Missouri State

GRADUATE COLLEGE

32nd Annual
Einhellig Interdisciplinary Forum
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Schedule

Poster Session A 10:30 A.M. – 12:00 P.M.
PSU Ballroom West

Oral Presentation Session 1 10:30 A.M. – 11:30 A.M.
Siceluff Hall, Rooms 119, 125, 127, and 222

Poster Session B 1:30 P.M. – 3:00 P.M.
PSU Ballroom West

Oral Presentation Session 2 12:30 P.M. – 1:30 P.M.
Siceluff Hall, Rooms 119, 125, 127, and 222

EIDF Awards Ceremony 3:30 P.M. – 4:15 P.M.
PSU Theater (2nd floor)

Abstracts

College of Business (COB)

Presenter – Jessica Holden
Authors – Jessica Holden, Ismet Anitsal, and M. Meral Anitsal
Poster # – A23
Business Administration
CAN VIRTUAL INFLUENCERS BE UTILIZED IN HEALTHCARE?
This research discusses how Virtual Influencers (VI's) have emerged and potential for their utilization in marketing within the healthcare industry. How social media is used by healthcare businesses and discussion on the implications of virtual influencers, this research looks to apply virtual influencers to the healthcare industry. Evaluating the differences and similarities of virtual and human influencers, then goes on to discuss the benefits and drawbacks of their application in the healthcare industry. Virtual influencers are still developing, and their implications are analyzed to provide a comprehensive view of virtual influencer adoption expectations for healthcare businesses. Further future research needed to expand managerial and scholarly knowledge on virtual influencer will also be included.

Presenter – Ha Nguyen
Authors – Ha Nguyen, Luong Thanh, and Raju Mainali
Poster # – A34
Information Technology
INVESTMENT BEHAVIORS OF MILLENIAL AND GEN Z IN VIETNAM
Investment behavior of Millennials and Generation Z in Vietnam is influenced by an affluent interaction between financial literacy, social norms, technology uptake, and cognitive

heuristics in the face of the country's rapid economic growth. Ever since the Doi Moi reforms, Vietnam has become a middle-income economy, yet challenges such as an aging population, productivity deficits among its workforce, and the specter of the middle-income trap exert growing economic pressure on succeeding generations. The study applies Behavioral Finance Theory, Theory of Planned Behavior (TPB), Risk Perception Theory, and the Technology Acceptance Model (TAM) to analyze the most potent factors that shape investment decisions. Using Path Analysis, Analysis of Variance (ANOVA), Reliability and Validity Testing, the research examines how investment involvement and asset allocation are affected by financial literacy, electronic tools, and psychological variables. The findings indicate gender and geographic variations. Women investors also have more investment ambitions and higher propensity to keep high-risk products, where urban residents and expatriates demonstrate more diversified investment behaviors compared to rural investors, who face the challenges of lacking financial sophistication and having constrained access to finance markets. Interestingly, income does not exert a strong influence on investment behavior, suggesting that other considerations like risk tolerance, technological savviness, and cognitive heuristics' overconfidence and loss aversion are more determinant. In addition, the increased application of fintech platforms is transforming investment access, particularly by younger investors. Vietnam's population transformation into an aging society puts into sharp relief the need for early investment inclusion among Gen Z and Millennials. Since the country is currently in a "golden population structure" phase, when a large population of working individuals has fewer dependents to care for, there is little time remaining to build wealth before the workforce declines. Unless today's generations adopt prudent investment practices, they may find themselves old with insufficient wealth, thereby exacerbating economic vulnerabilities in the future. This research provides actionable advice for financial institutions, policymakers, and educators to create an enhanced-informed and more resilient investor base. Among them are enhancing online investment platforms, launching nationwide programs of financial literacy, and integrating behavioral finance concepts into school education. Addressing these drivers, stakeholders can allow Vietnam's younger generations to handle economic slumps better, gain long-term financial security, and contribute to the country's ongoing economic shift.

Author – Nguyen Nam Anh Tran
Oral Presentation – 1-SICL 125
Business Administration
PUBLIC SENTIMENT, STOCK AND ENERGY PRICES DURING THE RUSSIA-UKRAINE WAR: GLOBAL EVIDENCE
This study uses public emotions shown through social media to identify public sentiment toward the current Russia-Ukraine war. Utilizing the development of natural language processing algorithms, this study tests the correlation between the public psychological factor and the fluctuation in financial markets and energy prices during the ongoing Russia-Ukraine war. This study emphasizes the public's initial response to this event (from 1/2022 to 5/2022). It aims to evaluate the public sentiment on sudden shock instead of taking the incident comprehensively. The study results ascertain the public sentiment index contained from social media as a market indicator. During shock events such as the Russia-Ukraine war, public sentiment intensifies energy and financial asset price fluctuation, indicating that public psychology tends to be influenced by negative news and causes them to act accordingly, resulting in a sell-off in financial and energy markets.

College of Education (COE)

Author – John Cazort
Poster # – A11
Teacher Leadership
TOMORROW IS TODAY: HOW THE 1990'S PT3 (PREPARING TOMORROW'S TEACHER TO USE TECHNOLOGY) FEDERAL GRANT HAS BOTH FULFILLED AND DISSAPOINTED US
The overarching question is what are the most effective and transformational methodological uses of technology to implement in the classroom, while reducing the negative aspects of the use of devices by students. These negative consequences have become prevalent with largely unsupervised use of personal devices in the classroom environment, including smartphones, 1 to 1 laptop programs, and the gamification of learning. Anxiety, short attention spans, cyberbullying and distractions from the use of social media have negatively impacted learning. The hope of integrating transformational technology has not yet been realized, and it is a distinct possibility that it has had the opposite of the intended outcomes from a number of expert theorists. This is a qualitative study reflecting expert thought as well as changing attitudes over time. This sustained reflection will introduce the goals of the PT3 initiative as well as the P21 Partnership for 21st Century Learning. Hopes ran high that these ideas would lead to a greater engagement in the learning process and prepare students for the skills to succeed in an increasing digital and interconnected world. A number of technology integration models will be introduced, reflecting the optimism educators had as the new century arrived. However, this optimistic outlook has been replaced by the realization that new policies must be introduced to mitigate the distracting effects of technology. These negative effects will be discussed in depth. In conclusion, the paper will offer strategies for overcoming the unanticipated consequences of the use of tech. District policies will be examined, and the effectiveness of those policies will be assessed. The reflection will conclude with suggestions for both redesigning technology use in lesson plans while avoiding or greatly restricting technology in schools altogether.

Author – Sarah Dodson
Poster # – B13
Teacher Leadership
THE ARCHITECTURE OF LEARNING: HOW SCHOOL DESIGN SUPPORTS DEWEY-BASED EDUCATION
This study explores how a school's physical building design can support the curricular goals of the school. Specifically, the study examines how to design a new building for a school based on a Dewey-style curriculum, which utilizes exploratory, hands-on learning. Using texts such as *The school and society; and, the child and the curriculum* (Dewey & Egan, 1990), *An imaginative approach to teaching* (Egan, 2005), and peer-reviewed articles, the researcher identified common design principles used to support human wellness, effective design and building processes, and the direct impact of physical space on the learning environment. With a qualitative approach, the researcher reflected on the literature to make recommendations for an effective school building design. Recommendations include involvement of stakeholders throughout the design and construction process, providing flexible and collaborative spaces throughout the building, carefully choosing the central point of the building (e.g. library, gymnasium, courtyard, etc.), and using natural materials

to support the human need to interact with nature. These recommendations allow for a physical learning environment that supports the needs of a Dewey-based school curriculum.

Author – Elizabeth Parks
Poster # – A37
Teacher Leadership
COMBATING TRAUMA IN THE CLASSROOM
This project aims to highlight the effects of trauma on students in schools and how adverse childhood experiences can impact learning, behavior, and health. It underscores the importance of trauma-knowledgeable practices that establish protection and encouragement to enable children to develop resilience and perform well in their academic careers. As a result, educators can identify children who have been affected by trauma and need support, which in turn can help improve the learning environment and equity in educational chances. The author believes there is a great need for professional training of teachers and other school staff to teach them how to handle these challenges.

College of Natural and Applied Sciences (CNAS)

Presenter – Saadatu Abdullah
Authors – Saadatu Abdullah, Kevin Mickus, and Andy Yaw Kwarteng
Poster # – B1
Geography and Geology
REMOTE SENSING AND MINERAL PROSPECTIVITY ANALYSIS OF LI-BEARING PEGMATITES AT EWOYAA, SOUTHERN GHANA
As the global shift towards cleaner energy sources accelerates, the demand for lithium for rechargeable batteries—essential for electric vehicles, laptops, and mobile phones—continues to rise. The Ewoyaa lithium mine in Ghana, West Africa, with ore reserves of 25.6 million tons and a projected operational lifespan of 12.5 years, is set to begin production in the second quarter of 2025. This mining site lies within the Cape Coast Basin, a Proterozoic volcano-sedimentary basin, part of the Early Proterozoic Birimian Supergroup. The region features several granitoid intrusions, consisting of tonalite to peraluminous granite, intruding the metasediments. It also hosts subvertical pegmatite dikes with mineralized units ranging from 30 to 100 meters in thickness. This study leverages remote sensing data from ASTER, Landsat OLI, Sentinel-2, and Worldview-3 to evaluate their effectiveness in mapping the mineralized pegmatites and associated hydrothermal alteration zones. Techniques employed include RGB combinations, band ratioing, Principal Component Analysis (PCA), and linear spectral unmixing. Additionally, airborne magnetic and radiometric datasets are analyzed using upward continuation, phase match filtering and derivative analyzes to interpret the geology and geological structural patterns contributing to the identification of potential mineralized zones. The magnetic data shows a low magnetic response in the area of interest, which is likely due to hydrothermal alteration or non-magnetic pegmatites. In contrast, the radiometric K/Th ratio shows moderate to high values, suggesting potassic alteration, which is typically associated with pegmatite formation and lithium mineralization. These anomalies point to the presence of possible structural controls, which could guide future investigations for lithium-bearing pegmatites.

Presenter – Mahmoud Abusaqer
Authors – Mahmoud Abusaqer and Jamil Saquer
Poster # – B2
Computer Science
A COMPREHENSIVE EVALUATION OF MACHINE LEARNING AND DEEP LEARNING MODELS FOR HATE SPEECH DETECTION
We present a large-scale evaluation of 38 models for hate speech detection, spanning traditional machine learning, deep learning, and transformer architectures. Experiments were conducted across seven datasets ranging from 6.5K to 451K samples. RoBERTa consistently outperformed other models, achieving 91.89% accuracy and F1-score on a 267K balanced raw dataset. Among deep learning models, Hierarchical Attention Networks performed best, while traditional methods like CatBoost and SVM offered strong results with lower computational cost. Our findings highlight that balanced, moderately sized raw datasets yield superior performance compared to larger, preprocessed datasets. Preprocessing negatively affected transformer models in particular. This study offers practical insights into the trade-offs between accuracy and efficiency, guiding model and data selection for scalable hate speech detection systems.

Presenter – Olumide Akinduro
Authors – Olumide Akinduro, Daniel Moreno, and Robert Mayanovic
Poster # – A1
Materials Science
A CHITOSAN-BASED GEL POLYMER ELECTROLYTE FOR IMPROVING PERFORMANCE AND STABILITY OF NICKEL-ZINC BATTERIES
A typical nickel-zinc (Ni-Zn) battery uses a potassium hydroxide (KOH) alkaline electrolyte to operate. We will compare this to a Ni-Zn battery that uses a chitosan-gel polymer. Chitosan-based gel polymer electrolyte have been gaining focus recently because the base material which is chitosan is obtained from a natural material, chitin. Chitin is obtained from crustaceans such as shrimp, crabs, and lobsters. Chitosan, when used as a gel polymer electrolyte enhances ionic conductivity and provides mechanical stability which is much needed for the efficiency of the battery. The viscosity of the gel and the surface tension will be examined to produce an optimal binder for enhancing the mobility of ions in the Ni-Zn battery. The gel polymer electrolyte (GPE) will be characterized using XRD and FTIR techniques. A Ni-Zn pouch battery will be fabricated using the chitosan-based GPE and its electrochemical performance tested using cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). We have carried out some EIS and CV tests; however, we are still working on the gel electrolyte composition, as we need to run more tests in order to optimize the composition for the gel, making it suitable for a Ni-Zn battery.

Presenter – Blessing Akinwande
Authors – Blessing Akinwande, Mary Fakunle, Riley pope, Jake Churchman, Minho Yoshimatsu, and Cyren Rico
Poster # – A2
Chemistry
LC-MS ANALYSIS OF METABOLITES IN PEAS EXPOSED TO BIODEGRADABLE AND NON-BIODEGRADABLE MICROPLASTICS
Microplastics are small plastic particles, generally under 5 millimeters in size, that are created when larger plastic objects, such as bottles, bags, and synthetic fabrics, break down. These particles are easily carried by wind and water, resulting in their widespread presence in various ecosystems. Biodegradable microplastics, like polylactic acid (PLA), are often

used in agricultural applications because they can be decomposed by microorganisms. In contrast, non-biodegradable microplastics, such as polyethylene (PE), are synthetic polymers that persist in the environment without breaking down into harmless components. In this research, we conducted a full life cycle cultivation of pea plants in a greenhouse, dividing them into three groups: a control group, a group exposed to biodegradable microplastics, and a group exposed to non-biodegradable microplastics. The study aimed to explore the impact of PLA and PE microplastics on various metabolites, such as amino acids and antioxidants, in pea leaves using Liquid Chromatography-Mass Spectrometry. Additionally, we assessed chlorophyll production and monitored plant stress responses.

Presenter – Tony Astuhuaman Davila
Authors – Tony E. Astuhuaman Davila and Ridwan Sakidja
Poster # – B3
Natural and Applied Science
COMBINED GENERATIVE AND PREDICTIVE AI FOR ANTIMALARIAL DRUG DISCOVERY: AN END-TO-END CLASSICAL PIPELINE
We present a novel AI-driven protocol that integrates predictive and generative methodologies into an end-to-end pipeline for protein-ligand design, applied to the crystal structure of the Kelch protein from Plasmodium falciparum (PDB ID: 4yy8), a key target for antimalarial therapy. Our approach utilizes AutoDock Vina to generate ligand-protein complexes, which are then represented as molecular graphs using RDKit, with nodes encoding atomic characteristics and edges capturing bonding and spatial relationships. A SchNet/DimeNet-based graph neural network extracts geometry-aware embeddings from these graphs, and an autoencoder with L1/L0 regularization compresses the high-dimensional features into a compact latent space. These latent representations are subsequently used in classical machine learning models, such as support vector machines, for binding energy prediction. This flexible framework offers a scalable, general approach for advancing drug discovery efforts using state-of-the-art AI techniques.

Presenter – Fahima Hasan Athina
Authors – Fahima Hasan Athina, Razib Iqbal, Tasnuba Jerin, and Yifan Zhang
Poster # – B4
Computer Science
SMART RIVER WIDTH EXTRACTION FROM SATELLITE IMAGERY USING SWIN TRANSFORMERS
Accurate estimation of river width is essential for hydrological research, sustainable water management, and ecological preservation. While traditional field measurements are precise, they can be costly, time-consuming, and susceptible to errors. Advances in remote sensing and image processing now allow for cost-effective, automated extraction using geospatial data sources such as MODIS, Landsat, and SAR. Existing methods, including thresholding and deep learning models (e.g., CNN, U-Net, DeepLabV3+, ResNet50, and EfficientNet), perform well for large rivers but face challenges with narrower ones. Swin transformers, recognized for their effectiveness in high-resolution segmentation, utilize patch processing and a window-based attention mechanism, presenting a promising alternative. In this study, I propose a Swin U-Net-based approach for accurate river width extraction. This method segments river bodies, derives centerlines using a graph-based module, and measures width at specified intervals. Initial experiments on the GLH-Water dataset attained 88.04% accuracy, showcasing its potential as a reliable tool for automated river width extraction across rivers of various sizes.

Presenter – Derek Bateman
Authors – Derek Bateman, Tessa N. Irvine, Kevin Babbitt, Alexander Edmond, and Day B. Ligon
Poster # – B7
Biology
ALLIGATOR SNAPPING TURTLE DISTRIBUTION SURVEYS IN ARKANSAS AND RED RIVER BASINS
Assessing the geographical distribution and population status of the Alligator Snapping Turtles (Macrochelys temminckii) is of great interest given the high historical and present-day hunting pressure the species has experienced. To this end, we conducted a two-year study to assess the current distribution of alligator snapping turtles in Oklahoma in the Arkansas and Red River drainages. The study was conducted from May 2023 to October 2024. Surveys were restricted to months when water temperatures were moderate and was suspended during periods of both high and low temperatures that have been demonstrated to suppress Alligator Snapping Turtle activity. Turtles were captured using both 0.9 and 1.2-m hoop nets baited daily with frozen carp. Throughout the study, we conducted 1454 net nights of survey effort, which resulted in identifying 168 unique Alligator Snapping Turtles and 99 recaptures of previously marked turtles (captures per unit effort = 0.12 turtles per net-night). We identified many systems with apparently low population densities of Alligator Snapping Turtles as well as several sites with apparently robust populations. Additionally, we failed to detect the species at some locations where it historically occurred, suggesting local extirpation. This patchy distribution pattern is likely due in part to segmentation of rivers by dams, which have had the effect of isolating populations and reducing their capacity to repopulate river segments that get fished out. The results of our study provide insights into the effects of dams on the distribution of Alligator Snapping Turtles and will help to inform subsequent surveys that will be conducted in Arkansas beginning in spring 2025.

