (8 male, 24 female) between the ages of 19 and 28 (mean age 21.4 ± 2.0 years) participated in the study. Participants first completed the PAR-Q to determine medical eligibility to participate and were then asked to complete the Queens College Step Test to determine aerobic fitness level and estimate V̇O2 max. Frequencies of categorical ratings of fitness (poor, average, etc.) were determined for the group as a whole, as well as separately for males and females. Descriptive statistics were also run to find mean estimated V̇O2 max values of study participants. Results: Twenty-seven students (8 male, 19 female) completed the step test. Five subjects (15.6% of the sample, all female) were unable to complete the step test. All other participants were classified as average (6 subjects), above average (3 subjects), or well above average (18 subjects). Mean V̇O2 max was estimated at 39.8 ± 2.5 ml/kg/min (males 39.6 ± 2.9 ml/kg/min; females 39.9 ± 2.4 ml/kg/min). Conclusion: Undergraduate Kinesiology students on average recorded higher than average aerobic fitness level, with 56.3% of the sample classified as well above average. However, 15.6% of the sample had very poor fitness, indicating that additional instruction or interventions may be required for some students to reach a level of aerobic fitness needed for good health. Future research should examine factors contributing to fitness and health habits (athlete status, lifestyle factors, etc.) in this population in order to formulate interventions to improve their aerobic fitness.

Quantifying Arm Swimming in the Octopus Muusoctopus Robustus

Presenter(s):
Ryan McMichael (Biology)

Faculty Mentor(s):
Maria Breitman

The locomotion and object manipulation abilities of the octopus' hydrostatic limbs are backed with incredible dexterity and effective force, inspiring promising applications as a model for soft robotics. While research on octopus biomechanics tends to emphasize the versatility of their body and degree of freedom in their movement, we must consider that specific motions will be selected for if they confer fitness. These develop into a predictable set of actions and behaviors, and research has shown that practical actions like punching and tactile communication culminate in a finite number of efficient, stereotyped movements. Arm swimming, the propulsion gained from oscillation of all 8 arms, may provide an excellent model of stereotyped motion, but still lacks formal analysis. By measuring 138 arm angles throughout 14 minutes of arm swimming motion in 8 Muusoctopus robustus individuals, we can recognize and quantify variation and consistencies in movements to identify the underlying fitness and efficiencies of arm swimming in this species.

Drishti: A Generative AI-Based Application for Gesture Recognition and Execution

Presenter(s):
Harshavardhan Meka (Computer Science)

Faculty Mentor(s):
Tathagata Bhattacharya

This study explores the evolution of the inclusive educational tool, now named "Drishti" a new release of the preceding "Dishari" project. Drishti integrates current technologies, specifically hand gesture detection, and generative AI, to cater to individuals with hearing and speech impairments. Traditional engines like Google
frequently overlook the unique accessibility desires of these users, developing barriers to digital engagement. Drishti bridges this gap by using machine learning algorithms and computer vision to interpret hand gestures captured via web cameras, translating them into both sign language and keyword inputs for search engines like
Google and Yahoo. The updated version extends the functionality of Dishari by incorporating not only alphabet inputs but also numerical inputs (0-9), delete button gesture, and space button gesture. Generative AI further complements the quest procedure, permitting seamless query inputs through both textual content and gestures.
Through an in-depth literature analysis, we list the advancements in gesture recognition and the role of generative AI in improving accessibility, marking Drishti as an enormous step

toward empowering people with hearing and speech impairments, to engage with digital platforms more efficiently.

Mobile Wallet Consumer Satisfaction

Presenter(s):
Sanjana Mendadala (Management Information Systems)

Faculty Mentor(s):
Donald Amoroso

This study investigates the factors that influence continued use of mobile wallets. By building on existing theories, we developed a new model that considers various factors, including risk, usefulness, ease of use, satisfaction, and attitude. Our findings reveal that confirmation is a crucial factor in continued use. Understanding consumer satisfaction and risk perception can inform the design of mobile wallets, encouraging more people to adopt digital payment systems. By doing so, we can boost the use of mobile wallets in the digital economy, growth and innovation in mobile payments. This research provides valuable insights for businesses and developers seeking to improve mobile wallet adoption.

Discovering Reptile and Amphibian Diversity in AUM's Forest

Presenter(s):
Antonio Neal (Interdisciplinary Studies)
Ryan McMichael (Biology) and Cody Kilpatrick (Environmental Science)

Faculty Mentor(s):
Maria Breitman and Justin Bagley

Alabama has a rich and diverse herpetofauna with ~166 species and the highest diversity in the Southeastern Coastal Plain (SCP) biodiversity "hotspots." Many of these species are now threatened or endangered because of the impacts of urbanization and other human activities. Auburn University in Montgomery (AUM) is located in the city of Montgomery and has a ~250-acre secondary urban forest. Urban forests have emerged as habitats that can balance the negative effect of urbanization on diversity, and reptiles and amphibians are considered model organisms for studying ecological and evolutionary patterns, including ecosystem health and function in natural and urban areas. Here, we set out to understand the community composition of the AUM forest herpetofauna, as well as its genetic diversity under different management treatments (invasive species removal, prescribed burns, prairie habitat, and control). In this presentation, we will summarize the results of our first year of sampling the Long-Term Ecological Research Experiment (LTERE) studying herp diversity in the AUM forest using 40 pit-fall trap surveys. Specimens are identified, measured, and released. Our study will allow us to make recommendations regarding conservation, preservation, and management of habitats. In addition, our study allows for students and classes to work on campus on relevant ecological questions, increasing AUM student representation in science.

Making Home a Safe Place through mindful Parent-Child Communication: Middle Childhood (6-11 Years)

Presenter(s):
Uzoechi Precious Nwadiaro (Counseling Education)

Faculty Mentor(s):
Yuh J Guo

The home serves as an important place where the mind of the child is grown and developed. Demographic of study are parents and children in formative stages, up to young adolescents. Mindful communicative patterns provide a safe space where children feel safe physically, emotionally and psychologically because they feel seen and heard. It is essential, especially in today's world, with how busy parents are coupled with the stressors children face growing up, that families learn and remember to communicate, speak, listen, share ideas and fears. Mindful parent-child communication creates safety for children and parents to be honest with each other and open up freely with day-to-day activities such that even the hard days are easily manageable. This study sheds light on perceptions about mindful parent-child communication in the home. What comes to mind when caregivers and parents hear the phrase making home a safe place? What are the challenges faced with making the home safe through mindful parent-child communication? Is it a one size fits all or can it be fine-tuned to each individual family? With different homes comes the differences in perception when one practices mindful communication. Making Home a Safe Place through mindful Parent-Child Communication: Middle Childhood (6-11 Years) is what this research aims to describe.

Real-Time Tactile Texture Classification Using Low-Cost Embedded Systems and Multi-Domain Signal Analysis

Presenter(s):
Chandana Pagudala (Computer Science)
Ashwin Kulangara Shaji (Computer Science)

Faculty Mentor(s):
Olcay Kursun

This work presents the design of a low-cost embedded system for real-time tactile texture classification. A hardware platform is built from budget-friendly components, including an Arduino Nano 33 BLE Sense, an external analog-to-digital converter ADS1115, and a combination of 3-axis accelerometers and piezoelectric vibration sensors. The system cost is less than $60, and it can be used in scalable and low-cost tactile sensing applications.
We are currently collecting a dataset of vibrotactile signals by interacting with a variety of surface textures under controlled motion conditions. In order to analyze the signals in real-time, we are setting up two parallel feature extraction pipelines, a Fast Fourier Transform (FFT)-based frequency analysis and a memory-efficient time-domain approach based on cumulative multi-bandpower (CMB) estimation. These are used to train compact machine learning classifiers, such as random forests and linear SVMs, which are optimized to execute on microcontroller hardware. The system is being developed, and experiments are ongoing to

determine the best sensor configurations, signal lengths, and classification techniques. Preliminary results indicate that the CMB approach can achieve a good trade-off between accuracy and computational expense, especially for real-time edge deployment. The goal of this work is to create a realistic, self-contained tactile classification system that does not depend on cloud resources, with possible applications in assistive technology, robotics, and smart IoT devices.