Presenter – Katherine Brand
Authors – Katherine Brand and Tasnuba Jerin
Poster # – A5
Geography and Geology
MODERN FLOW REGIME AND CHANNEL MORPHOLOGY IN RESPONSE TO SHIFTING CLIMATE PATTERNS: GASCONADE RIVER, MISSOURI, USA
Shifting patterns in climate cause changes in rain and snow patterns that lead to shifts in flood magnitude and frequency. As rivers experience more frequent and intense flood events, they accommodate by changing their morphological characteristics. The Gasconade River, a tributary of the Missouri River located in southcentral Missouri, has exhibited recent patterns of acute erosion with limited understanding of its causes and effects on the river. This study aims to understand how shifts in flow regime driven by climate change have influenced erosion on the Gasconade River. Three 30-year climate periods, 1930-1960, 1960-1990, and 1990-2020, will be assessed throughout the study. Flood frequency analysis was run for each climatic period. Preliminary results indicate a significant shift in flood magnitudes post-1990. Small 2-year floods, medium 10- to 25-year floods, and large 50-year floods are increased on average by 44.5%, 44.3%, and 54.6%, respectively. Analysis aiming to describe changes in channel characteristics will also be performed for each climatic period. It's expected that increases in flood magnitude will lead to accelerated geomorphic change and will contribute to knowledge about flood management and bank erosion.

Presenter – Emma Braun
Authors – Emma Braun and Kyoungtae Kim
Oral Presentation – 1-SICL 125
Natural and Applied Science
EVALUATION OF CARBON QUANTUM DOTS AS A DRUG DELIVERY SYSTEM FOR CERVICAL CANCER TREATMENT
Cervical cancer is the fourth most common cancer diagnosis in women worldwide. Common cancer treatments, like doxorubicin, are nonspecific which leads to unfavorable side effects. This problem has led to the push for more targeted cancer treatments to minimize side effects and increase efficacy. Implementing nanoparticles as a drug delivery system has yielded promising results. A specific type of nanoparticle called quantum dots (QDs) are semiconductive, have tunable fluorescence, and high photostability. Metal-based quantum dots were recently discovered to be toxic in vitro which is why this project has moved toward a more biocompatible carbon-based quantum dot (CQD). CQDs have similar properties to their metal-based counterparts but much lower rates of toxicity. This study aims to synthesize and characterize a red-fluorescent carbon quantum dot to be used as a cancer drug delivery vehicle. Thus far, the CQDs have been synthesized and characterized showing an average size of 4 nm, -15.4 mV surface charge, and no cytotoxicity. To further enhance biocompatibility and cell targeting of HeLa cells, a cervical cancer cell line, the CQDs will be encapsulated in a micelle dispersed with doxorubicin and tagged with folic acid.

Presenters – Matthew Bruenning, Tony Astuhuaman Davila, Jessica Fink, and Greg Vatrano
Authors – Matthew Bruenning, Jessica Fink, and Tony Astuhuaman Davila
Poster # – A7
Materials Science
QUANTUM AGENTS FOR CATALYST COMPETITION: REINFORCEMENT LEARNING MEETS CHEMISTRY
Due to the large amounts of noise and limited scalability of current quantum computing hardware, machine learning techniques have been implemented as a helping hand to improve the performance of quantum circuits. This project investigates the use of quantum computing and machine learning to optimize catalyst selection for carbon monoxide (CO) conversion. We model catalyst candidates as agents within a learning framework, where each agent employs a quantum circuit to guide decision-making. Through iterative testing and feedback, the agents receive performance-based rewards, effectively simulating a competitive environment among the catalyst candidates. Over time, this approach enables the identification of "winning" candidates, i.e. catalysts that are most likely to form. By integrating quantum computing with classical machine learning techniques, this work highlights a hybrid strategy for addressing complex chemical challenges.

Presenters – Matthew Bruenning, Greg Vatrano, Jon Kliewer
Authors – Matthew Bruenning, Jonathan Kliewer, and Greg Vatrano
Poster # – B9
Materials Science
HYBRID QUANTUM-CLASSICAL ALGORITHMS FOR QUANTUM CHEMISTRY
Quantum computing is currently in the Noisy Intermediate-Scale Quantum (NISQ) era and although the full capabilities of quantum computers is not yet realized noisy hardware and classical simulators are utilized to study how quantum algorithms can be applied to

quantum chemistry problems. In this research, we explore hybrid quantum-classical algorithms to study electron interactions at the atomic scale, particularly in corrosion processes. We extract tight-binding Hamiltonians from first principle calculations and use quantum algorithms, such as the Variational Quantum Eigensolver (VQE) and Quantum Phase Estimator (QPE), to determine the ground and excited states of the system. By leveraging quantum computing, we aim to improve the accuracy and efficiency of simulations that are crucial for understanding materials degradation. This work represents a step toward practical quantum applications in chemistry, demonstrating how quantum and classical computing can work together to tackle scientific challenges.

Presenter – Jami Bull
Authors – Paul Durham, Babur Mirza, and Jami Bull
Poster # – A9
Natural and Applied Science
EFFECTS OF A GLP-1 RECEPTOR AGONIST ON THE GUT BACTERIAL COMMUNITY IN C57BL/6J MICE
This study investigates the effects of the GLP-1 receptor agonist liraglutide on the gut bacterial community of diet-induced overweight mice. Overweight and obesity are major health concerns associated with metabolic disorders and gut dysbiosis. While GLP-1 receptor agonists promote weight loss and insulin sensitivity, their impact on the gut bacteria remains unclear. Twelve-week-old male C57BL/6J mice were placed on a high-fat diet and treated with liraglutide (0.2 mg/kg) via daily subcutaneous injection for 14 days. High-fat and low-fat diet controls received PBS injections. Fecal samples were collected at baseline, after treatment, and one week later. Mice receiving liraglutide lost an average of 0.85 g (â˜'2.78%), while high-fat controls gained 3.20 g (+10.22%), and low-fat controls gained 0.56 g (+1.92%). I am currently analyzing changes in bacterial composition using Illumina paired-end 16S rRNA amplicon sequencing. I hypothesize that while liraglutide reduces weight, it may not restore microbial balance and could reduce beneficial bacteria. This study will help clarify how diet and host-targeted treatments shape the gut bacterial community.

Presenter – Gabriela Carroll
Authors – Gabriela Carroll, Alexander Wait, Jay McEntee, Sean Maher, and Taylor Hiers
Poster # – A10
Biology
GIANT CANE AND THE SWAINSON'S WARBLER: IMPLEMENTING INNOVATIVE MONITORING TECHNIQUES FOR SPECIES OF CONSERVATION CONCERN
As the landscape of a region changes, so do the ranges of the species that inhabit it. In the U.S., following colonization and agricultural expansion, giant cane (Arundinaria gigantea) has been reduced to only 1-2% of its original extent, causing shifts in the abundance and distribution of over 50 animal species. Among those species is the Swainson's warbler (Limnothlypis swainsonii), which has been known to prefer canebrakes as habitat during the breeding season. Though little is known about the historical range of the Swainson's warbler and its current population status, some have speculated that due to its reduced preferred habitat, its population may have declined. Given that this species of bird is rare and evasive, creative forms of tracking must be considered to observe its current reliance on canebrakes in Southwest Missouri. Autonomous recording units (ARUs) offer a minimal-effort and highly efficient way to monitor species. The recent application of deep convolutional neural networks (CNNs) and their improved accessibility with programs like

BirdNET has made the use of ARUs more manageable for scientists. With these recent advances in technology and the combination of these approaches, we may find out if Swainson's warblers are inhabiting some of the existing canebrakes in the Ozarks. In this study, I investigate the effectiveness of these methods in detecting Swainson's warblers and discuss the challenges posed by similar-sounding species when using trained algorithms.

Presenter – Spencer Casey
Authors – Spencer R. Casey, Charles W. Rovey, and Damon J. Bassett
Poster # – B10
Geography and Geology
THE PALEONTOLOGY OF THE NORTHVIEW FORMATION AND ITS DEPOSITIONAL ENVIRONMENT
The fossil fauna of the Northview Formation in southwest Missouri has been mostly neglected in the paleontological world. Paleontological descriptions of the Northview Formation from as early as 1855, along with our own present-day analysis and descriptions, will be used to describe fauna within the Northview Formation to construct an updated list. The phylum brachiopoda and the class gastropoda from the phylum mollusca have been the most prevalent organisms found in this study. These organisms, along with their size, can be applied to already present ideas on paleoecology and paleoenvironment to assist in reinforcing recent studies claiming that the Northview Formation was deposited in deltaic conditions.

Presenter – Abhishu Chand
Authors – Abhishu Chand and Kyoungtae Kim
Poster # – B11
Biology
IMPACT OF QUANTUM DOTS ON ACTIN DYNAMICS AND THEIR INTERACTIONS WITH ACTIN-BINDING PROTEIN
Quantum Dots (QDs) are nanoparticles that carry immense potential in clinical medicine as drug delivery vehicles due to their distinct optical properties. However, once the drug has been delivered, there are major concerns over the ability of naked QDs to non-specific interact with proteins such as actin and cause cytotoxicity. Therefore, in this study we investigate the effects of QDs on actin dynamics and other actin binding proteins such as alpha-actinin. Our results revealed that the QDs had a biphasic effect on actin dynamics: at low concentration of treatment, QDs promote actin polymerization, while at higher concentrations, they inhibit it. Additionally, these QDs enhance the depolymerization process. We also observed that QDs interact with actin binding proteins like alpha-actinin and interfere with the bundling process. Furthermore, to evaluate greater physiological impact, we conducted a wound-healing assay on HeLa cells which revealed that QDs hinder cell migration as well. Overall, our study provides novel insights into QD toxicity, showcasing their harmful effects on protein function. These results highlight the need for safer QDs for use in intracellular biomedical applications and expand on our current knowledge of the cytotoxicity induced by QDs.

Presenter – Abiha Tahsin Chowdhury
Authors – Abiha Tahsin Chowdhury, Dhanush Bavisetti, Daniel B. Hier, Rahul Dubey, and Tayo Obafemi-Ajayi
Oral Presentation – 2-SICL 222
Computer Science

ENHANCING EXPLAINABLE AI FOR MEDICAL IMAGING: IMPROVED LIME INTERPRETATION WITH INFLUENCE MAPPING

In medical imaging, where precision and reliability are critical, existing Explainable Artificial Intelligence (XAI) methods often fail to provide consistent, holistic, and comprehensive explanations of deep model's predictions. To provide consistent explanation, this paper first introduces influence-mapped LIME, an enhancement to LIME that aggregates multiple runs to reduce variability and improve interpretability and then uses different XAI methods to provide holistic and comprehensive explanation of model's predictions. Experiments were conducted on brain MRI scans for Alzheimer's stage detection and a detailed analysis has been conducted. Results show that LIME and the proposed influence map based LIME emphasize ventricle enlargement and cortical atrophy whereas SHAP and Grad-CAM consistently highlight regions like the corpus callosum in Alzheimer's cases. Together these XAI methods present consistent, holistic, and comprehensive explanation. By systematically analyzing multiple XAI techniques, this work highlights their complementary strengths, enabling practitioners to better interpret and trust AI-driven diagnostic decisions.

Author – Daniel Donkor
Poster # – B14
Geography and Geology
ASSESSING THE IMPACT OF CLIMATE CHANGE ON PLANT HARDINESS ZONE ACROSS THE CONTIGUOUS UNITED STATES

In this era of continual climate change extreme events, it is important to examine how these could ripple through various facets of the natural system, including agriculture. The Plant Hardiness Zone is a geographic area defined by the average annual minimum temperature, a factor relevant to the survival of plant species and distribution. As climate changes and global temperatures rise, minimum temperatures may rise as well and the Plant Hardiness Zones will shift north systemically to higher latitudes, impacting the ecosystems that depend on them (Bowen, 2023). The Plant Hardiness Zone has witnessed a significant transformation over the past decades. Notably, it is important to point out that there has been a paucity of research addressing the essential topic of the impact of climate change on Plant Hardiness. While other studies focused on short-term projection of the plant hardiness zone, the present study would examine the Spatio-temporal dynamics of Plant Hardiness Zones over longer periods, including historical changes and future projections, offering a more comprehensive perspective on the evolution of these zones. Therefore, the overall aim of this study is to analyze the shift in plant hardiness zones under climate change across the contiguous USA, employing climatic data analysis, and geospatial mapping techniques.

Presenter – Josephine Dankwa
Authors – Josephine Dankwa and Gary Michelfelder
Poster # – B46
Geography and Geology
EVOLUTION OF THE FOGO VOLCANO MAGMA CHAMBER: INSIGHTS FROM SYENITE XENOLITHS THROUGH GEOCHEMICAL AND U-TH GEOCHRONOLOGY

The perception of magma chambers being composed entirely of melt is changing due to mush crystals within plumbing systems. These mushy crystals later solidify into plutonic rocks, which, when erupted within volcanic deposits, provide a wealth of information to bridge the volcanic and plutonic connection and enhance our understanding of processes influencing a magma chamber's evolution. This research investigates whether syenite

xenoliths found as clasts in the largest eruption of the Fogo Volcano represent cumulates from the roots of the magma chamber that produced the erupted trachytic magmas. To achieve this, we integrate geochemical analysis on the syenites and pumice clasts, combined with U-Th geochronology on the zircons within syenite clasts. Our geochemical results reveal that the pumices and syenite share similar REE patterns, linking them genetically. In addition, isochron data from U-Th geochronology provide an age of approximately 7 ka for syenite, indicating these are cumulates from older eruptions of the Fogo Volcano. Our findings provide strong evidence for our hypothesis that the syenite clasts are cumulates from the trachytic magma chamber and demonstrate that they preserve the history of magma diversity of the Fogo volcanic plumbing system. The results contribute to a broader understanding of the relevance of plutonic xenoliths in revealing the magmatic processes and evolution of the Fogo Volcano.

Presenter – Bezali Danso
Author – Bezali Danso and Gary Michelfelder
Poster # – A12
Geography and Geology
MAGMA RESIDENCE AND STORAGE CONDITIONS AT LARGE VOLUME SILICIC DOMES IN THE ANDEAN CENTRAL VOLCANIC ZONE, CHILE
Volcanic eruptions pose significant hazards, highlighting the need to constrain magmatic timescales for improved forecasting and study magma geochemistry. Diffusion geospeedometry treats volcanic crystals as time capsules providing a method to quantify pre-eruption magmatic processes. The Andean Central Volcanic Zone (CVZ) is home to silicic volcanic systems like the Chao Dacite and Chillahuita Dome which offers an ideal setting to investigate these processes. This study quantifies magma residence times and storage conditions by analyzing Strontium (Sr) and Magnesium (Mg) diffusion in plagioclase phenocrysts using Electron Probe Microanalysis (EPMA) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICPMS) for the analysis. Machine learning (diffusion models) will use the analysis results to determine the timescales of magmatic evolution. Expected outcomes include evidence of prolonged magma storage at near-solidus temperatures, insights into fractional crystallization and magma mixing, and a comparative framework linking dome growth to ignimbrite eruptions. The findings advance understanding of silicic dome evolution and volcanic hazard assessment.

Presenter – Partha Das
Authors – Partha Das and Tiglet Besara
Poster # – B12
Materials Science
SYNTHESIS AND CHARACTERIZATION OF DOPED RARE EARTH-ZINC ALLOYS
Rare-Earth-Zinc (RE-Zn) alloys doped with manganese represent a promising class of materials with diverse applications in magnetic, electronic, and thermoelectric devices. These alloys hold significant potential owing to the unique combination of rare-earth elements' properties with the versatility of zinc, augmented by manganese doping. In this study, we present the successful synthesis of ErMnxZn(12-x), Dy2MnxZn(17-x), and HoMnxZn(12-x) alloys, achieved through self-flux method. The synthesized crystals were characterized using electron dispersive spectroscopy (EDS) and single crystal X-ray diffraction (XRD). Additionally, magnetic measurements were performed to investigate the magnetic properties. Future plans include DFT calculations and comparison study between Rare-Earth-Zinc alloys with Manganese doped Rare-Earth-Zinc in terms of Magnetic properties.

Presenter – Jackson Davis
Authors – Jackson Davis, Brianne Edwards, Marc Owen, Babur Mirza, and Irum Qureshi
Poster # – A13
Biology
IDENTIFYING AND TRACKING FECAL COLIFORM CONTAMINATION WITHIN MISSOURI SURFACE WATERS
Protection and management of Missouri's surface waters, differing in size from a small creek to Lake of the Ozarks, is not an easy task for local, state, and federal officials. Impairment of these water systems directly leads to decreased biodiversity, reduction in public health, and diminished economic growth. In addition to broad ecological consequences of water system impairment, the impairments themselves can have diverse origins and mechanisms of harm. One causative agent of impairment in Missouri water systems, regardless of size and location, are fecal coliforms. Fecal coliforms derive from the intestines of warm-blooded animals, meaning detection indicates the water source is contaminated by feces, and by proxy—potential pathogenic bacteria. Isolated bacterial DNA originating from multiples sites within James River and Pearson's Creek in Springfield, MO was quantified, identified, and cross-referenced. Respectively, detection of bovine and human fecal contamination was discovered within James River and Pearson Creek. Employing this information with regular monitoring, we can better understand and locate sources of fecal coliforms within our water systems and limit them through source tracking.

Author – Marck Dragoi
Poster # – B15
Chemistry
INVESTIGATIONS OF ONE-DIMENSIONAL MOLECULAR SLINKY FLUORESCENT PLATINUM CYANOXIMATES.
In recent years in our research group there was discovery of a series of six dark-green new compounds based on platinum that have [PtL2]n composition (L = ligands shown below). They were found to polymeric 1D solids held together via metallophilic interactions that form "metal wire". Also, compounds exhibit ability for self-assembly in solutions with the formation of a flexible "poker-chip" stack (or molecular slinky). Remarkably, these polymers demonstrate electrical conductivity and photoluminescence in the near-infrared region of electromagnetic spectrum beyond 1000 nm. The former property evidenced the formation of mixed valence system in which an electron "hopping" between Pt centers occurs. In this presentation we report results of our studies of these dark-green powders of six platinum compounds in solid state and in solutions as their micelles based on Na-salts of a long chain carboxylic acids. It was determined that studied powders of complexes are rapidly heated to >100oC temperature being exposed to 808 nm laser within ~30 sec. Thus, main goal of this work is to assess the ability of Pt-cyanoximates to act as potential agents for photothermal cancer therapy in addition to already established their pronounced in vitro cytotoxicity.

Presenter – Corbin Ebeling
Authors – Corbin Ebeling and Tasnuba Jerin
Poster # – A14
Geography and Geology
DOWN STREAM VARIATIONS IN CHANNEL MORPHOLOGY AND RIFFLE SPACING: A STUDY ON THE GASCONADE RIVER, CENTRAL MISSOURI

The flow structures of fluvial systems globally can be related by their tendency to form sequential bedform features under persistent flow conditions. Channel bedform features will form under changes in stream gradient, width, depth, flow velocity, and discharge (Thompson, 2001). These features typically transition between high and low areas, through a rhythmic spacing. The hypothesis of riffle-pool spacing proposed by Leopold et al. (1964), suggest that pool and riffles will form within a distance of 5-7 times the channel width. There has been a gap in our understanding of channel bedform structures and hydraulic variables related to downstream hydraulic geometry on Ozark rivers. This study aims to assess the hydraulic geometry and located on the mainstem of the Gasconade River, within the Upper Gasconade Watershed. Modern channel widths gathered from 2022 aerial imagery (MSDIS) will also be used for the assessment and mapping of riffle locations. This research examines two primary research questions: (i) are there longitudinal variations between the channel geometry at riffles downstream and does it conform to the downstream hydraulic geometry concept?, (ii) what is the riffle-riffle spacing and does it align with the conventional 5-7 channel width spacing? This research will benefit understanding on the spatial distribution of riffles on the Gasconade River and to contribute to our understanding if riffle spacing trends.

Presenter – Success Ekemezie
Authors – Success Ekemezie, Charlotte Davis, Marco Russo, Leo Carpenter, and Avery Russell
Oral Presentation – 2-SICL 125
Biology
POLLEN-MICROBE INTERACTIONS IN NECTAR WEAKLY INFLUENCE BEE FORAGING BEHAVIOR.
Pollinator behavior is often affected by flower microbes. Bacteria and yeast frequently colonize nectar, a sugar-rich floral reward that is also commonly contaminated with protein-rich pollen. Microbes can induce pollen to germinate or burst in nectar, potentially making pollen nutrients accessible to pollinators. Yet, whether pollen-microbe interactions affect pollinator behavior remains unclear. We tested how a common nectar yeast and bacteria affected pollen germination and bursting in artificial nectar, as well as the consequences for bee behavior through behavioral trials. Bacteria and, to a lesser extent, yeast, caused pollen to germinate and burst. Although microbes potentially enhance nectar quality via access to pollen nutrients, bee preference was unaffected. Bees also showed no increased floral constancy to nectar contaminated with pollen and microbes. Instead, bees more often rejected flowers with nectar contaminated with yeast, pollen, or both compared to uncontaminated nectar. Our work suggests pollen-microbe interactions within nectar may have relatively minor influences on pollinator foraging behavior. We discuss possible explanations and implications of these results for plant and pollinator ecology.

Presenter – Md Abdur Rahman Fahad
Authors – Md Abdur Rahman Fahad and Razib Iqbal
Poster # – A15
Computer Science
USER BEHAVIOR-DRIVEN SMART HOME AUTOMATION: A DEEP LEARNING APPROACH LEVERAGING SENSOR-ACTUATOR INTERACTIONS.
Recent advancements in the Internet of Things (IoT) have enabled smart home environments to automate daily activities with increasing sophistication. However, most existing systems use automation based on fixed rules. The generalized rules do not prioritize the user's statistical behavior and might require constant human updates. This

study proposes a novel data-driven approach for learning sensor-actuator activation and deactivation patterns in smart home environments, independent of specific human activities. Using deep learning models, our method extracts information on sensor-actuator interactions, which can be leveraged to automate the operations of actuators. We evaluate Long Short-Term Memory (LSTM) networks and Transformer models to analyze time-series sensor-actuator interactions, assessing their ability to anticipate human-centric actuation policies dynamically. Unlike traditional rule-based systems, our approach continuously adapts to changes in daily routines, leading to more intelligent and more efficient automation with less human intervention. We validate our method across multiple smart environment testbeds using real human activity data, demonstrating the potential of deep learning to enhance autonomous and adaptive smart home automation.

Presenter – Mary Fakunle
Authors – Mary Fakunle, Riley Pope-Buss, Blessing Akinwande, Jake Churchman, and Cyren Rico
Poster # – A16
Chemistry
METABOLITE ANALYSIS OF LETTUCE AFTER EXPOSURE TO MOLYBDENUM DISULFIDE AND SULFUR NANOPARTICLES USING LC-MS
Nanotechnology has opened new frontlines in agriculture, with nanoparticles being explored for their potential benefits in enhancing plant growth, protection, and nutrient efficiency. Among these, sulfur (S) and molybdenum disulfide (MoS_2) nanoparticles are gaining attention. Sulfur is a vital nutrient for plants, and its nanoparticles can improve nutrient uptake and disease resistance. MoS_2 is also suitable for enhancing plant growth and stress tolerance. Lettuce plants were cultivated 35days under greenhouse conditions in one of three treatments: control, Sulfur NPs and MoS_2 NPs. The Liquid Chromatography – Mass Spectrometry (LC-MS) instrument was used to quantify the concentration of amino acids and antioxidants in the harvested lettuce plants. Other phenotypic parameters such as biomass, chlorophyll content, and oxidative stress were also measured to determine the overall effect of the nanoparticles on plant health.

Presenter – Purna Ganji
Authors – Toby Dogwiler and Purna Ganji
Poster # – B19
Computer Science
AI-DRIVEN AUTOMATED STRUCTURE MAPPING FOR FLOOD RISK ASSESSMENT IN TREASURE BEACH, JAMAICA
This study explores the application of deep learning in ArcGIS Pro to automate the delineation of structures in Treasure Beach, Jamaica, as part of a flood risk assessment. Drone imagery was analyzed using two tools: Extract Features Using AI Models and Detect Objects Using Deep Learning. The latter tool provided better performance and allowed for more advanced parameter tuning. A hybrid model training approach was adopted using both single-class and multi-class data. Optimized parameters included a tile size of 256 and padding of 64. Among five tested models, the most accurate one detected 89.37% of actual structures while reducing false positives and false negatives. Issues such as object misclassification and over-segmentation were addressed using post-processing steps like the Dissolve Boundaries tool. Overall, the study demonstrates that deep learning can significantly improve the efficiency and accuracy of structure mapping in support of flood preparedness efforts.

Presenter – Sandipani Ghosh
Authors – Sandipani Ghosh, Fahad Munshe, Jessica Fink, Md. Zulkernain Haider, and Kartik Ghosh
Poster # – A19
Materials Science
EFFECT OF REDUCTION ANNEALING ON THE STRUCTURAL AND ELECTRICAL PROPERTIES OF Î±-MOO3 THIN FILMS
2D layered molybdenum oxide has attracted significant research interest due to its tuneable bandgap and diverse structural, chemical, electrical, and optical properties influenced by growth parameters and synthesis techniques. In this study, the effects of reduction annealing on the structural and electrical properties of few-layer MoOâ‚ƒ thin films, deposited on Si/SiOâ‚‚ substrates via pulsed laser deposition, were investigated. X-ray diffraction revealed nanocrystalline structures with a preferred (020) orientation, reduction annealing produced highly crystalline orthorhombic Î±-MoOâ‚ƒ with reduced unit cell volume. FESEM/EDS provided detailed analyses of microstructures and elemental compositions. Raman spectroscopy confirmed the orthorhombic structure, with characteristic peaks at 667, 820, and 995 cmâ»Â¹, corresponding to O-Mo-O and Mo=O vibrational modes. UV-Vis spectroscopy showed a bandgap reduction from 3.3 eV to 3.07 eV, enhancing conductivity through oxygen vacancies. Preliminary FET measurements demonstrated that the samples retained their semiconducting behaviour, with IDS vs VDS characteristics showing effective gate modulation.

Presenter – Ta'lor Gold
Authors – Ta'lor Gold and Kyoungtae Kim
Poster # – B20
Biology
PERFLUOROOCTANE SULFONATE (PFOS) TOXICITY IN YEAST CELLS: VIABILITY AND MITOCHONDRIAL MODIFICATIONS
Several studies about PFOS and its toxicity to bacteria and certain eukaryotic cells have been reported; however, studies about PFOS and its toxicity within yeast cells remain to be accomplished. Showcasing the toxicity of PFOS in budding yeast cells will offer new insights into the underlying molecular mechanisms of PFOS-mediated toxicity in fungal cells and provide potential impacts in raising public awareness about the risk of PFOS exposure as well as strategies to decrease the presence of the toxic compound within the environment. A budding yeast strain expressing ABP1-GFP was cultured and grown in yeast extract peptone dextrose (YPD) media exposed to PFOS with varying concentrations. The concentrations were as follows: no treatment (control), 8 uM, 80 uM, 800 uM, and 1600 uM. The optical density was recorded using spectrophotometry to determine if viability was decreasing with increased concentration of PFOS. This was completed as a triplicate to ensure repeatable results. After repetition of the growth assay, with increasing concentrations of PFOS, the growth of yeast cells decreased. With this result, it is possible that PFOS is toxic to this budding yeast strain causing a decrease in viability and growth. After the growth assay was completed and determined, a mitochondrial assay was conducted. To determine if the levels of viability alteration in response to PFOS were associated with impaired integrity of mitochondria structure and function, MitoTracker Red was utilized to visualize budding yeast cells using confocal microscopy. Using a revised standard protocol, cells were able to be stained and visualized under a microscope. This was completed in a triplicate, as well. After the experiments were concluded, it was determined that PFOS does make small mitochondrial abnormalities with yeast cells in terms of structural modifications. Throughout all experiments, cells were treated with an inhibitory concentration at 50%

(IC50) of PFOS or PFOS-free vehicle (water). The IC50 in this study was about 800 uM. An ANOVA test was used to analyze differences and/or similarities with GraphPad. It was concluded that PFOS does have toxic effects on budding yeast cells, especially with growth/viability and mitochondrial success.

Presenter – Shayd Gothard
Authors – Shayd Gothard, Andrew Pettenger, Egor Glushkov, Ethan Grier, and Santimukul Santra
Oral Presentation – 1-SICL 127
Chemistry
POLYETHYLENE GLYCOL STABILIZED GOLD NANOPARTICLES FOR CATALYTIC REDUCTION OF PARA-NITROPHENOL TO PARA-AMINOPHENOL
Stabilized gold nanoparticles (GNPs) are synthesized using an exchange method of polyethylene glycol (PEG) with novel GNPs-Citrate. The specific molecular weight of PEG is 6000. The encapsulated GNPs-PEG undergoes morphing of the PEG ligand during synthesis depending on amount of PEG used. Varying molar ratios of GNPs to PEG molecules results in conformational changes affecting size and catalytic activity. The GNPS-PEG were characterized using dynamic light scattering. In this study, UV-visible spectrophotometry was used to compare the catalytic activity of the GNPs-PEG for the reduction of para-nitrophenol to para-aminophenol. Reaction rates are compared to suggest activities of varying ratios of gold nanoparticles to PEG. The nanocatalyst with the highest catalytic activity was found in smaller NPs sizes. The trend revealed better kinetics from the smallest ratio to the middle ratio, then decreased as the PEG amount increased from the middle ratio to the highest ratio. More studies are needed to understand the catalytic comparison between different molecular weights of PEG.

Presenters – Mateo Guerra Toro, Jonah Vercher
Authors – Mateo Guerra Toro, Tony Davila, Jonah Vercher, Micah Herron, Simarpreet Girn, and Bishwash Devkota
Poster # – A21
Natural and Applied Science
FROM STARS TO QUBITS: APPLYING QUANTUM ML TO ASTROPHYSICAL DATA
In this project, we explored how quantum machine learning can be applied to astrophysical data analysis. We used a variational quantum circuit to train a simple model for classifying types of celestial objects, such as stars and galaxies, based on features from simulated datasets. Our goal was to test whether quantum models could identify useful patterns in the data and compare their performance to classical approaches. This work allowed us to investigate the potential role of quantum computing in future astrophysics research while gaining experience with quantum circuits and machine learning methods.

Presenter – Khalid Hasan
Author – Khalid Hasan and Jamil Saquer
Poster # – A22
Computer Science
EVALUATING TRANSFORMER MODELS FOR MENTAL HEALTH DISORDER ON SOCIAL MEDIA
The growing incidence of mental health disorders demands sophisticated, computerized instruments to facilitate early detection and ongoing monitoring. Recent advances in Natural Language Processing (NLP), particularly transformer models, have proven highly promising in processing textual data. This work compares current transformer models (BERT, RoBERTa, DistilBERT, ALBERT, and ELECTRA) with the conventional Long Short-

Term Memory (LSTM) methods with various text embeddings for mental health disorder classification on Reddit. We built a large, annotated data set and tested the quality of the data through statistical analysis and topic modeling. Experimentation reveals that models based on the transformer are superior to the older deep-learning methods. RoBERTa performed the best among the models, with an F1-score over 99% over the hold-out test set and nearly 96% over an external test set. Interestingly, LSTM models with added BERT embeddings performed well, yielding F1-scores above 93% on external datasets, and are computationally much more efficient. These results demonstrate the potential of transformer models for real-time, scalable monitoring of mental health. We lay out their clinical applications, intervention potential through digital means, as well as strengths and limitations of current state-of-the-art NLP approaches towards detecting mental health.

Presenters – Micah Herron, Jessica Fink, Greg Vatrano
Authors – Micah Herron, Jessica Fink, and Gregory A Vatrano
Poster # – B21
Mathematics
SOLVING THE POISSON PROBLEM WITH HYBRID QUANTUM PHYSICS-INFORMED NEURAL NETWORKS
This project explores how quantum computing can be used to solve problems in physics. We use a hybrid quantum-classical approach to learn hidden source terms in the 2D Poisson equation by embedding the physics directly into a loss function method known as a Physics-Informed Neural Network (PINN). By combining classical automatic differentiation with a variational quantum circuit, this work demonstrates how quantum computing can be applied to real-world problems in engineering and design. This can be applicable to inverse Poisson problems as well.

Presenter – Fahim Irfan
Authors – Fahim Ahmed Irfan and Razib Iqbal
Poster # – B22
Computer Science
AN UNSUPERVISED LEARNING APPROACH FOR SENSOR-ACTUATOR RELATIONS IN SMART HOMES
The evolution of wireless technology and the Internet of Things (IoT) has allowed smart homes to incorporate various actuators, such as smart lights, smart switches, and smart doorbells, etc., that respond to various sensor events, such as motion, door, and light sensors, etc., facilitating automated control of appliances. This automation is particularly advantageous for elderly individuals and those unfamiliar with complex technologies. However, identifying relationships between sensors and actuators remains a challenge due to the diverse time series data they generate. In this research, we investigated a novel method to determine sensor-to-actuator relationships using only time series data automatically. The approach consists of two phases: first, it identifies contextually related sensors by identifying how often sensor events follow each other in close proximity in terms of two features: Normalized Frequent Next Event (N-FNE) and Normalized Time Delta (N-TD); second, it extracts relevant features from the time series data and applies an unsupervised clustering technique to group related sensors and actuators based on behavioral similarities. Unlike traditional methods, this approach does not require prior knowledge of deployment scenarios, making it highly adaptable across different smart home environments. Experimental results demonstrate the effectiveness of the proposed method in identifying sensor-actuator relationships across various configurations.

Presenter – Tania Islam
Author – Tania Islam and Toby Dogwiler
Poster # – B23
Geography and Geology
EVALUATING CHANNEL DYNAMICS AND EROSION CONTROL MEASURES IN TURKEY CREEK, TRI-STATE MINING DISTRICT, MISSOURI, USA.
The Tri-State Mining District (TSMD), covering southeast Kansas, southwest Missouri, and northeast Oklahoma, has undergone extensive environmental degradation due to lead and zinc mining between the 1880s and 1920s. Turkey Creek, a major tributary within the Oronogo-Duenweg Mining Belt, is still affected by around 10 million tons of mine waste. Despite ongoing remediation efforts, sediment erosion continues to mobilize legacy contaminants, threatening water quality and ecosystem health. This study utilized geomorphic analysis and HEC-RAS 2D hydraulic modeling to assess channel migration, identify erosion-prone areas, and delineate priority remediation zones for bioengineered bank stabilization along an 11.5-mile stretch of Turkey Creek. The creek is classified as a low-gradient stream with riffle-pool sequences, divided into three geomorphic zones: erosion (13%), transition (27%), and deposition (50%). Eight high-priority erosion sites were identified for bio-engineered stabilization. Hydraulic modeling reveals that peak flow events increase sediment mobilization by 15-30%, with bank erosion rates of 0.5-2.5 feet annually. Bio-engineered stabilization is expected to reduce sediment mobilization by 25%, supporting sustainable erosion control. This research contributes to EPA's efforts to prioritize restoration within TSMD.