Candida Auris

Presenter(s):
Alejandra Palacios (Medical Laboratory Science)
Kanya Perry (Medical Laboratory Science)

Faculty Mentor(s):
Li Qian

Candida auris is an emerging multidrug-resistant fungus that is rapidly spreading more than 45 countries worldwide since 2009. It is considered a major threat to healthcare settings. The aim of this mini review is to describe the current status to identify C. auris, mainly focusing on its resistant characteristics that gives its ability to spread.

Machine Learning for Antibiotic Susceptibility

Presenter(s):
Alejandra Palacios (Medical Laboratory Science)
Md Moin Kabir (Management Information Systems)

Faculty Mentor(s):
Li Qian

Urinary tract infections (UTIs) are among the most common bacterial infections. Antibiotic resistance poses a critical challenge to the healthcare system in treating UTI's. Broad-spectrum antibiotics are often administered the patient empirically due to the time-consuming nature of traditional diagnostic methods. This study aims to explore machine learning models for predicting antibiotic susceptibility patterns based on urine culture in Central Alabama.

A Deep Learning Framework for Scalable Protein Structural Similarity Search from Sequences

Presenter(s):
Sai Prashanthi Pallati (Computer Science)
Robert Spicer (Computer Science)

Faculty Mentor(s):
Sutanu Batthacharya

Protein sequence similarity has traditionally been the primary approach for identifying evolutionary relationships and functional annotations. However, this method is often limited when dealing with remote homologs with low sequence similarity (<30%), where structural information provides a more reliable metric for assessing protein relationships. Existing structural alignment tools require either experimentally determined structures or computationally intensive structure predictions, making large-scale (e.g., metagenomic) structural similarity searches challenging. Our work introduces a deep learning-based approach that enables the prediction of structural similarity scores directly from sequence pairs. The model is trained using a twin neural network architecture to approximate structure-based alignment scores, allowing for efficient indexing and querying of large protein sequence databases. By transforming protein sequences into vector representations that encode structural features, our approach facilitates rapid structural similarity searches without the need for explicit structure computation. Our method significantly improves sensitivity in detecting remote homologs compared to traditional or recent AI-based sequence alignment techniques. Benchmarking on multiple protein structure databases demonstrates that it achieves high accuracy in predicting structural similarity, even for proteins with minimal sequence identity. Additionally, our approach scales efficiently, allowing for rapid and accurate searches across large protein sequence datasets. The results highlight the effectiveness of this method in enhancing structural annotation and remote homology detection, providing a scalable solution for large-scale protein sequence analysis.

Flight School: Utilizing Peer Mentors to Make Class Awesome

Presenter(s):
Courtney Pettaway (Biology)
Neha Sehar (Pre-Nursing) and Emilee McCracken (Biology)

Faculty Mentor(s):
Tara Beziat, Matthew Grilliot, Maria Breitman, and Chelsea Ward

Our NSF-funded model, “Flight School” uses a tiered peer-mentor structure that allows learners and mentors to engage directly with the learning experience, provide feedback, and make real-time adjustments to the learning process. After 3 years of research and implementation, our results indicate that training undergraduate students and faculty in community building, communication, lesson planning, and concepts from educational and cognitive psychology positively impact the learners, mentors, and faculty. Specifically, learners showed significant learning gains, and a reduction in their DFW rates, mentors

showed a greater sense of belonging in science, and faculty reported higher satisfaction while teaching. Our results suggest that Flight School can emerge as a mechanism to increase representation in STEM jobs and careers because empowers students to advocate for their learning and promotes a more efficient use of class time and study sessions

Chest X-Ray Classification Using Deep Learning Models

Presenter(s):
Adithya Rakesh Rayala (Management Information Systems)
Srilekha Thallapelly, Satya Venkateswara Rao Inukonda, Rohit Kollati (Management Information Systems)

Faculty Mentor(s):
David Simmonds

This project applies convolutional neural networks (CNNs) to classify chest X-ray images into categories such as normal, pneumonia, and tuberculosis. Using a labeled dataset from Kaggle, we trained a CNN model that achieved over 92% accuracy. Preprocessing steps included normalization and augmentation to improve performance. Results show strong detection of pneumonia, demonstrating the potential of AI to support radiological diagnosis. Future work includes testing deeper models and integrating the system into clinical workflows.

Ocean Genes: Discovering Substrates for Membrane Transporters in Ruegeria Pomeroyi

Presenter(s):
Gabriel Rissman (Environmental Science)
Khushali Bharat Panchal and Kelly Corbin (Biology)

Faculty Mentor(s):
Maria Breitman

Carbon is the foundation of all organic molecules and plays a crucial role in climate change. Carbon can be incorporated into biomass, can be sedimented at the bottom of the ocean, or can be in the atmosphere as CO2, making the Earth warmer along with other greenhouse gasses. Studying the oceans is crucial because that's where half of the Earth's photosynthesis happens; and in particular studying bacteria in the ocean is of extreme importance because they drive key steps in the carbon cycle. The bacteria Ruegeria pomeroyi is emerging as a model organism to understand carbon flux in the ocean. Ruegeria pomeroyi has a published genome and is easy to grow in the lab; colleagues from UGA have been researching this organism from +20 years, and have developed ~4000 lines of mutants along with lab protocols for the discovery of genes that regulate metabolite uptake. In this work we describe the results of a Course-based Undergraduate Research Experience that was conducted in Spring 2025 at Auburn University at Montgomery. In this study, we grew ~ 20 mutant R. pomeroyi bacteria that have unique disruptions in transporter genes for which the substrate taken up by the transporter is unknown, on a variety of substrates. We performed t- tests to understand if growth was significantly different and we discussed results in light of available literature.

Lighting Design for RED by John Logan

Presenter(s):
Aaron Rudnick (Communication)

Faculty Mentor(s):
Michael Krek

Lighting Design for Theatre AUM fall production. Includes play analysis, research, light plot and technical information.

Tipping the Balance: A Global Look at Public Debt and Its Nonlinear Impact on Growth

Presenter(s):
Michael Russo (Economics)

Faculty Mentor(s):
Agnitra Roy Choudhury

We performed whole-soil inoculation experiments in the greenhouse to assess how kudzu's soil microbiome influences drought responses of kudzu itself and four different crop species. Our results indicate that during its early seedling establishment phase, kudzu is negatively affected by drought. Growing in its own soil microbial community did not improve growth under drought compared to growing with a non-kudzu associated soil microbiome nor growing without any live soil microbiome. The crop species did not show any improved growth under drought when grown in soil with the kudzu-associated soil microbiome. We discuss future experiments needed to fully assess if kudzu's soil microbiome could provide drought tolerance to itself or crop species.

Using Natural History Collections to Assess Factors Influencing Range Expansion of Invasive Plants in The United States

Presenter(s):
Brittney Smith (Environmental Science)

Faculty Mentor(s):
Claudia Stein

Invasive plant species quickly reproduce and thrive in a variety of conditions outcompeting plant species native to the ecosystems. Understanding factors that contribute to their rapid range expansion can substantially improve our ability to prevent and control their spread. We used digital natural history collections data, (i.e. herbarium data from iDigBio, citizen science observations from GBIF) to compare the rate of range expansion of three invasive species Ligustrum sinense (Chinese privet), Lonicera japonica (Japanese honeysuckle) and Imperata

cylindrica (Cogon grass) in North America. Privet and honeysuckle are escaped ornamental plants in the US, as their seeds are spread by birds. Cogon grass was introduced as forage and seeds are wind dispersed. We hypothesized that the wind pollinated and wind dispersed Cogon grass spreads more rapidly compared to Chinese privet and Japanese honeysuckle which both rely on insect pollinators and animals for seed disperal. We used QGIS to map species occurrences in North America and calculated the range expansion for all three species using 20-year intervals. Using covariance analysis, we tested the rate of range expansion. Our results showed that Chinese privet had the fastest range expansion, while range expansion rates did not differ significantly between Cogon grass and Japanese honeysuckle. Our study also showed that the range expansion rate for Chinese privet increased significantly 80 years post introduction, indicating that monitoring the range expansion of potential invasive species via natural history collections could be an important early warning tool to identify invasive species that require implementation of large-scale distribution restrictions.

Food and Think

Presenter(s):
Greyson Smith (Sociology)

Faculty Mentor(s):
Brett Lehman

This research focuses on the effects of nutrition on educational outcomes. Previous literature indicates that lower income communities struggle with nutrition due to lack of information on diet and lack of resources on proper nutrition. The research study to be presented is a comparison of a lower income community and a higher income community that is classified as a "blue zone", meaning that the community has a disproportionate number of residents living up to 100 years old. The first community is Flint, Michigan and the second is Loma Linda, California. Through case study research on both communities' resources and education systems, this study can shed additional light on educational inequalities based on factors like health, race, and social class.