Presenter – Elizabeth Jones
Author – Elizabeth Jones
Melida Gutierrez
Poster # – A26
Geography and Geology
LEITH CREEK: FIELD METHODS TO DETERMINE IF A KARST CREEK IS GAINING OR LOSING
Leith Creek is a small stream in Polk County, Missouri fed by two springs and the shallow unconfined Springfield Plateau aquifer, a highly karstified aquifer which is made up of limestone and minor interbedded shale-mudstone units. To determine if Leith Creek is gaining or losing, stream flow, water chemistry and temperature sensors were monitored. Another objective of the study was to determine if Leith Creek is being contaminated by sewage, fertilizers, and manure since this county has the 2nd largest number of cattle in Missouri. Stream discharge was measured bimonthly at four sites within a 0.4 km creek segment. Water samples were also tested bimonthly for sulfates and nitrate-nitrogen. Results of this study show that Leith Creek is both a losing stream with a low degree of contamination by animal waste, and that precipitation influences water quality. The water quality reflects dissolution of limestone and contains little sulfur. The nitrate nitrogen amount ranges from 0.09 mg/L to 1.59 mg/L, with an average nitrate nitrogen level of 0.85 mg/L.

Presenter – Acacia Jurkowski
Authors – Acacia Jurkowski and Natasha DeVore
Poster # – B25
Chemistry
DEVELOPMENT OF CYAN THERMOSTABLE FLUORESCENT PROTEINS: CHARACTERIZATION AND STRUCTURAL ANALYSIS

Fluorescent proteins are commonly used as cell markers in living organisms. Modifications by mutation can be used to improve the qualities of these proteins including fluorescence, thermostability, pH stability, and chemical stability. The goal of this research project is to use mutagenesis to try to improve the fluorescence of currently thermostable cyan and blue proteins derived from the thermal green protein (TGP). The first cyan protein developed by the DeVore lab (CTP 0.0) shifted the fluorescence to cyan but decreased the quantum yield to 0.056. Further mutations were incorporated to increase the quantum yield through incorporating hydrogen bonding interactions to the chromophore and to remove a kink present in beta strand seven. These proteins, CTP 0.5 (Y67W I199T) and CTP 1.0 (Y67W I199T W143L E144I P145D S146A), increased the quantum yield to 0.07 and 0.37, respectively and improved stability characteristics. CTP 0.75 incorporated another chromophore mutation into CTP 1.0 (Q66E) to increase the stability characteristics but decreased the quantum yield to 0.22. The CTP 1.0 cyan protein was also compared to mTurquoise2, one of the current best cyan fluorescent proteins based on GFP. CTP 1.0 had comparable chemical stability and improved acid stability. Crystal structures were solved for CTP 0.5 at pH 6.5 (2.00 Å), CTP 1.0 at pH 6.5 (1.70 Å), CTP 1.0 at pH 8.5 (1.60 Å), and CTP 0.75 at pH 7.4 (1.70 Å). Structural analysis of the proteins showed that while improvement to beta strand seven was unsuccessful, the increase in quantum yield is likely due to the incorporation of the T199 residue and subsequent hydrogen bonding interaction improvements with the chromophore.

Presenter – Rahab Kanogo
Authors – Rahab Kanogo, Tuhina Banerjee, and Santimukul Santra
Poster # – A28
Chemistry
INTERACTION OF TUBULIN ASSOCIATED UNIT (TAU) WITH PEGYLATED NANOPARTICLES
Tubulin associated unit (Tau) protein plays a role in the development of neurodegenerative illnesses such as Alzheimer's disease, where it aggregates and accumulates in the brain. Recent research has investigated the use of nanoparticles as potential therapeutic agents for modulating Tau protein function and mitigating its adverse effects. In this study, we are looking at the interaction of Tau protein with PEGylated nanoparticles, which have distinct structural and surface features that may influence Tau aggregation and clearance. To analyze the binding interactions between Tau protein and PEGylated nanoparticles, the study will use a variety of techniques such as dynamic light scattering, size exclusion spectroscopy, and transmission electron microscopy. The study will also examine if PEGylated nanoparticles could be a suitable platform for developing tailored therapeutics to treat Tau-related pathologies in neurodegenerative disorders by exploring how those nanoparticles interact with human corona.

Presenter – Matthew Knoll
Authors – Matthew Knoll, Cole Roman, Brianne Edwards, and Babur Mirza
Oral Presentation – 1-SICL 222
Biology
SELECTION OF BRADYRHIZOBIUM AND SINORHIZOBIUM IN SOYBEAN ROOT NODULES AT DIFFERENT PLANT GROWTH STAGES
Soybean plants require nitrogen but cannot use N2 from the atmosphere. Instead, nitrogen-fixing bacteria, such as rhizobia, form symbiotic relationships with soybeans, providing usable nitrogen in exchange for sugars. Four main rhizobial genera, including *Bradyrhizobium* and *Sinorhizobium*, form root nodules on soybeans. This study looked at whether soybean plant age and rhizobial cell density in the rhizosphere affect endophyte

selection. Soybeans were grown for 56 days and inoculated with *Bradyrhizobium japonicum* USDA 110 and *Sinorhizobium fredii* USDA 191 at different cell density ratios (1:1, 100:1, 1:100) and at different growth stages (T0, T2, T4). Illumina sequencing of the bacterial 16S rRNA gene showed preferential selection of *Sinorhizobium* in root nodules as the plant got older. Cell density does not seem to impact selection. Both isolates were also able to nodulate soybean independently. These findings suggest that plant age could be a driving factor in endophyte selection.

Presenter – Jacob Linhardt
Authors – Jacob Linhardt and Keiichi Yoshimatsu
Poster # – B28
Chemistry
TOWARDS THE EXPRESSION OF OMNILIGASE-1 IN E.COLI
Peptides are a class of molecules that are of significant interest to the fundamental research and industrial communities including pharmaceutical companies. This is due to the variety of applications that peptides can offer in the broad areas including healthcare. Naturally this led to an increased demand for a simpler, cost-effective method for peptide synthesis, in particular the synthesis of long peptides. Solid-phase peptide synthesis is the most common method for synthesizing peptides; however, the longer the peptide is, the less efficient the process becomes. The utilization of omniligase-1 helps alleviate the decreasing purity of solid phase peptide synthesis by joining small peptide fragments together to achieve longer peptides without the decrease in purity; however, the utilization of omniligase-1 has issues in and of itself. Omniligase-1 cannot be purchased from commercial sources. There has been no report of the recombinant expression of omniligase-1 in E.coli. , but protein expression in E.coli would allow for lowering the barrier for entry for labs to utilize omniligase-1. Along those lines, this work has investigated the feasibility to express omniligase-1 in E. coli.

Presenter – Mackenzie McIntire
Authors – Mackenzie S. McIntire, Zubair Faruqui, Rahul Dubey, and Jay P. McEntee
Oral Presentation – 2-SICL 119
Biology
CHARACTERIZING GEOGRAPHIC VARIATION IN BEWICK'S WREN (THRYOMANES BEWICKII) SONG USING A NOVEL MACHINE LEARNING METHOD
Bewick's Wren (Thryomanes bewickii) sings strikingly different songs across its range. I study two variants, referred to here as the Eastern and Mexican lineage, which differ in song length, complexity and spectro-temporal structure. I aim to characterize variation between song variants by elucidating their geographic ranges and quantifying the acoustic differences. I recorded Bewick's Wrens and collected geographic data in Arizona and New Mexico to refine the range boundaries of two song variants. Using my recordings, I trained a machine learning model to distinguish between song types and applied explainable AI (XAI) to explain the model's predictions. I also used a discriminant function analysis to determine what acoustic variables best identify the two groups. My results show the ranges of the two song variants come into contact in west-central Arizona, where I documented evidence of two mixed singers, who sang songs typical of both variants. I also demonstrate that XAI can be used to explain birdsong machine learning classifiers by capturing more variation in the data than using visual spectrogram inspection or statistics alone. This study advances knowledge of Bewick's Wren and proposes a new method of bioacoustic analysis.

Presenter – Kaiser Mostafiz
Author – Kaiser Mostafiz and Tasnuba Jerin
Poster # – B30
Geography and Geology
HYDROLOGICAL SHIFTS IN FLOOD MAGNITUDE AND RECURRENCE: A CASE STUDY OF THE LOWER MISSOURI RIVER BASIN
Flooding is a significant environmental hazard exacerbated by climate change, posing serious risks to communities, infrastructure, and ecosystems. This study investigates shifts in flood frequency and magnitude over two climatic periods (1960–1990 and 1991–2020) in the Lower Missouri River Drainage Basin across Nebraska, Iowa, Kansas, and Missouri. By analyzing secondary and quantitative data from the USGS National Water Information System (NWIS), the study performs a flood frequency analysis (FFA) based on the Log-Pearson Type III distribution, as outlined in US Bulletin 17C. A dataset comprising for 465 USGS gaging stations that are in Missouri with continuous peak streamflow records was initially selected for the analysis. After completing the data cleaning process, 107 (out of 465) common gaging stations, flood frequency analysis was done using annual peak flow (cfs) for each station. Data processing included automated retrieval and cleaning through Python and R scripts, ensuring consistency and accuracy. Results indicate variations in peak streamflow trends between the two climatic periods, reflecting the increasing influence of climate change on flood magnitudes and recurrence intervals. The post-1990 period shows a higher frequency of extreme flood events due to frequent precipitation patterns. These findings underscore the need for updated flood risk assessments and adaptive management strategies.

Presenter – Ali Muhammad
Authors – Author: Ali Muhammad and Tony Astuhuaman Davila
Poster # – A32
Geography and Geology
QUANTUM MAPPING: EXPLORING GEOSPATIAL MODELS WITH QUANTUM COMPUTING
In this project, we explored how quantum computing can be applied to geospatial data. We used simple quantum circuits to model spatial patterns and tested how quantum machine learning techniques could support tasks such as classifying land types or identifying regions. We also implemented quantum kernel methods, which allow us to compare data points using quantum circuits instead of traditional distance formulas. This helped us investigate whether quantum models can reveal patterns that might be harder to detect using classical methods. Our goal was to apply foundational quantum computing tools to real-world mapping problems and better understand their potential in environmental and geospatial applications.

Presenter – Jordan Murray
Authors – Jordan Murray and Alexandar Wait
Oral Presentation – 1-SICL 119
Biology
INVESTIGATING THE PHYTOREMEDIATION POTENTIAL OF GIANT CANE (ARUNDINARIA GIGANTEA) ON LEAD (PB) CONTAMINATED SOILS
Human activities have caused substantial disruptions to biodiversity and ecosystem processes worldwide. Anthropogenic activities like industrial processes and mining release heavy metals like lead, zinc, cadmium, mercury, nickel, and copper into the environment. Lead (Pb) is a thoroughly studied heavy metal that accumulates in the food chain and causes severe developmental and neurological issues in humans. Removing heavy metal

contaminants from soil and water is important for human and ecosystem health, but traditional remediation methods can be expensive and labor-intensive. Biological remediation using plants (phytoremediation) can provide effective removal of these metals as well as provide numerous other ecological benefits. Giant cane (Arundinaria gigantea) is a temperate species of bamboo and has potential to be an effective extractor of heavy metals due to its high biomass accumulation and ability to take up other kinds of contaminants. To quantify giant cane's uptake ability, plants will be grown in soil contaminated with lead under greenhouse conditions. Plant tissue samples will be analyzed to find the concentration of lead in the rhizome, shoot, and leaf of the plant. We expect giant cane will take up large quantities of lead without seeing substantial impacts on its physiology and growth. Giant cane could be an excellent plant choice for remediation in riparian areas and could help improve environmental quality and human health.

Author – Nicole Nalley
Poster # – A33
Biology
CALCITONIN GENE-RELATED PEPTIDE MODULATES INTRACELLULAR CALCIUM LEVELS IN TRIGEMINAL GANGLION NEURONS AND GLIA
Calcitonin gene-related peptide (CGRP) is implicated in TMD and migraine pathology but its effects on the excitability state of Aδ and C fiber neurons is understudied. The goal of my study was to determine changes mediated by CGRP on intracellular calcium levels in trigeminal ganglion neurons and glia in response to depolarizing stimulation. Intracellular calcium levels were determined using Fura-2 and fluorescent microscopy in primary trigeminal ganglion cultures established from neonatal Sprague Dawley rats. Cells were left untreated or pretreated for 2 hours with CGRP prior to addition of depolarizing stimuli KCl or ATP. Image analysis was performed using Olympus CellSens Dimension software and JASP. CGRP greatly increased the calcium amplitude in response to KCl and ATP in Aδ neurons, while causing a smaller response in C fibers. CGRP also increased the percentage of Aδ neurons responsive to KCl and extended the duration of the elevated response. In glial cells, CGRP increased the duration of the KCl-mediated response. Our findings provide evidence of a novel role of CGRP in potentiating the excitability state of Aδ and C fiber neurons and glial cells implicated in pain signaling in TMD and migraine. Funding Source: NIH R15.

Presenter – Samiha Nuzhat
Authors – Samiha Nuzhat and Asif Ishtiaque
Oral Presentation – 2-SICL 127
Geography and Geology
IDENTIFYING THE DETERMINANTS OF MARGINALIZATION IN CLIMATE ADAPTATION DECISIONS
Marginalization in climate adaptation is a complex issue driven by socioeconomic, environmental, and systemic factors. While individuals with limited power and resources are perceived as the most marginalized, there is no systematic research examining other drivers of marginalization. Our study addresses this gap and identifies the determinants of marginalization in the climate-vulnerable coastal villages of Bangladesh. In this cross-sectional study, we interviewed 301 respondents and employed a generalized additive model for data analysis. Our findings reveal that a lower percentage of men in households, lack of organizational membership, and financial constraints increase marginalization, while early engagement of communities, frequent community visits by organizational representatives and NGO incentives reduce it. Motivational factors (societal contribution

and topic interest) decrease exclusion, whereas perceived ineffectiveness and disinterest increase it. Notably, those perceiving geographic distance as a barrier participate more, likely due to targeted outreach by adaptation practitioners in remote locations. These insights can inform more inclusive adaptation strategies, engaging individuals at a greater risk of exclusion.

Presenter – Tony Nyabayo
Authors – Tony Nyabayo, Rahab Kanogo, Santimukul Santra, and Tuhina Banerjee
Poster # – A35
Chemistry
ALPHA-SYNUCLEIN INTERACTION WITH GEDUNIN
Parkinson's disease and other neurodegenerative diseases are caused by the misfolding of the alpha-synuclein protein, which then aggregates into amyloid fibrils. While existing treatments for PD are primarily focused on managing its symptom, a promising approach for slowing down the propagation of Parkinson's Disease involves targeting the production of toxic alpha-synuclein amyloids. Gedunin, a natural inhibitor of heat shock protein 90, has extensively been used to treat malaria. Also, recent research investigations have shed light on its potential beyond malaria therapy, indicating that Gedunin may be a promising choice for treating a variety of neurodegenerative diseases. This study examined how Gedunin reduces alpha-synuclein aggregation and its impact on Parkinson's disease pathogenesis. The study found that Gedunin dose dependent concentrations modulates alpha-synuclein aggregation pattern, reducing the formation of toxic oligomeric forms and increasing its susceptibility to proteolytic breakdown. Gedunin interacts with the hydrophobic regions of alpha-synuclein oligomers, significantly reducing alpha-synuclein amyloid toxicity. This suggests that oligomerization may be crucial for alpha-synuclein to manifest its neurotoxic effects. These findings provide convincing evidence for Gedunin's neuroprotective potential in PD by targeting protein misfolding and aggregation. Also, they indicate a path forward for disease modifying therapies in neurodegenerative illnesses.

Presenter – Bhooma Parthasarathy
Author – Bhooma Parthasarathy and Kevin Mickus
Oral Presentation – 1-SICL 127
Geography and Geology
GEOPHYSICAL ANALYSIS OF THE LAURENTIAN BASEMENT UNDERLYING THE BLACK WARRIOR BASIN
The crustal structure of southeast Laurentia is related to processes that occurred from the Mesoproterozic to the Cretaceous. The Mesoproterozoic terrane accretion occurred during the formation of granite rhyolite province. The subsequent Grenville orogeny that assembled Rodinia produced intrusions and crustal thickening along the eastern-southeastern margins, stretching from southeast Canada to northwest Alabama. The Neoproterozoic-earliest Cambrian rifting and fragmentation of Rodinia created the Laurentian basement outlined by rift margins and segmented by transform faults. The AL-OK transform fault connecting the Alabama and Texas promontories, is the southern end of Reelfoot Rift, an early Paleozoic NE-SW striking aulacogen. The early Paleozoic Laurentian passive margin accumulated transgressive sequences over the basement structures. During the Late Paleozoic Alleghenian orogeny, sediment deposition within the NE-SW trending Black Warrior Basin further buried the basement. The basin homocline extends from Nashville Dome to the syntaxial bend between the Appalachian and Ouachita thrust belts. The purpose of this project is to investigate the crustal structure of the Precambrian Laurentian basement underlying the Black Warrior Basin using gravity and magnetic data.