Foundational Speciation Work for The Southeastern Azalea, Rhododendron Prunifolium (Ericaceae)

Presenter(s):
Isabella Soto (Environmental Science)

Faculty Mentor(s):
Vanessa Koelling

The southeastern azaleas (genus Rhododendron, section Pentanthera) are a complex group of species that show evidence of rapid diversification and widespread hybridization. Species within the clade often have substantial morphological overlap but also show evidence of morphological differentiation and geographic separation along temperature gradients. As long lived woody perennial plants, we are interested in their speciation and reproductive isolation due to the little knowledge surrounding them. To understand speciation in the southeastern azaleas specifically, more genetic resources must be developed for phylogenetic and population genetic analyses. To begin the work in this group, we have focused on Rhododendron prunifolium because this species is native to Alabama and due to their diploid nature. We aim to optimize the isolation of quality DNA due to its difficulties and begin to understand some of the early life history (since little is known about it.) The objective of this study is to present an analysis of multiple modifications to the standard CTAB isolation protocol, soil mix compositions and their effect on germination success, variance between populations, and exploring potential genes of interest when mapped to the reference genome of R. vialii.

A Fast AI-Based Low-Homology Protein Sequence Alignment

Presenter(s):
Robert Spicer (Computer Science)
Sai Prashanthi Pallati (Computer Science)

Faculty Mentor(s):
Sutanu Batthacharya

Accurate detection of protein sequence homology is essential for understanding evolutionary relationships and predicting protein functions, particularly for low-homology proteins in the "twilight zone" (<30% sequence identity). Traditional sequence alignment methods often fail in these cases, and while AlphaFold2 has revolutionized protein structure prediction, its applicability is limited by the vast gap between known protein sequences and predicted structures. Metagenomics datasets alone reveal billions of unique protein sequences, with only a fraction having experimentally determined or reliably predicted structures. Additionally, AlphaFold2's high computational cost often requires hours or even days for large-scale analyses. To address these challenges, we propose a novel embedding-based sequence alignment approach that leverages residue-level embeddings from pre-trained protein language models (e.g., ProtT5, ESM-1b). Our tool integrates clustering and double dynamic programming to achieve Spearman correlation coefficients of up to 0.93 (TM-min), outperforming existing embedding-based tools, and completes alignments in seconds, offering a scalable and efficient solution for bioinformatics applications.

Navigating the Twilight Zone: An AI-based Approach to Protein Sequence Alignment

Presenter(s):
Robert Spicer (Computer Science)
Sai Prashanthi Pallati (Computer Science)

Faculty Mentor(s):
Sutanu Bhattacharya

Accurate detection of protein sequence homology is essential for understanding evolutionary relationships and predicting protein functions, particularly for low-homology proteins in the "twilight zone" (< 30% sequence identity). Traditional sequence alignment methods often fail in these cases, and while AlphaFold2 has revolutionized protein structure prediction, its applicability is limited by the vast gap between known protein sequences and predicted structures. Metagenomics datasets alone reveal billions of unique protein sequences, with only a fraction having experimentally determined or reliably predicted structures. Additionally, AlphaFold2's high computational cost often requires hours or even days for large-scale analyses. To address these challenges, we propose a novel embedding-based sequence alignment approach that leverages residue-level embeddings from pre-trained protein language models (e.g., ProtT5, ESM-1b). Our tool integrates clustering and double dynamic programming to achieve Spearman correlation coefficients of up to 0.93 (TM-min), outperforming existing embedding-based tools, and completes alignments in seconds, offering a scalable and efficient solution for bioinformatics applications.

AI-Assisted Rapid Review: A Case Study in Spreadsheet Use in Higher Education

Presenter(s):
Anusha Sunkari (Management Information Systems)
Sushmitha Cehvula and Tony Gootam (Management Information Systems)

Faculty Mentor(s):
Wendy Anderson and Jeffery Bohler

We compared human and AI-assisted reviews of 120 articles on Excel use in higher education. Four graduate students, two faculty, and two AIs (ChatGPT, Gemini) rated articles using a 14-question survey covering themes, methods, benefits, and challenges. Cronbach's alpha measured inter-rater reliability. Results highlight strong alignment in theme identification and pedagogical implications, with AI offering consistent, time-efficient support. The study suggests AI can enhance rapid reviews without compromising quality, paving the way for hybrid human-AI research workflows in education.

Birmingham Media Coverage

Presenter(s):
Alexis Taylor (Communication)

Faculty Mentor(s):
Kendra Love

Analyzing Birmingham, Alabama's media coverage.

Application Prototype

Presenter(s):
Jenna Thornton (Art)
Breanna Lewis (Art)

Faculty Mentor(s):
Nikhil Ghodke

I will be presenting an app prototype that I built in my Interaction Design class VISU 4702, in this project I worked with a client who had a need for an app and researches their needs, and the optimal way to design an app that satisfies the User Experience methodology.

Decoding Employability: A Multi-Dimensional Analysis of Curriculum Focus, Rankings, and Hiring Trends

Presenter(s):
Srikruthi Thumala (Management Information Systems)

Faculty Mentor(s):
David Simmonds

A significant challenge in higher education and workforce alignment lies in understanding how university characteristics specifically curriculum focus and school rankings influence employment outcomes for graduates. Despite increasing attention to graduate employability, there remains a lack of consolidated research that connects academic program design and institutional reputation to real-world labor market results. In this paper, we examine the existing research on how these university characteristics correlate with the types of companies graduates join, particularly in the fields of Information Systems (IS), Computer Science (CS), and related disciplines. This review seeks to address the pressing need for clarity around how curriculum alignment with industry needs and perceived institutional quality affect job placement. This review is structured around five core pillars: curriculum design, school rankings, employment trends, cross-analysis of curriculum and tier.

Protective Role of Mammalian Sestrin2 Against Arsenic-Induced Cytotoxicity

Presenter(s):
Colby Tillman (Chemistry)
Michkayla Prince (Chemistry and Molecular Biology) and
Mason McCollister (Chemistry)

Faculty Mentor(s):
David Ro

Sestrins, proteins that accumulates in cells exposed to environmental or genotoxic stress, play an important role in cell health, protecting tissues from damage or death by removing reactive oxygen species and inhibiting mTORC1 to induce autophagy. Arsenic is an environmental pollutant and is classified as class 1A carcinogen. One member of the Sestrin family, Sestrin2, also plays a role in inducing autophagy, clearance of damaged proteins and organelles, which is crucial for cellular homeostasis and integrity. However, while the molecular mechanism by which Sestrin2 induces autophagy in cells and tissues has been studied, how it induces autophagy against arsenic-induced toxicity is significantly less understood. Given the importance of cellular homeostasis in controlling redox status and energy metabolism, it is important that this knowledge gap be filled. The goal of this project is to determine the novel defense mechanisms by which Sestrins protect mammalian cells through autophagy induction caused by arsenic-induced oxidative stress. Our central hypothesis is that the ULK1/Sestrin2 complex is activated by arsenic-induced oxidative stress, and that it induces autophagy, thus preventing further oxidative damage, improving cell metabolism. The following research questions will be pursued to test this hypothesis: 1) Are Sestrin2 and ULK1 robustly induced by ROS causing- arsenic? 2) How Sestrin2 regulates the gene and protein expressions of autophagy pathway? 3) Does the induction of Sestrin2 useful for autophagy activity, recycling of damaged protein? We will utilize western blotting, qRT-PCR and immunofluorescence techniques in wild type and Sestrin2- manipulated mammalian cells to investigate the protective roles of autophagy process against arsenic-induced toxicity. The work proposed here will shed new light on the physiological roles of Sestrin2 in maintaining cellular homeostasis and in protecting cells against arsenic-induced oxidative stress and its associated metabolic disease.

Syrian Civil War

Presenter(s):
Quaysean Turner (Political Science)

Faculty Mentor(s):
Andrew Cortell

Why did the Syrian Civil War not end through a Negotiated Settlement?