Bouguer gravity and residual gravity anomaly maps indicate NE-SW trending gravity maxima with sources between 11.25 and 37.5 km based on upward continuation maps. These gravity maxima correlate with magnetic maxima on both reduced to the pole and residual magnetic maps which suggests the sources are linear mafic bodies underlying the Black Warrior Basin.

Presenter – Ophelia Pettington
Author – Ophelia Pettington and La Toya Kissoon-Charles
Oral Presentation – 2-SICL 222
Biology
MICROBIAL AND METAL COMPOSITION OF RHIZOSPHERE AND BULK SOILS IN AREAS OF THE TRI-STATE MINING DISTRICT
The Tri-State mining district (TSMD) was mined for zinc and lead for over 100 years and former mines remain sources of metals. Metals easily disperse due to karst topography, accumulate in sediments, and enter the food chain via plant uptake. There is a growing interest in bioremediation, including using plant-microbe interactions, which has shown to be successful. Plants manipulate their microbiome and recruit microbes to increase metal tolerance. Remediating bacteria are site-specific and identifying native microbes can accelerate remediation efforts. Microbial relationships to metal concentrations in remediated areas have not been widely studied in the TSMD. We collected root and bulk soils associated with Andropogon virginicus from remediated and non-remediated sites in Webb City, MO. We used Amplicon DNA sequencing to evaluate the bacterial community and ICP-MS to measure metal concentrations. Metal concentrations of remediated areas were similar to a nearby remnant prairie, but 3-15 times less than the non-remediated area. We hypothesized that (1) metal remediating genera of bacteria will be more abundant in root than bulk soils and (2) bacterial diversity and abundance will increase with decreasing metal concentrations.

Presenter – Elaine Pham
Oral Presentation – 1-SICL 125
Chemistry
SYNTHESIS AND CHARACTERIZATION OF G3 FAMILY OF ORGANOANTIMONY(V) CYANOXIMATES FOR ANTIMICROBIAL AND ANTIFUNGAL STUDIES.
As antibiotic resistance continues to rise, it became imperative to find principally new types of compounds that possess antimicrobial activity. Previously in our research group two series of novel organometallic antimony(V) compounds containing different number of organic groups and biologically active cyanoxime moieties were synthesized and in vitro studied against notorious human pathogens [1-3]. These two series received the definition of G1 and G2 families and shown in Figure 1. Based on results of thus far carried out research, a new G3 family of compounds was designed to take the best active organoantimony motif and the most active cyanoximes as displayed therein. This project focuses on synthesizing and characterizing several novel organoantimony (V) cyanoximates of the latter family with the aim of their subsequent antimicrobial and antifungal studies. to fight infections. Unlike traditional standard antibiotics, these compounds have unique structures with stable Sb-C bonds, possess great thermal strength, and miscible with variable solvents forming lasting molecular solutions.

Presenter – Riley Pope-Buss
Authors – Riley Pope-Buss, Mary Fakunle, Blessing Akinwande, Jake Churchman, Matthew Knoll, Babur Mirza, Aldeyemi Adeleye, Nubia Zuverza-Mena, and Cyren Rico
Poster # – B33
Chemistry
PLANT GROWTH AND SOIL MICROBIAL DIVERSITY IN SOYBEANS EXPOSED TO PERFLUOROOCTANESULFONIC ACID
Perfluorooctanesulfonic acid (PFOS) is a major environmental contaminant known to impact plant and animal health. This study investigated the effects of PFOS on soybeans and their associated soil microbial community. Soybeans were grown under short-term (30 days) and long-term (90 days) conditions in soil containing 0 mg/kg, 25 mg/kg, or 50 mg/kg of PFOS. In the short-term study, chlorophyll content, lipid peroxidation (LPOX), and ascorbate peroxidase activity (APOX) were analyzed. In the long-term study, soybean biomass, yield, and seed metabolites were examined, along with the elemental composition in the roots, shoots, and seeds. PFOS uptake in plants was also measured. Additionally, microbial DNA was collected from the rhizosphere and bulk soil, followed by 16S rRNA gene amplification and sequencing to assess microbial community changes. The results suggest that plants grown in 25 mg/kg PFOS performed better than the control, while those grown in 50 mg/kg PFOS showed only slight or non-significant differences compared to the control.

Author – Lyndsey Rightnowar
Poster # – B38
Biology
BRIDGE TO BIODIVERSITY: AN EFFORT TO RESTORE MO'S ONLY NATIVE BAMBOO, GIANT RIVER CANE (ARUNDINARIA GIGANTEA)
Giant river cane (Arundinaria gigantea) is a species of bamboo native to Missouri that provides habitat for over 50 animal species. It was once a dominant plant in bottomland forests and riparian areas throughout the southeastern United States, but only 2% of historical canebrakes remain, so it is considered a critically endangered ecosystem. This project focused on investigating the transplant success of various putative genotypes and planting types by measuring survival and shoot production at restoration sites. My research establishes the growing conditions in four existing canebrakes and associated shoot emergence and survival at three restoration sites. I compared two planting types: 72 rhizomes were collected, propagated in the greenhouse, and then planted at two field locations; 36 rhizomes were collected and directly planted at two field locations. Results showed higher shoot production and survival for greenhouse-to-field (1.8 new shoots per rhizome, 76% survival) compared to field-to-field (0.75 new shoots per rhizome, 59% survival) outplants. By identifying environmental and putative genetic variables associated with success, this project provides insight that supports the restoration of this valuable endangered ecosystem.

Presenter – Rubina Sherchan
Authors – Rubina Sherchan and Babur Mirza
Oral Presentation – 1-SICL 127
Natural and Applied Science
UNDERSTANDING MICROBIAL COMMUNITY DYNAMICS IN WASTEWATER TREATMENT PLANTS USING NEXT GENERATION SEQUENCING TECHNIQUES
Wastewater treatment plants (WWTPs) play a crucial role in mitigating water pollution by removing contaminants before discharging effluent into the environment. However, these

facilities also serve as reservoirs for various microbial communities, including both beneficial bacteria and potential pathogens. This study examines the dynamics of the microbial communities at several wastewater treatment stages in two WWTPs- Southwest Water Treatment Plant (SWTP) and the Northwest Water Treatment Plant (NWTP) in Springfield, Missouri. A total of 55 water samples were collected, and DNA extraction and library preparation were performed in the lab. Illumina paired-end sequencing of 16S rRNA gene amplicons was conducted to assess changes in the bacterial community composition using Next-generation DNA sequencing. Physicochemical parameters such as alkalinity, BOD, COD, nutrients, and microbial indicators were analyzed to evaluate treatment efficiency. Preliminary results indicated a significant shift in microbial community composition across different treatment stages. *Proteobacteria* dominated influent samples, making up over 42% of sequences, followed by *Actinobacteria, Bacteroidetes*, and *Firmicutes*. *Bacteroidetes* and *Firmicutes* increased in abundance during secondary treatment, correlating with their role in organic pollutant breakdown. *Planctomycetes* and *Nitrospirae* were found predominantly in anaerobic tanks, contributing to nitrogen cycling through ammonium oxidation and nitrification. These results are crucial for identifying key bacterial species involved in the removal organic and inorganic pollutants from water before it can be released into freshwater systems.

Presenter – Md Asif Tanvir
Authors – Md Asif Tanvir and Razib Iqbal
Poster # – A40
Computer Science
FROM CHAOS TO CLARITY: IMPROVING SENSOR GROUPING FOR SMART ENVIRONMENTS THROUGH ANOMALY DETECTION
The use of IoT devices is rapidly increasing in households, creating a need for automation and synchronization among these devices. Automating various actuator events based on sensor activities and generating automated policies from these events can provide a solution to this issue. Achieving this automation in a smart environment requires identifying and grouping related sensors as a crucial step. However, this sensor grouping process can be disrupted by an abundance of anomalous data, which can hinder the automated policy generation process. These anomalies may arise due to sensor failures, external interference, or unexpected human interactions that introduce noise into the data. In this project, we investigated a novel approach to detecting anomalies by analyzing the total number of sensor events triggered within a specific time window, followed by an unsupervised learning method. We evaluated multiple unsupervised learning approaches by leveraging existing sensor grouping mechanisms across three custom datasets and one public dataset. Our experimental results demonstrate that the quality of sensor groupings improves in the datasets after removing anomalies. Additionally, we compared our approach with other anomaly detection techniques and found that our approach outperformed state-of-the-art methods.

Presenter – Marcell Toth
Author – Marcell Toth and Tasnuba Jerin
Poster # – B41
Geography and Geology
SPATIAL PATTERNS AND DISTRIBUTION OF SINKHOLES IN KARST DOMINATED WATERSHEDS: EXAMPLE FROM THE OZARKS, MISSOURI
Sinkholes are characteristic enclosed depressions, recognized as signature landforms of karst landscapes and sources of geohazard. Therefore, identification and spatial distribution

pattern studies of sinkholes are important as karst terrains are vulnerable to subsidence and collapse. Sinkhole occurrence shows spatial variability based on watershed geomorphological attributes, surficial hydrological patterns, hydrogeological and geological settings. This research aims to analyze the spatial patterns and distribution of sinkholes in the carbonate karst-dominated lands of Mark Twain National Forest in Missouri, USA in relation to watershed geomorphology and surficial hydrology. The objectives are to (1) identify sinkhole classification groups or clusters based on their morphometry; (2) define the morphometrical characteristics of each identified sinkhole cluster; (3) characterize the spatial sinkhole occurrence patterns of the predefined clusters and compare it with landscape topography, watershed hydrological features and drainage properties in the study area. A selected clustering method (K-Means) will be utilized on a high-accuracy sinkhole inventory combined with Stepwise Regression analysis and Classification & Regression Tree (CART) predictive algorithm. This study is expected to enhance understanding of how sinkhole morphometry is dictated by geospatial occurrence patterns in the landscape.

Presenter – Phuong Tran
Authors – Phuong Tran and Kyoungtae Kim
Poster # – A41
Biology
TRANSCRIPTOMIC ANALYSIS OF LIVER CELL MODELS UPON EXPOSURE TO PERFLUOROOCTANE SULFONATE (PFOS)
Background & Purpose: Perfluorooctane sulfonate (PFOS) is a prevalent environmental pollutant that has garnered significant attention due to its potential hepatoxic effects and associated health risks. Despite its widespread distribution, the underlying mechanisms remain inadequately understood. To investigate the toxicities of PFOS, our study utilized HepG2, and THLE-2 hepatic cell models to replicate conditions reflecting PFOS accumulating in the liver. Methods: Cell viability, cell stress, and cell death assays were conducted to assess the toxicological interactions of the chemical on both cell lines. Total RNA extraction was performed, followed by cDNA sequencing and quantification using rt-qPCR. Results: The XTT viability assay revealed a dose-dependent decrease in number of viable cells when treated with increasing concentrations of PFOS. The IC50 values were approximately 100 micromolar, which elevated reactive oxygen species (ROS) in both cell lines. PFOS exposure also led to increased apoptotic levels, as evidenced by the upregulation of Caspase-3 activity. Based on our data from transcriptomic analysis for HepG2 cells, mitochondrial genes involved in oxidative phosphorylation were downregulated, including COX, ND, and ATP synthase family. Additionally, there were about 30 up-regulated genes implicated in the cAMP signaling pathway. Conclusions: Our future goals involve exploration of metabolomic profiling of PFOS-exposed HepG2 cells, providing comprehensive insights into the chemical's toxic effects on hepatic cellular metabolism.

Presenter – Michell Waterman
Authors – Michell Waterman, Kevin Mickus, Melida Gutierrez, and Xin Miao
Poster # – A43
Geography and Geology
GEOPHYSICAL ANALYSIS OF THE SUPERIOR PROVINCE IN WESTERN MINNESOTA: INSIGHTS INTO MINERAL EXPLORATION
The Superior Province, an Archean craton, spans approximately 132,000 square miles across south-central Canada and north-central United States. In Minnesota, this region is dominated by diverse granitic and granitoid intrusions, with smaller amounts of

metamorphic rocks formed through orogenic events between 2.8 and 2.6 billion years ago. The Penokean Orogeny, the final tectonic event, significantly shaped west-central Minnesota. In contrast, northwestern Minnesota within the Superior Province features minor Cretaceous clastic sediments, with glacial deposits overlying the bedrock, complicating direct identification of bedrock units. Renowned for hosting world-class ore deposits—including banded-iron formations, volcanogenic massive sulfides, and granitoid-hosted gold and copper deposits—the Superior Province in northwestern Minnesota remains largely underexplored. This is due to the scarcity of outcrops and the lack of detailed geophysical and geochemical surveys. To address this, a high-resolution aeromagnetic and radiometric survey was conducted as part of the USGS Critical Mineral Program. The available gravity data was integrated into a geophysical analysis to produce residual and derivative anomaly maps, along with two- and three-dimensional gravity and magnetic models, correlated with existing geochemical datasets. Initial results from the gravity and magnetic anomaly maps highlight gravity and magnetic lows on Bouguer gravity, reduced-to-pole magnetic, and residual maps, which align with Archean granite intrusions. In contrast, gravity and magnetic highs are associated with banded-iron formations and basaltic dikes. Larger-scale anomalies trend SW-NE, while anomalies linked to iron formations and dikes exhibit SE-NW trends. Derivative analyses validate these patterns and refine the location of source bodies. Forward modeling across three sections of the study area has further refined our understanding of subsurface structures. Dikes exhibiting high densities and magnetic susceptibilities were identified, with localized zones of even higher density and magnetic susceptibility within these features, suggesting potential mineralized or lithologically distinct bodies. The models also reveal clear boundaries between the sedimentary-dominated Quetico subprovince and the adjoining Wabigoon and Wawa subprovinces, inferred from observed gravity and magnetic data contrasts. These findings provide critical insights into the region's structural framework and mineral potential, further guiding exploration efforts. Future work will focus on generating additional residual anomaly maps, refining subsurface models, and applying machine learning techniques alongside geochemical and radiometric data to identify high-potential areas for mineral exploration.

Presenter – Carl York
Authors – Carl York and Kevin Mickus
Oral Presentation – 2-SICL 119
Geography and Geology
APPLIED MACHINE LEARNING IN MINERAL PROSPECTIVITY MAPPING IN THE SOUTH PASS-GRANITE MOUNTAINS, WYOMING
The South Pass Granite Mountains, comprised of Archean to Tertiary rocks embedded with an Archean greenstone belt in Central Wyoming, have historically been mined for gold, iron, steel, and silver. Rare earth elements have been of increasing interest in the region and thus, several datasets have become available. Knowledge driven and data driven models are used in mineral prospectivity mapping with input data including geological mapping, geochemical data, geophysical (USGS Critical Mineral magnetic and gravity data), radiometric (U, Th, K) data and multispectral remote sensing data. Mineral prospectivity has seen a rapid improvement in recent years using advancements in machine learning for processing large and complex datasets to identify new potential deposit locations. The magnetic and gravity data will be utilized to create lineaments that may act as conduits for ore fluids and for fault density evidential maps for input into the machine learning algorithms. This study aims to utilize and compare algorithms such as Random Forest, Light Gradient Machine Boosting, Support Vector Machine, and Convolutional Neural Networks

on evidential maps to identify potential new gold and rare earth elements deposits within the South Pass region.

Presenter – Thomas Zapletal
Authors – Thomas M. Zapletal, Larissa Saarel, Donald T. McKnight, David A. Penning, and Day B. Ligon
Poster # – B45
Biology
BABY GOT BITE: STRIKE KINEMATICS OF THE DUROPHAGUS NORTHERN GIANT MUSK TURTLE (STAUROTYPUS TRIPORCATUS)
Strike kinematics are important in many ecological contexts, including foraging, intraspecific competition, and defense against predators. Among different taxa and in different contexts, producing a strong bite or quick lunge may increase the success of prey acquisition and enhance defensive behavior. The Northern Giant Musk Turtle (Staurotypus triporcatus) inhabits a wide range of wetlands throughout much of Central America and faces frequent predation attempts from crocodiles (Crocodylus moreletii and C. acutus). Further, their diet consists largely of hard-shelled prey items (e.g., gastropods, palm seeds, etc.), a tendency that often favors megacephaly. Using a force transducer and high-speed camera, we investigated maximum bite performance and lunge speed of Northern Giant Musk Turtles across a broad size spectrum and from five populations. Force scaled positively with straight carapace length but did not vary among populations or sexes despite apparent morphological differences among populations. Finally, this species produced a strong maximum bite force that exceeds that in some other bitey turtles (e.g., Alligator Snapping Turtles), which we hypothesize may be due to interspecific differences in cranial anatomy and foraging ecology.

Darr College of Agriculture (COA)

Presenter – Tucker Bittick
Authors – Tucker Bittick, Christi Sudbrock, Benjamin Onyango, and Nichole Busdieker-Jesse
Poster # – A4
Agriculture
NEXT IN LINE: EXPLORING OWNER, BUSINESS, AND FAMILY CHARACTERISTICS AND FARM SUCCESSION PLANNING
The increasing average age of the American farmer raises concerns about who will be involved in the future agricultural economy. Efficient succession in family farms keeps farm values high, and farms that plan for succession have an incentive to invest more resources into the farm. Knowing what factors on family farms are common when succession occurs could help encourage earlier succession planning. This research evaluates the likelihood of farm succession planning and the importance for owners of keeping their families involved on the farm by measuring family, business and ownership characteristics of individual farms through a survey funded by the USDA NIFA Capacity Building Grant for Non-Land Grant Colleges of Agriculture. Probit models suggest that legal structure, involvement in business goal discussions, education, and age of the principal operator are significant factors regarding farm succession and interest in keeping families on farms. These results may indicate what estate planners can prioritize when discussing farm estates with farm owners to help current and future farmers maintain their operations.