Unsupervised Clustering of Protein Language Model Embeddings for Homology Detection

Presenter(s):
Priscilla Udomprasert (Computer Science)
William Rochelle (Computer Science)

Faculty Mentor(s):
Sutanu Bhattacharya

Homology detection plays a crucial role in understanding protein evolution and functional annotation. Traditional sequence similarity-based approaches often struggle to detect remote homologs with low sequence identity, necessitating the use of structure-based or machine learning methods. Recent advancements in protein language models have provided new opportunities for improved homology detection by generating meaningful sequence representations. However, efficient clustering of these embeddings to extract homologous relationships remains a challenge.

Our work employs a protein language model to generate embeddings that capture evolutionary and functional signals from protein sequences. Using an unsupervised clustering approach, we systematically optimize the grouping of protein sequences based on these embeddings. The impact of different clustering parameters, including the number of clusters and dimensionality reduction techniques, is evaluated to enhance homology detection. Comparative analyses with existing methods assess the accuracy and scalability of this approach.

Our approach effectively identifies homologous relationships by leveraging protein sequence embeddings and unsupervised clustering. It demonstrates strong performance in grouping related proteins while maintaining scalability for large datasets. The method shows promise in reconstructing evolutionary relationships and functional similarities, offering a computationally efficient alternative to traditional sequence alignment techniques. These findings highlight the potential of embedding-based clustering for large-scale protein analysis and annotation.

Realigning Information Systems Curriculum with Job Markets: A Student Success Approach

Presenter(s):
Srilekha Vadepally (Management Information Systems)

Faculty Mentor(s):
David Simmonds

A well-structured curriculum not only enhances students' technical and soft skills but also improves institutional visibility and reputation. This study explores the constantly evolving relationship between curriculum design and job market requirements, which affect university rankings. In particular we focus on programs in Information Systems, Computer Science & Engineering, Data Analytics and AI, and related computing disciplines. As technological advancements and labor market demands continue to reshape higher education, universities are

putting more effort into aligning curricular content with industry expectations and accreditation standards. Using literature across curriculum theory, accreditation frameworks, and higher education performance metrics, this paper examines how academic programs that integrate emerging technologies, interdisciplinary learning, and practical experience, achieve better student outcomes and rise in global rankings. Additionally, the research addresses the self-reinforcing dynamic where improved rankings attract better resources, such as qualified faculty and funding which in turn facilitate further curricular innovation. By investigating this reciprocal relationship, the paper underscores the importance of strategic curriculum planning in shaping both institutional prestige and graduate employability.

Oxygen Measurement in Respiring Bacterial Cultures

Presenter(s):
Shannon Warlick (Biochemistry and Molecular Biology)

Faculty Mentor(s):
Pete Haddix

Previous research established a definitive link between intracellular levels of the prodigiosin pigment and adenosine triphosphate (ATP) concentration. This research utilized Triphenyltetrazolium Chloride (TTC) as a respiratory indicator in order to investigate the mechanisms driving this relationship. Using TTC allowed for the quantification of cellular respiration through measurements of formazan, which directly correlates with levels of cellular NADH.

Climate Change and Economic Growth in High Income Countries

Presenter(s):
Maria Wharton (Economics)

Faculty Mentor(s):
Agnitra Roy Choudhury

The economic impact of climate change is a growing concern, especially in low-income countries. However, the impact of climate change in high income countries has received less attention. This study shows whether climate related variables correlate with changes in economic growth in high income countries. Using panel data from 50 high income countries between 1970 and 2022, to measure how climate factors affect GDP growth rate. This model applies a fixed effect that focuses on changes within each country over time related to changes in the different climate variables. Along with the climate variables, the analysis also includes economic and demographic variables, and separate models look at sector specific effects. The results indicate that there is no statistically significant relationship between climate variables and GDP growth rate across the full sample or within sectors. Regardless of the model that is

used, the results remain consistent. Even though no short-term effects are found, more research is needed for the long-term effects as climate change continues to evolve.