Presenter – Sydni Nilles
Authors – Sydni Nilles, Elizabeth Walker, Catherine Hoegeman, and Adam McGee
Poster # – B31
Agriculture
A STUDY OF COLLEGIATE EQUINE TEAM FUNDING, EXPENDITURES, AND RECRUITMENT STRATEGIES
This research explored funding, expenditure, and recruitment strategies of collegiate equine teams (ranch horse, horse judging, equestrian), crucial for student development. An online survey assessed support, budget allocation, and anticipated financial trends. Descriptive statistics and cross-tabulations analyzed relationships between funding, expenses, team demographics, and coaching roles. Head coaches/advisors were the target population. Findings reveal inconsistent support access, with coaching commitment impacting funding availability, especially from academic units and development accounts. Effective recruitment tactics, emphasizing community, were identified. The study highlights the necessity of standardized financial models and strategic resource allocation to ensure team sustainability. Results demonstrate the teams' positive impact on students' professional/personal growth, underlining the importance of consistent financial support and effective recruitment for continued success. This work provides insights for administrators and coaches to optimize team resources and recruitment.

Presenter – Cory Reichmuth
Authors – Cory Reichmuth, Melissa Bledsoe, and Will McClain
Oral Presentation – 1-SICL 119
Plant Science
CALCIUM: THE EFFECTS OF A MACRONUTRIENT ON THE PRODUCTION OF RAPHANUS SATIVUS MICROGREENS
Microgreens are young, edible seedlings harvested upon emergence of the first true leaf. Their popularity is growing as a nutritionally dense food source that can be grown quickly in space-efficient systems. However, little is known about optimal cultivation practices and the effects of fertilization on growth and nutrition of microgreens. This study investigates the role of calcium (Ca) fertilization in optimizing the growth, yield, and nutrient content of daikon radish (*Raphanus sativus*) microgreens. A hydroponic system was designed to consistently deliver nutrient solution to microgreens grown in a closed-environment chamber. This study tested different Ca fertilization rates of 0, 5, 10, 15, 20, and 25 mM $CaCl_2$ and assessed key growth parameters including fresh and dry weight, plant and hypocotyl height, cotyledon area, and calcium content. This study found 0 and 5 mM Ca to be deficient levels for radish microgreen growth, while 10 to 25 mM Ca were adequate, increasing fresh weight up to 1.92-fold, dry weight 1.37-fold, plant height 1.55-fold, cotyledon area 1.66-fold, and Ca content up to 12.55-fold. These findings highlight the importance of Ca fertilization management in hydroponic systems to enhance growth and nutrient content for more efficient microgreen cultivation. Further studies are needed to identify the toxic threshold of Ca in this growth system and to explore interactions with other plant essential nutrients and environmental factors

Presenter – Hunter White
Authors – Hunter White, Sylvia Petersen, and Wenping Qiu
Oral Presentation – 1-SICL 125
Plant Science
THE MYSTERY OF MICROECOLOGY: THE ECOLOGICAL RELATIONSHIP BETWEEN ALLORHIZOBIUM VITIS AND MISSOURI NATIVE GRAPEVINES

Grapevines around the world are plagued by the tumorigenic bacteria *Allorhizobium vitis* (*A. vitis*). This bacterium inserts its own DNA into a plant genome and causes the formation of tumors known as crown gall disease. Crown gall reduces vine vigor and even kills grapevines in vineyards, but tumors have never been reported on wild grapevines. Missouri is home to a diverse group of wild grapevines containing seven species. Whether *A. vitis* is present in Missouri wild grapevines remains a mystery. In this study, we are investigating if these wild vines harbor tumorigenic *A. vitis* to explore the ecological relationships of wild grapevine species with *A. vitis*. We collected soil and tissue samples from three wild grapevines, *Vitis vulpina, V. rupestris, V. cinerea*, and tested them for the presence of *A. vitis* using molecular markers. The results showed that tumorigenic *A. vitis* are present in 0%, 63%, and 69% of tissue samples from asymptomatic *V. vulpina*, *V. rupestris*, and *V. cinerea,* respectively. This discovery merits further investigation of underlying ecological mechanisms that could potentially be exploited for controlling crown gall disease in vineyards.

Presenter – Qiuni Yang
Authors – Qiuni Yang, Li-Ling Chen, and Chin-Feng Hwang
Oral Presentation – 1-SICL 222
Plant Science
IDENTIFICATION OF A JUICE COLOR QTL FROM A 'CHAMBOURCIN'-DERIVED POPULATION
Berry juice color is one of the key factors influencing grape and wine quality, consumer preference, and marketability. While most previous studies on berry color have focused on the skin, research on juice color remains limited. This study investigated the genetic basis of berry juice color in a hybrid population derived from the Vitis interspecific hybrid 'Chambourcin' and V. vinifera 'Cabernet Sauvignon'. A new nine-category visual scoring system was developed to assess juice color based on OIV 225. To achieve comprehensive precision and quantitative analysis, CIELAB parameters (L*, a*, b*), Hue, and Chroma were extracted from image-based measurements. Using berries harvested over four different years, a stable QTL associated with juice color was identified on linkage group (LG) 2 within a 4.8 cM interval. Two peak markers: rh_chr2_14239122 and rh_chr2_14464718, were closely linked to the QTL, which co-localizes with three MYBA genes involved in anthocyanin synthesis. The haplotypes associated with the pigmentation alleles at these two rhAmpSeq markers can be used to identify Noir varieties with an accuracy of 97.2%. These findings provide a valuable resource for marker-assisted selection in grape breeding programs to develop cultivars with specific juice color traits while also contributing to a broader understanding of the genetic regulation of anthocyanin-related traits.

Graduate Interdisciplinary Programs (GIP)

Author – Nicholas Levell
Virtual Presentation
Professional Studies
INCREASING CHRISTIAN INTRA-FAITH COMMUNICATION BETWEEN CATHOLICS AND PROTESTANTS IN A RURAL NORTHERN MISSOURI COUNTY
The body of Christianity includes a variety of ways of belief. An ecumenical approach allows for a view of Christianity as a unit, rather than separate and competing groups. Linn County is a rural county in northern Missouri. Of its religious adherents, Linn County is

predominately Protestant. It was hypothesized that a demographic-aware open ecumenical event would improve understanding between the Catholic minority and Protestant majority. The idea of this faced both vocal opposition and disengagement from local Catholics and Protestants. Resistance was held on multiple grounds, including that Catholics are not Christian, there are no misconceptions between Catholics and Protestants in the local area, and Protestants working with Catholics are not to be trusted. The event failed to generate quantitative data to test the proposition, but qualitative results became evident in the very response to the event and were a positive indicator of the hypothesis. An unlikely Catholic proponent came out of the event in the form of an initially oppositional Sister. There is additional opportunity for further ecumenical research with those who expressed erroneous belief but did not attend.

McQueary College of Health and Human Services (MCHHS)

Author – Lyric S. Arvizu
Oral Presentation – 2-SICL 119
Experimental Psychology
SENSORY PROCESSING AND ANXIETY IN BIPOLAR DISORDER
Previous research has indicated that individuals with bipolar disorder often have decreased sensory gating abilities compared to controls (Cheng et al., 2016; Lijffijt et al., 2009; Olincy & Martin, 2005; Schulze et al., 2008; Shaffer et al., 2018, Wang et al., 2014). A qualitative study and some quantitative studies have found that individuals with bipolar disorder experience altered sensory phenomena, especially during depressive and manic mood states (Parker et al., 2017; Engel-Yeger et al., 2016a; Engel-Yeger et al., 2018). Other research has found decreased sensory gating in individuals with anxiety disorders (Ghisolfi et al., 2006; Storozheva et al., 2021; Neal et al., 2002; Engel-Yeger & Dunn, 2011a). Anxiety disorders are often comorbid with bipolar disorder, but there has been no research to examine the possible effects of anxiety on sensory processing in bipolar disorder (Spoorthy et al., 2019). The present study examines the relationship between self-reported sensory processing measures and the presence of bipolar disorder and anxiety. Individuals with bipolar disorder and controls were recruited to participate in the study. Anxiety symptomatology was measured via the State-Trait Anxiety Inventory (STAI) Form Y. Sensory processing questionnaires included the Sensory Gating Inventory (SGI) and the Adult Sensory Processing Scale (ASPS). This study provides insight into a less-examined symptom of bipolar disorder. The findings from this study may help individuals with bipolar disorder better understand themselves and eventually lead to better detection of the disorder.

Presenter – Tyrus Ayers
Authors – Keith McShan and Tyrus Ayers
Poster # – B5
Kinesiology
OPPORTUNITIES, CHALLENGES AND REPRESENTATION: HOW BEING BLACK INTERSECTS WITH THE COACH-ATHLETE RELATIONSHIP QUALITY.
The coach-athlete relationship (CAR) plays a crucial role in sports, yet limited research has examined the influence of race on CAR quality. Black coaches remain underrepresented as head coaches, which may limit coaches' ability to develop quality CARs. (Lapchick, 2023). Sport psychology literature historically lacks the perspective of racialized minority and non-

elite coaches (e.g., high school) (Dorsch et al., 2023; McShan & Moore, 2023). The 3C model (i.e., closeness, commitment, and complementarity) provides a framework for understanding the CAR (Jowett, 2017). This study employs a transcendental phenomenological research design to examine how race influences the CAR using the 3C model. Nine high school football coaches were interviewed via Zoom. Results included themes of opportunities and responsibilities with four subthemes (e.g., stewardship and representation). The second theme was challenges, which included a subtheme of biases and exclusion. The last theme was navigating identity, history, and difference with five subthemes (e.g., racial differences). These findings underscore the necessity of cultural competence within CARs. This study highlights representation and the structural barriers affecting black coaches.

Presenters – Paige Barber, Calyssa Jones, Lexi Morgan, and Kemmer Schramm
Authors – Cade Sexauer, Megan Keeven, Kyle Donahue, Patricia Cahoj, Jeanne Cook, Sean Newton, Jason Shaw, Lexi Morgan, Calyssa Jones, Paige Barber, and Kemmer Schramm
Poster # – B6
Physical Therapy
THE EFFECTS OF WII FIT FOR THE TREATMENT OF URINARY INCONTINENCE
Urinary incontinence (UI) is a prevalent condition that significantly impacts quality of life. Pelvic floor muscle training (PFMT) is a well-established intervention for UI, yet adherence remains a challenge. This study explores an innovative approach utilizing the Wii Fit balance board to engage participants in interactive gaming while training their pelvic floor muscles. Participants underwent a 6-week Wii Fit-based PFMT program, and changes in perceived UI symptoms and quality of life were assessed using the ICIQ-UI SF, ICIQ-OAB, and King's Health Questionnaire. Results indicated improvements in self-reported symptoms and overall quality of life, suggesting that gamified PFMT may serve as an effective and engaging alternative for UI management. This study highlights the potential of technology-assisted interventions to enhance adherence and improve patient outcomes in pelvic floor rehabilitation.

Presenters – Rae'Shaun Brown, Rae'Shaun Brown, Taylor Melton, Liz Philips, and Shane Walters
Authors – Natalie Dosso, Alyssa Jaso, Jada Johnson, Kayla Rudolphi, Caroline Weatherford, Jason Shaw, and Sean Newton
Poster # – A6
Physical Therapy
AGE-RELATED CHANGES IN MOTOR RECRUITMENT IN RESPONSE TO MULTIDIRECTIONAL PLATFORM-BASED BALANCE PERTURBATIONS
Purpose of research: The purpose of this study was to determine age-related motor recruitment changes in response to multidirectional platform-based balance perturbations. Comparative responses between younger and older adults for diagonal plane perturbations have yet to be studied. Methods: Noraxon wireless sEMG sensors were placed on seven muscles. Participants stood on the BalanceTutor perturbation platform and were instructed to align their feet along designated laser lines while standing in a relaxed position with eyes looking forward. The platform moved underneath each participant unexpectedly in cardinal and diagonal directions at intervals of 15 seconds. Peak EMG amplitude was measured during right-facing-stance perturbations for tibialis anterior, peroneals, glutes medius, erector spinae, gastroc, rectus femoris, and semitendinosis muscles. Results: Higher activation of hip musculature was recorded in the older age group as well as a higher rate of

stepping, both indicating reduced balance strategy efficiency. Conclusions: Individuals typically rely first on ankle strategies, followed by hip strategies, and then stepping strategies. With aging, there is a shift from the more efficient ankle strategies to the less efficient hip and stepping strategies in response to balance perturbations. This could be related to slower reaction time in older adults, which should be investigated in further studies. Training both ankle and hip reactive balance strategies in older adults, including within diagonal planes, may enhance balance abilities and reduce the risk of falls.

Presenters – James Buechter, Alyson Goad, and Sowmya Ponugoti
Authors – Wafaa Kaf, Alyson Goad, James Buechter, Sowmya Ponugoti, Mara Anselm, and Kaitlyn Johnson
Poster # – A8
Audiology
HEARING SENSITIVITY AND NEURAL TRANSMISSION CHANGES DURING MIGRAINE ATTACKS IN EPISODIC MIGRAINEURS
The aim of the study is to assess potential auditory manifestations in participants with episodic migraine both before and during migraine attacks. We will assess changes in hearing, sound intolerance using both hearing evaluation and questionnaires, and changes in neural transmission at the brainstem and cortical levels using both auditory brainstem response (ABR) and cortical potential (N1-P2) in response to sounds. The two visits will include a baseline audiological evaluation before a migraine attack and a follow-up evaluation during a migraine attack. In both visits, participants will complete questionnaires about their migraines, phonophobia, and auditory problems followed by audiological evaluation on both ears. The audiological testing will include visual inspection of the ear canal, standard Tympanometry, standard hearing thresholds at both conventional frequencies and ultrahigh frequencies, and speech audiometry to assess their ability to hear speech in quiet and in noise. Testing will also include assessment of sound intolerance using Uncomfortable Loudness level and acoustic reflex measures. In addition, assessment of the auditory brainstem and cortical integrity will be performed objectively using the ABR test to click, and click N1-P2 cortical potential. Results during the migraine attack will be compared to those at baseline for descriptive and data analysis.

Presenter – Jianna Cox
Authors – Jianna Cox and Joshua J. Smith
Oral Presentation – 2-SICL 125
Biomedical Sciences
OVEREXPRESSION OF THE RECA HOMOLOGS RAD51 AND DMC1 AFFECT CELL DIVISION CREATING AMACRONUCLATE CELLS.
RecA homologs, Dmc1 and Rad51, work to repair DNA double-strand breaks (DSBs) within the cell through the recombination of homologous sections of DNA. Dmc1 works to repair programmed DSBs through meiotic recombination, while Rad51 functions to repair both meiotic and non-meiotic DSBs, the latter repaired through the process of homologous recombination repair (HHR). Chemotherapeutics, exogenous agents, work to form DSBs in cancer cells, attempting to inhibit the cell's growth. A hyper-recombinant phenotype is often seen in cancer cells due to the overexpression of RAD51, leading to drug resistance, the persistence of cancers, and an overall poor patient outcome. In the model organism Tetrahymena thermophila, an amacronuclear phenotype and increase in cell diameter is observed at elevated growth temperatures when RAD51 is overexpressed. A complication in elongation of the macronucleus occurs, but DNA synthesis is not halted, resulting in a macronucleus containing up to 5 times the normal genetic content. When DMC1 is

overexpressed, an amacronuclear phenotype is observed; though, cell diameter does not increase. Further study between the two RecA homologs will help elucidate how RAD51 overexpression leads to genomic instability in the cell.

Presenter – Vignan Ele
Authors – Wafaa Kaf and Vignan Ele
Poster # – B16
Audiology
NORMATIVE CERVICAL EVOKED MYOGENIC POTENTIAL MEASUREMENTS:EFFECTS OF MUSCLE CONTRACTION LEVELS, RELIABILITY, & THRESHOLD
Cervical Vestibular Evoked Potential (cVEMP) is as a key vestibular clinical test to evaluate the function of saccule and inferior vestibular nerve in response to 500Hz tone. This study aims to explore normative cVEMP response across two Sternocleidomastoid muscle contractions levels, determine its threshold value, and assess test-retest reliability. 25 healthy, normal-hearing subjects, aged 21 to 29 years underwent two cVEMP sessions 48-72 hours apart at 95dBnHL of 500Hz tone-burst stimulus and a muscle tone of 50-150μV to assess its reliability. 5 of these 25 were also tested at >150μV in session two, and another 5 underwent threshold estimation with 5dB decrements at >150μV. P1 and N1 amplitudes are analyzed across these three categories. A paired-sample t-test revealed a good reliability ($p > .05$), a moderate correlation, and increased P1 amplitudes($p < .05$), while the N1 amplitude, P1 and N1 latencies at >150μV remained unaffected ($p > .05$). For cVEMP thresholds, amplitudes and latencies are unaffected by change in muscle tone, and the mean cVEMP threshold was similar between females and males (85 vs 83 dBnHL). Further investigations are needed to standardize clinical guidelines for cVEMP testing across commercial equipment.

Presenters – Connor Eyre and Maggie Ratcliff
Authors – Connor Eyre, Maggie Ratcliff, Jeffrey Foster, and Kristen Thompson
Poster # – B17
Psychology
ARTIFICIAL INTELLIGENCE IN HEALTHCARE: EXAMINING PATIENT PERCEPTIONS & TRUST
Artificial intelligence (AI) is transforming healthcare by improving diagnostic accuracy, treatment planning, and clinical efficiency. Despite these advances, many patients remain skeptical due to concerns about data security, algorithmic bias, and transparency. Trust is essential in patient-physician relationships, especially when physicians rely on AI tools for diagnosis, treatment, and medical decision making. The current study seeks to examine how patients' perceptions of physician AI usage influence their trust in physicians. A cross-sectional survey using a combination of adapted established questionnaires (Fritsch et al., 2022 & Zondag et al., 2024) and an original survey will be administered to obtain a nuanced understanding of AI's role in shaping the future of healthcare. Planned analyses include, but are not limited to, descriptive statistics, item analysis, regression modeling, and factor analysis. By investigating patients' perceptions, perceived physician AI usage, and trust dynamics, this study aims to help provide insights into how AI can be integrated into clinical practice while ensuring patients are comfortable with the ever-changing landscape of AI utilization within the healthcare sector.

Presenter – Cristina Flaquer Fuste
Authors – Cristina Flaquer Fuste, Mayeen H. Choudhury, Amanda Brodeur, and Josh Smith
Poster # – B18
Cell and Molecular Biology
THE EFFECT OF HYPOCHLOROUS ACID ON CULTURED OSTEOBLASTS AND ESCHERICHIA COLI.
Hypochlorous acid (HOCl), a naturally occurring compound in neutrophils, has been used as an antimicrobial in wound treatment. Osteoblasts, bone-forming cells, within the bone tissue play a large role in bone fracture healing. Orthopedic infections are challenging to treat and highly morbid, including surgical site infection of arthroplasty procedures or infection in the setting of compound fractures. HOCl is being considered as a surgical antiseptic to decrease infections in orthopedic surgical procedures. This study therefore seeks to determine the effects of HOCl on osteoblasts and E. coli. Cultured osteoblasts were incubated with varying concentrations of HOCl to examine osteoblast survivability. Upon examining osteoblasts in the presence of varying concentrations of HOCl, it was determined that survivability is not affected at 10 ppm and was 51% at 50 ppm HOCl. The most common pathogens associated with osteomyelitis (bone infection) following compound fracture are Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus. To examine antimicrobial effects of HOCl, this work looked at the ability of 5 and 50 ppm HOCl to inhibit growth of E. coli. Bacterial cultures were exposed to HOCl for 5 or 15 minutes, plated on nutrient agar (NA) or Eosin-Methylene Blue (EMB) agar, incubated 24-48 hours, and then colony forming units were used to determine percent kill. E. coli was killed to over 99% with 50 ppm HOCl, while ddH2O showed a better ability to kill E. coli than HEPES solution in the 5 ppm HOCl concentration. A growing body of research shows that HOCl is a safe and effective antiseptic in various medical settings. This study suggests HOCl may have a role in orthopedic surgical procedures.

Presenter – Katie Frigerio
Authors – Katie Frigerio and Dee Telting
Poster # – A17
Speech-Language Pathology
THE IMPACT OF MEDITATIVE BREATHING ON THE WORKING MEMORY OF OLDER ADULTS
Decline in cognitive skills, such as working memory, is a normal part of aging. Meditative breathing (MB) has been found to improve them. This study examines the impact of box-breathing (BB), a type of MB, on older adults' working memory. Two groups of older adults were taught to perform BB in an initial training session. On separate days, the groups participated in two recall tasks (A and B) during treatment sessions. In task A, participants were read aloud a list of 12 items to recall. After waiting 5 minutes, they used a checklist to identify recalled items. In task B, participants performed the BB exercise prior to the presentation of a similar recall task using a different list of 12 items. The number of items each participant successfully recalled in each task was compared to determine if working memory was impacted by BB. Task order was counterbalanced to minimize the influence of order effects. Both groups' results showed high scores of correctly recalled items and low scores of incorrectly recalled items, regardless of treatment being provided. No statistically significant differences between control and treatment scores were found. Conclusions about the impact of BB on older adults' working memory cannot be drawn.

Presenter – Callie Fry
Author – Callie Fry, Marc Havlicek, and Amy Hulme
Poster # – A18
Biomedical Science
DETERMINING THE ROLE OF SPTBN1 IN HIV-1 UNCOATING IN HUMAN MICROGLIAL CELLS
HIV-1 is the virus that causes acquired immunodeficiency syndrome (AIDS), and currently, there is no cure once an individual is infected. The development of new drugs targeting HIV-1 replication steps is essential for keeping viral levels at a minimum and to prevent further transmission. An attractive replication step for new drug targets is viral capsid uncoating, where the virus loses the protein structure encapsulating the genome. The exact mechanism of capsid uncoating is unknown; however, several host-factors may be involved including SPTBN1. Recent studies have shown a significant decrease in viral infectivity when this protein is knocked down, yet its role in replication has not been characterized. The plus/minus cyclosporine A assay demonstrated that interactions of SPTBN1 with the capsid are independent of the host factor cyclophilin A. Preliminary data revealed a delay in early time points of uncoating in vivo when SPTBN1 was knocked down. Furthermore, using the cyclosporine washout assay, we aim to determine the role of SPTBN1 in HIV-1 uncoating. We anticipate that understanding uncoating kinetics and the role of host cell factors will open a door for the development of new capsid inhibitors.

Presenter – Morgan Hoover
Authors – Daniela Novotny, Hillary L. Roberts, Seth Breesawitz, and Morgan Hoover
Poster # – A24
Nutrition and Dietetics
FROM CLASSROOMS TO CAMPUS LIFE: THE INFLUENCE OF WEIGHT STIGMA ON UNIVERSITY STUDENTS
Purpose: Weight stigma is a pervasive issue with consequences for mental and physical health. However, its specific impact on the college experience remains underexplored. This qualitative study examined how anticipated weight stigma (AWS) and experienced weight stigma (EWS) influenced students' academic and extracurricular choices, as well as their psychosocial well-being and university experience. Methods: Two Zoom focus groups (n=5, n=7) were conducted. Discussions were transcribed using Zoom, then reviewed and corrected by the research team, with final transcripts undergoing thematic analysis. Results: AWS and EWS shaped participants' decisions regarding major selection, campus involvement, and professional engagement. Participants experienced stigma through the built environment on campus, and stigma also contributed to avoidance behaviors such as not attending campus events or professional development opportunities. To promote weight inclusivity, participants recommended implementing campus-wide supports and resources addressing weight stigma. Conclusions: Continued research is needed to further examine effects of stigma and develop strategies to foster weight inclusive campus environments.

Presenters – Kierstin Johnston and Hannah Todd
Authors – Hannah Todd and Kierstin Johnston
Poster # – A25
Speech-Language Pathology
REIGNITING THE JOY OF READING: EXPLORING MIDDLE SCHOOL STUDENTS' ATTITUDES THROUGH COLLABORATIVE BOOK CLUBS
This qualitative study examines middle schoolers' attitudes toward reading before joining the Let's Get Lit book club. In an era of digital distractions, many students disengage from

reading, seeing it as a chore rather than an enjoyable activity. Struggling readers often experience years of difficulty, leading to low confidence and decreased motivation (O'Brien et al., p. 52). Book clubs may help re-engage students by fostering discussion, vocabulary growth, and critical thinking. Middle schoolers were recruited to complete a 10-minute survey about their opinions, beliefs, and attitudes about reading, literacy, and book clubs. Participants reported enjoying reading, reading regularly, preferring independent and silent reading, and favoring printed books. These, and additional future findings will inform strategies to enhance adolescent reading engagement.

Presenter – Arshpreet Kandola
Authors – Arshpreet S. Kandola and D. Wayne Mitchell
Poster # – A27
Experimental Psychology
LEARNED HELPLESSNESS: AN ONLINE REPLICATION AND VALIDATION
The current study entails the partial replication of a classic learned helplessness two-phase triadic design experiment (Hiroto & Seligman, 1975) within an online learning context, and aims to validate a new attributional style self-report measure designed to identify individual differences in tendencies to develop learned helplessness consistent with Abramson and colleagues' (1978) reformulation of the hypothesis. It is hypothesized that a group initially and repeatedly exposed to unsolvable anagrams will perform worse than groups initially exposed to solvable anagrams on a subsequent identical solvable anagram measure, with regard to mean response latencies, number of solution trials, percentage of correct trials, and slope of response latencies across trials; and individuals with global, stable, and internal (i.e., pessimistic) attributional styles will demonstrate greater susceptibility to learned helplessness than those with specific, unstable, and external (i.e., optimistic) attributional styles on both the new Learned Helplessness Attributional Scale (LHAS; Luse & Burkman, 2022) and the original Attributional Style Questionnaire (ASQ; Peterson et al., 1982), with the new measure demonstrating greater predictive validity.

Author – Olivia Kiersey
Virtual Presentation
Audiology
THE EFFECT OF ELECTROMYOGRAPHY MONITORING FOR OCULAR VESTIBULAR EVOKED MYOGENIC POTENTIALS
Objectives: This study aimed to establish normative suprathreshold and threshold data and assess the reliability of ocular vestibular evoked myogenic potentials (oVEMP) using the Integrity V500 system in healthy adults. Design: oVEMP responses were recorded from 25 healthy adults across two sessions, 48 to 72 hours apart, to evaluate suprathreshold responses and test-retest reliability. Five participants were randomly selected for threshold testing. Participants, seated and gazing upward at a 30-degree angle to contract the inferior oblique muscle, were exposed to 500Hz tone at 95 dB nHL. N1-P1 response amplitudes and latencies were measured and compared between sessions, and thresholds were also analyzed. Results: The mean N1-P1 amplitude was 6.9 ÂμV, with N1 and P1 latencies at 12 ms and 18 ms, respectively. No significant differences in amplitudes or latencies were observed between sessions ($p > .05$), indicating good test-retest reliability. The average oVEMP threshold was 85 dB nHL. Conclusions: Normative oVEMP data obtained with the Integrity V500 system align with existing literature using other commercial systems. Future research should explore the correlation between N1-P1 amplitudes and ocular muscle contraction strength.

Presenters – Skyler Lee and Cheing-Hai Christen
Authors – S. Lee, K. Kendrick, C. Nichols, C. Rivas, and R. J. Ulbricht
Poster # – A29
Cell and Molecular Biology
TISSUE AND SEX-DEPENDENT EFFECTS OF A-TO-I EDITING AND INNATE IMMUNITY IN MICE.
Innate immunity is the body's first defense against viral infections, with Adenosine-to-Inosine (A-to-I) RNA editing by ADAR preventing harmful immune activation. Inflammatory factors like ADAR1, TNF-α, and MDA5 are induced during immune activation, with stronger expression of TNF-α and MDA5 in females. However, little is known about ADAR in female animals. This study aims to determine whether ADAR1 RNA editing in skeletal muscle is sex-specific or influenced by immune activation. Sanger sequencing was used to measure RNA editing, and ADAR1 protein levels were assessed. Females, with more ADAR1p150 mRNA, were expected to have more editing, protein production, and a controlled immune response. Results showed that immune activation increased FLNB editing in males but had no significant effect in females. FLNA showed no treatment effect but had sex-dependent editing differences. Additionally, RPA1 editing was higher in females. These findings suggest that sex differences in inflammatory factors may affect RNA editing and protein production in specific tissues, advancing our understanding of RNA editing's role in immune responses and sex-dependent diseases.

Presenter – Kaitlyn Lewer
Authors – Kaitlyn Lewer, Katie Ellermeier, Mason Scrivener, and Lori Vedder
Poster # – B26
Physical Therapy
IS THE ACTIVITIES-SPECIFIC BALANCE CONFIDENCE SCALE A GOOD PREDICTOR OF FUNCTIONAL REACH TEST SCORES?
The purpose of this study was to determine if a correlation exists between the Activities-Specific Balance Confidence Scale (ABC) and the Functional Reach Test (FRT) among community-dwelling older adults. We hypothesize that there will be a strong positive correlation between the willingness to reach forward outside of the base of support and self-perceived balance confidence. Twenty-eight individuals (mean age = 77, Male = 5, Female = 23) participated in Fall Prevention Awareness Day activities at a local senior citizen center. Participants were age 55 years or older, able to stand independently for 20 minutes, had no recent history of lower extremity injury, surgery, or fracture, and were cognitively able to perform test procedures. The FRT is an objective assessment of balance and the willingness to reach forward. The ABC is an assessment of self-perceived balance during functional activities, such as ambulating in different environments, navigating stairs, and reaching for something above the head. There was no significant correlation between ABC Scale scores and FRT scores. Since there was no significant correlation identified between these two measures, we predict that the ABC is a less reliable measure for an individual's fall risk as it is subjective. Physical Therapists frequently see patients who overestimate their balance abilities. Therefore, it is important to include objective assessments when measuring balance of older adults.

Presenter – Emma Liimatta
Authors – Emma Liimatta, Rachel Mullner, Emily Schmoll, Ariel Carpenter, and Joshua J. Smith
Poster # – B27
Cell and Molecular Biology
IDENTIFICATION OF A ROLE FOR RAD23 IN CASPASE-INDEPENDENT APOPTOSIS LEADING TO UV RESISTANCE IN TETRAHYMENA THERMOPHILA
In 2020, 10 million deaths were attributed to cancer, with multidrug resistance being responsible for over 90% of deaths in cancer patients receiving treatment. We utilized the model organism *Tetrahymena thermophila* to study how cells become resistant to Ultraviolet Radiation (UV) radiation, a process similar to multidrug resistance. We specifically focused on the nucleotide excision repair and ubiquitin shuttle protein Rad23 because 30-60% of cancers documented by the National Cancer Institute had a mutation in *RAD23*. Knockdown of *RAD23* in *Tetrahymena thermophila* demonstrated a UV resistance phenotype with decreased nucleotide excision repair and differential expression of proteins active within caspase-independent cell death instigated by mitochondrial outer membrane permeabilization and radical oxygen species release. We concluded that Rad23 has an essential role within caspase-independent cell death leading to UV resistance. This study uncovers a potential role for Rad23 in caspase independent cell death and opens up the ability to use *Tetrahymena thermophila* as a model organism in which to study how cancer cells utilize caspase-independent cell death to become multidrug resistant.

Presenter – Katelyn Long
Authors – Weston Phipps, Tori West Staples, and Amber Abernathy
Oral Presentation – 1-SICL 119
Behavior Analysis and Therapy
THE RELATIONSHIP BETWEEN PARENTING STYLES AND PERSONALITY TRAITS ON WILLINGNESS TO PURSUE SELF- OR CLINICIAN DIAGNOSIS
Information surrounding mental health is widely prevalent on social media, so it is now easier to understand and access. The novel prevalence of information regarding mental health and mental illness may support those that have a clinical diagnosis of mental health illness, but it may also result in individuals self-diagnosing or requesting clinical diagnoses based on information that was accessed via social media and the internet. The present study targeted the development of a better understanding of the potential underlying variables, including parenting styles and personality, that may cause individuals to self-diagnose themselves or seek out clinical diagnosis. Due to the ethical concerns and deficient use of reliable resources associated with self-diagnosis, the push to appropriately educate individuals on mental health illnesses is vital to avoid issues associated with incorrect diagnoses. Identifying variables that may influence an individual to pursue self-diagnosis over clinical diagnoses may allow research and clinical professionals to understand how to approach those that turn to self-diagnosis first.

Presenters – Sofi Loveland and Annabel White
Authors – Blake Pomajzl, Diane Mayes, and Elizabeth Williamson
Poster # – B47
Physical Therapy
THE EFFECT OF BLOOD FLOW RESTRICTION THERAPY ON THE ROTATOR CUFF IN OPERATIVE AND NON-OPERATIVE ROTATOR CUFF INJURIES
Purpose and Background: This systematic review examined the impact of blood flow restriction (BFR) therapy on rotator cuff musculature in both non-surgical impairments and

post-surgical repairs patients. BFR is brief and intermittent occlusion of arterial and venous blood flow using a tourniquet while at rest or exercise which allows for strengthening at lower exercise intensities. Methods: We search multiple databases using the terms “blood flow restriction” AND “rotator cuff”. Inclusion criteria included written in English language, assessed strength, thickness, endurance, pain, or function, and was a completed experimental designed study. Six studies meet the criteria. Results: Overall, BFR therapy significantly improve muscle strength in 4 of 6, muscle thickness in 2 of 6, and muscle activation in 2 of 6 studies. Conclusion: These results are promising but further research is needed to establish standardized protocols, long-term effects, and potential adverse effects.

Author – Lauren Alexis Mercer
Poster # – A31
Audiology
SUPPORTING STUDENTS THROUGH THE NOISE: HOW TO HAVE ACOUSTICALLY APPROPRIATE CLASSROOMS ACROSS THE AGE RANGE
Students across the country can experience difficulties in noisy classrooms, regardless of presence of hearing loss, learning difficulties, or classroom size. This study is designed to see how noise levels in classrooms change across the age range and what we could do as professionals in a multidisciplinary team to help students in noisy situations. Noise levels were measured using a sound level meter at five key points in seven classrooms across the K-12 age range: each corner and the center of the room per classroom for ages kindergarten, 2nd grade, 4th grade, 6th grade, 8th grade, 10th grade, and 12th grade. The dimensions of each room along with any key features present (such as metal ceilings, proximity to playgrounds, in-room HVAC systems, etc.) were included in the data collection. The findings of this research in association with previous literature written can help us create guidelines for how different classrooms, based on their unique features and population of students, can become an acoustically appropriate classroom for all students while maintaining functionality for teachers and students alike.