EHR Strategies to Reduce Central Line Associated Bloodstream Infections

Presenter(s):
Wes Whitaker (Nursing)

Faculty Mentor(s):
Courtney Bagents Cochran

Central venous catheters (CVC) or central lines are utilized in both inpatient and community health settings to provide access for necessary intravenous (IV) therapies and treatments. Common IV therapies provided to patients through CVCs include: medications, fluids, nutrition, and access points for diagnostic blood samples. Although CVCs are an appropriate intervention for medical treatment, they pose potential risks for patients. Central line associated bloodstream infections (CLABSI) are the most preventable hospital-acquired infections and fatal adverse events associated with CVC therapy. CLABSIs frequently occur due to improper care and maintenance of the CVC line and insertion site. Inpatient outcomes caused by CLABSIs include prolonged length of hospitalization, higher healthcare costs, and increased risk of mortality. The identification of CLABSIs within a select health system has sparked efforts to mitigate their occurrence among patients receiving CVC therapy. In response to rising CLABSI rates, a quality improvement project was conducted at three acute care hospitals within a select health system. A root cause analysis framework guided the development of project interventions focused on the integration of an evidence-based documentation system within the electronic health record (EHR) and creation of a vascular access nurse rounding protocol. Prior to project implementation, 13 CLABSIs occurred in 2023, costing the health system over $585,000. Following project implementation (2024), CLABSI occurrence decreased to five, costing the health system $360,000. A significant decrease in CLABSI occurrence (Cohen's $d = 0.66$) led to improved patient outcomes and an estimated cost savings of $225,000. The findings from this quality improvement project indicate the coordination of care system, which connected the vascular access nurse to enhanced notifications of EHR data, increased the global surveillance of patients receiving CVC therapy and improved patient outcomes through the mitigation of CLABSI occurrences.

Relationship between Aerobic Fitness and Accuracy of Predicted Aerobic Fitness in Undergraduate Kinesiology Majors

Presenter(s):
Hailey Whitlock (Kinesiology)
Alexis Brown, Alexus Robbins, Demetrice Williams, LaQuesha Wright, and Aneilya McFarlin (Kinesiology)

Faculty Mentor(s):
Angela Russell

Purpose: The purpose of this study was to determine if actual aerobic fitness is related to calibration of aerobic fitness. Methods: Thirty-two healthy Kinesiology students (8 male, 24 female) between the ages of 19 and 28 (mean age 21.4 ± 2.0 years) participated in the study. Participants first completed the PAR-Q to determine medical eligibility to participate and were then asked to describe their aerobic fitness level as one of the following: well below average, below average, average, above average or well average. Participants were then asked to complete the Queens College Step Test to determine actual aerobic fitness category. A calibration variable was then created to categorize student predictions as overpredicted, accurate, or underpredicted. Chi-square was used to determine if fitness prediction accuracy varies by actual aerobic fitness level. Results: Accuracy of predicting aerobic fitness varied by actual fitness category, X2(6, N=31) = 36.55, p < .001. All 4 students whose fitness was very poor overpredicted their fitness level. Of the 6 students of average fitness, 1 overpredicted and 1 underpredicted fitness, while 4 predicted their fitness accurately. Of the 3 students with above average fitness, only 1 underpredicted fitness, while 2 were accurate. Students with well above average fitness largely underpredicted their fitness (16 students), while 2 students were accurate. No students classified as above average or well above average overpredicted their fitness level. Conclusion: Students with poor aerobic fitness overpredicted their fitness level, while students with well above average fitness underpredicted their fitness level. Students with average to above average fitness were most likely to predict their fitness level accurately. Poor calibration of aerobic fitness may result in suboptimal decisions about exercise and could lead individuals to misjudge their health risks. Interventions to increase students' awareness of their actual aerobic fitness level may be needed to promote optimal training decisions to help students develop a health-enhancing level of fitness.

Fairview Farmer's Market Apparel Design

Presenter(s):
Terryn Williams (Art)
Madison Mills (Art)

Faculty Mentor(s):
Nikhil Ghodke

City of Montgomery is redeveloping the Fairview Farmers Market at 150 W Fairview; students were briefed by the city officials to design an identity for the upcoming market that can be produced on T-shirts and caps. The students researched the history of the market, understood the community and the sellers. They also looked at civic minded virtues and drew on iconography that captures the spirit of the market. These will be displayed in form of posters for at the research fair.

Understanding Prosocial Behaviors in Self-Service: The Influence of Self-Construal and Retail Cues.

Presenter(s):
Cathedral Zeyeh Management Information Systems

Faculty Mentor(s):
Dorcia Bolton

Understanding Prosocial Behaviors in Self-Service: The Influence of Self-Construal and Retail Cues.