Author – Sydney Middlebrook
Poster # – B29
Audiology
THE SOUND OF FUN: ASSESSING THE IMPACT OF RECREATIONAL NOISE ON HEARING HEALTH
Noise induced hearing loss (NIHL) is a prevalent condition that affects many people who have been exposed to loud noise throughout their life. This poses the question about how everyday activities can contribute to the onset of noise induced hearing loss. There are things we do on a weekly basis that are typically seen as harmless, such as seeing movies, going to restaurants, joining friends at the bar, which may, over time, contribute to hearing damage. To further explore this, dosimetry measures were taken in a variety of social situations to see the different noise levels of everyday activities. The findings showed that while the noise levels in these settings are not loud enough to cause immediate auditory harm, they raise the question of what would happen if you combined them and repeated exposure over prolonged periods. What could the long-term impact on hearing be?

Authors – Emily Oster and Anna Seep
Poster # – B32
Speech-Language Pathology
EXPLORING THE IMPACT OF BRIEF ASD TRAINING FOR ELEMENTARY EDUCATORS: A PILOT INITIATIVE

Inclusive education for students with Autism Spectrum Disorder (ASD) requires well-prepared educators, yet general education teachers often report limited knowledge and misconceptions about ASD (Jaffal, 2022; Russell, 2022). This exploratory project investigates the impact of a brief, targeted professional development session (approx. 20 minutes), led by Speech-Language Pathology (SLP) graduate students, on the experiences, attitudes, and beliefs of elementary educators regarding ASD and Social Pragmatic Language Disorders. Grounded in findings that general education teachers receive inadequate ASD-specific training, our pilot aims to equip educators with foundational knowledge to foster more inclusive classrooms. Preliminary implementation focuses on recognizing ASD characteristics, classroom modifications, and inclusive strategies. We hypothesize that even brief, accessible training may positively shift educator perspectives and readiness to support neurodivergent students. This work proposes a replicable model for scalable, low-barrier professional development to address critical gaps in ASD awareness within public school systems.

Presenters – Carson Patton and Claire Taylor
Author – Carson Patton, Claire Taylor, Chase Hagle, and Brian McNeely
Poster # – A38
Physical Therapy
CORRELATION BETWEEN THE FUNCTIONAL GAIT ASSESSMENT AND THE TIMED UP & GO TEST AMONG OLDER INDIVIDUALS
According to the Centers of Disease Control and Prevention (CDC), approximately one in four older individuals (aged 65+) fall every year and falls are the leading cause of injury-related deaths in this age group. The purpose of this study was to determine if a correlation exists among the Functional Gait Assessment (FGA) and the Timed up and Go Test (TUG) in community dwelling older adults. We hypothesize that there will be a direct correlation between the FGA and TUG. Twenty-eight individuals (mean age = 77, Male = 5, Female = 23) participated in Fall Prevention Awareness Day activities at a local senior citizen center. Participants were age 55 years or older, able to stand independently for 20 minutes, had no recent history of lower extremity injury, surgery, or fracture, and were cognitively able to perform test procedures. The FGA is a functional outcome measure used to assess an individual's ability to maintain gait during 10 different tasks. The TUG is a measure of functional mobility and assesses an individual's ability to stand, walk ten feet, turn around, and return to the chair. Results indicated a negative relationship ($r = -0.541$) between the FGA and the TUG; a lower FGA score correlates with a higher TUG score. A significant correlation ($p = 0.003$) was found indicating that both assessments were accurate measures of risk for falls. It is not necessary to perform both assessments on the same individual.

Presenter – Olivia Reinwald-Johnson
Authors – Olivia N. Reinwald-Johnson and Amy E. Hulme
Poster # – B36
Biomedical Sciences
THE ROLE OF SPTBN1 IN NUCLEAR IMPORT OF HIV-1 IN HUMAN MICROGLIAL CELLS.
Human immunodeficiency virus (HIV-1) is a pathogen which causes chronic illness that, as of 2023, has infected approximately 39.9 million people worldwide. Many current HIV-1 therapies focus on blocking steps of viral replication. The goal of this thesis research focuses on the effect of the cellular protein SPTBN1 in the nuclear import step of HIV-1 replication. To better understand how SPTBN1 affects HIV-1 nuclear import in CHME3 microglial cells, the formation of 2-LTR circles will be measured. The circularized 2-LTR form of the HIV-1 genome can be detected when viral DNA has entered the nucleus but failed to integrate into

the host cell genome. Before 2-LTR circles can be accurately quantified using qPCR, the primer efficiencies must be determined for the primer sets that will be used. Once this is accomplished, siRNA knockdown of SPTBN1 will be performed and confirmed before infecting CHME3 cells with HIV-1. DNA will then be isolated from the infected cells and qPCR will follow. These experiments will allow us to further understand the role of cell factors like SPTBN1 in HIV-1 nuclear import.

Presenters – Emily Renken and Blake Hamelink
Authors – Elisabeth Burley, Abigail Street, and Elizabeth Williamson
Poster # – B37
Physical Therapy
COMPARING THE BERG BALANCE SCALE AND TINETTI BALANCE ASSESSMENT TOOL IN PREDICTING FALL RISK IN PATIENTS AGED 65+
Purpose: This systematic review examined the effectiveness of the Berg Balance Scale and Tinetti Balance Assessment to predicted fall risk in individuals over 65 years of age. Specifically, examining if one of the assessment tools better predict fall risk than the other tool. Methods: Using the keywords “Berg”, “Tinetti”, “fall risk”, and elderly, we sought published research articles from January 2019 to June 2024 in various scholarly databases. Duplicated studies were removed, and 44 articles were reviewed by two independent reviewers. Five articles meet the inclusion criteria of 1) inclusion of both assessment tools, 2) assessed fall risk, and 3) participants 65 years and older. Only 1 article had sufficient data for analysis. Differences in predicting fall risk between the two tools was determined utilizing a two-tailed t-test. Results: No significant differences ($p = 0.69$) were found between the two tools’ ability to predict falls. Conclusions: Due to the limited articles which specifically comparing the Berg Balance Scale and Tinetti Balance Assessment ability to predict fall risk, no recommendations on which assessment tool clinicians should use is provided.

Authors – Katie Saiko and Ryan Gillund
Poster # – B39
Speech-Language Pathology
GREENE VALLEY INTERVIEWS
This study explores experiences, challenges, and insights of the educational team at Greene Valley State School, one of 35 schools in Missouri that are part of the Missouri Schools for the Severely Disabled (MSSD). MSSD is a state-operated program that serves students with severe disabilities who cannot be adequately supported in their local school districts. These schools provide a specialized educational setting tailored to meet the complex needs of these students. Through interviews and follow-up evaluations, the research examines the background and motivations of staff, their strategies for behavioral management, fostering student independence, and the rewards and difficulties of their roles. Additionally, the study highlights the significance of collaboration and a good leadership team for enhancing student outcomes. This qualitative study used a triangulation process, allowing the participants to review and amend emerging themes. Ultimately, this research aims to inform advocacy efforts, resource allocations, and public awareness by using the voices of dedicated professionals to support future improvements in special education.

Author – Jordan Schler
Virtual Presentation
Audiology
COMPARING AUDITORY BRAINSTEM RESPONSES BETWEEN CLICK AND WIDE BAND CHIRP STIMULI FROM TWO COMMERCIAL SYSTEMS: GROUP TWO
Auditory Brainstem Response (ABR) testing is a widely used objective measure in audiological assessments. This study compares ABR wave V latencies and threshold differences between two commercial systems namely Integrity and Eclipse. 15 normal-hearing adults (18-30 years) underwent comprehensive audiological evaluations, including pure-tone audiometry (250-8000 Hz) to determine behavioral hearing thresholds. Suprathreshold responses were recorded to compare wave V latency using Click stimulus with the Integrity system and CE-Chirp stimulus with the Eclipse system at 70 dB nHL. Thresholds were assessed at 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz using the new VF-Chirp stimuli versus the conventional NB-Chirp stimuli. Paired-Samples t-test showed both systems produce comparable Wave V latencies. Within-subject repeated measures ANOVAs revealed that both the VF and NB chirp thresholds were elevated relative to behavioral thresholds for all tested frequencies ($p < .001$), and the VF chirp threshold was approximately 10 dB higher than that to the NB chirp threshold only at 500 Hz ($p < .004$). Our results suggest that the VF chirp of the Integrity system is a promising alternative to the conventional NB chirp of the Eclipse for ABR testing.

Author – Brooke Schwartz
Poster # – B40
Audiology
BEYOND THE RINGING: UNRAVELING THE CAUSES, SYMPTOMS, AND SOLUTIONS OF TINNITUS
Tinnitus is a common condition that causes people to hear ringing, buzzing, or other phantom sounds without an external source. It can range from a minor annoyance to a serious disruption, affecting sleep, concentration, and emotional well-being. While tinnitus is often linked to noise-induced hearing loss, it can also result from factors like ototoxic medications, neurological conditions, and stress. Certain lifestyle choices, such as high caffeine or sodium intake, can make symptoms worse. Treatment options vary and include traditional approaches like hearing aids and sound therapy, as well as newer technologies such as NeoSensory, a device that uses sensory stimulation to retrain the brain, and Lenire, which uses similar multimodal technology to reduce symptoms. While no universal cure exists, these treatments, along with cognitive behavioral therapy and lifestyle adjustments, can help individuals manage their tinnitus more effectively. Ongoing research continues to improve our understanding and treatment of this condition, offering hope for better management in the future.

Authors – Claire Spinelli and Ashley Foster
Poster # – A39
Speech-language pathology
ALTERNATIVE APPLICATIONS OF LSVT
The Lee Silverman Voice Treatment (LSVT) is widely recognized for its efficacy in improving speech and voice function in individuals with Parkinson's disease. However, recent studies have suggested that LSVT may have broader applications beyond its traditional use in speech therapy. Our project examines alternative uses of LSVT in the context of neurological rehabilitation, including its potential in enhancing motor function, cognitive performance, and voice production.

Presenter – Abbi Vachon
Authors – Abbi Vachon, Jacklyn Goodman, Sarah Murray, and Natalie Allen
Poster # – A42
Nutrition and Dietetics
SOCIAL MEDIA STRATEGIES FOR ATTRACTING AND RETAINING STUDENTS IN NUTRITION AND DIETETICS PROGRAMS
Social media is key for university brand promotion, influencing student recruitment. Studies identify five content categories that elicit positive engagement: university images, generating awareness, acknowledgements, athletics, and town/city images. This study examined these categories effectiveness in attracting students to a midwestern university's nutrition and dietetics program via Instagram and Facebook. Four posts were created for each content category, totaling 20 observed posts. Engagement (likes, comments, shares) was analyzed. University images yielded the highest engagement on Instagram with a mean of 50 likes, while acknowledgements yielded the highest engagement on Facebook with a mean of 10.75 likes. Athletics had the second-highest engagement on both platforms with a mean of 45.5 likes on Instagram, and 10.25 likes on Facebook. Comments and shares showed low engagement. For program promotion, using university images, acknowledging student success, and including athletics increases engagement. This research shows that posts with faculty, staff, students, and familiar backgrounds create more engagement, supporting social media's role in branding and relatability with prospective students.

Author – Ellie Van Sickle
Virtual Presentation
Audiology
AUDITORY BRAINSTEM RESPONSES USING WIDEBAND AND FREQUENCY-SPECIFIC STIMULI IN NORMAL HEARING ADULTS
Auditory brainstem response (ABR) testing is a widely used objective measure in audiology for neurodiagnostic testing, newborn hearing screenings, or to obtain estimated hearing thresholds. These measured brainstem responses can be evoked by a wide range of stimuli, each having their own effect on the yielded response. The objective of this study is to compare (a) suprathreshold ABRs in normal-hearing males and females using three broadband stimuli (100 μs click, 80 μs click, and wideband CE- chirp) and (b) two frequency-specific stimuli (2-1-2 tone burst and Vivosonic VF- Chirp) for ABR thresholds at four frequencies. Fifteen normal hearing adults between the ages of 20 and 30 years old were recruited for participation. Each participant underwent screening procedures, audiological evaluation, and ABR test protocol. Upon meeting required criteria, suprathreshold ABR responses were recorded using 100 μs click, 80 μs click, and wideband CE- chirp, and ABR thresholds were determined for 500, 1000, 2000 and 4000 Hz using tone burst and Vivosonic VF-Chirp. In suprathreshold responses wave V latency was found to be shortest when using CE- Chirp with an average latency of 5.270±0.340 ($P < 0.001$). Thresholds were found to be lower and closer to behavioral thresholds when using VF-Chirp stimuli than tone burst stimuli. The average amplitude of Wave V at threshold was found to be larger when using tone burst (0.195± 0.164 μV) than when using VF-Chirp (0.130 ± 0.062 μV) mainly due to larger amplitude at 500 Hz. Wave V latency at threshold was found to be longer when using VF-Chirp than tone burst stimuli for all tested frequencies. Though not as widely used chirp stimuli can offer accurate and reliable results for threshold and neurodiagnostic purposes.

Presenter – Laura Vandenberghe
Authors – Daniela Novotny, Hillary L. Roberts, Bella Jung, and Laura Vandenberghe
Poster # – B43
Nutrition and Dietetics
FROM KITCHEN TO CONFIDENCE: ENHANCING NUTRITION LITERACY AND SOCIAL CONNECTION IN COLLEGE STUDENTS
Purpose: Teaching kitchens are experiential learning environments that combine nutrition education, cooking skills, and other facets of health promotion. These programs are correlated with higher cooking self-efficacy, decreased reliance on convenience foods, and improved psychosocial well-being (Novotny, Urich, & Roberts, 2022). Research also suggests health focused interventions are most effective during college years as young adults tend to focus on self, solidify food preferences, and navigate social pressures related to food (Drzal et al., 2025; French et al., 2024). Methods: This study, guided by social cognitive theory framework, examined how a teaching kitchen impacted nutrition literacy, cooking skills, and social connectedness among college students. Seventeen students participated in the 3-session teaching kitchen and completed pre- and post-surveys, which included validated scales such the CAFPAS Self-Efficacy, Townsend Fruit and Vegetable Inventory, and Sense of Social Fit. Additionally, focus group discussions provided valuable insights into how teaching kitchens can support the health and wellbeing of students. Results and Conclusions: This study is on-going, and quantitative results will be presented.

Presenters – Maria Verslues and Madalynn Hoeper
Authors – Maria Verslues, Madalynn Hoeper, Makayla Ferguson, Madelyn Lindeman, and Alana Mantie-Kozlowski
Poster # – B44
Speech-Language Pathology
SONGS AS AN AUXILIARY TOOL IN LANGUAGE THERAPY FOR CHILDREN WITH SEVERE COMMUNICATION CHALLENGES
Music has been suggested as an effective instructional tool in therapeutic settings, with proponents emphasizing its engaging, multi-sensory qualities and potential to support content retention. This study explores the perceptions of graduate students in speech-language pathology as they incorporate musical elements—such as song, rhythm, and melody—into language therapy for children with severe cognitive disabilities over a six-week period. Additionally, the study examines the feasibility of delivering language therapy in a group setting for children with severe cognitive disabilities. Using a qualitative approach, four graduate students participated in language intervention sessions at Green Valley State School, documenting their experiences through reflective journaling guided by Gibbs' Reflective Cycle. Weekly meetings ensured therapy consistency while preventing bias in individual reflections. A thematic analysis, employing both manual and AI-assisted coding, identified five key themes: (1) Structure, Organization, and Group Dynamics, (2) Adaptability and Responsiveness, (3) Managing Behavior Through Structure and Timing, (4) Music as a Tool for Engagement and Progress, and (5) Building Rapport and Trust. Recommendations based on the themes that emerged included a need for structured routines, clear group dynamics, and adaptability in therapy design to enhance session effectiveness. Student clinicians believed that the involvement of music in the delivery of language intervention facilitated engagement, social interaction, and expressive language use. This study highlights graduate clinicians' perspectives on the use of music in language intervention, as well as the key themes that emerged over the six-week implementation period. Additionally, it serves as a proof of concept for incorporating music-based strategies

into language therapy and demonstrates the feasibility of this modality of service delivery for children with severe cognitive disabilities.

Presenter – Kennedy Webb
Authors – Wafaa Kaf, Kennedy Webb, Mara Anselm, and Kaitlyn Johnson
Poster # – A44
Audiology
ASSESSMENT OF AUDITORY BRAINSTEM RESPONSE AND ELECTROCOCHLEOGRAPHY RESULTS IN PATIENTS WITH DIABETIC NEUROPATHY
Diabetic neuropathy affects the peripheral nervous system in nearly 50% of adults with type II diabetes. Emerging research suggests that this condition may also extend to the auditory system, potentially disrupting neural transmission along the auditory pathway. This study investigates the impact of diabetic neuropathy on cochlear synapses and auditory brainstem conduction using electrocochleography (ECochG) and auditory brainstem response (ABR) to click stimuli. ABR recordings will be analyzed at slow (7.1/sec) and fast (234/sec) click rates to assess neural integrity under increased temporal stress. Results will be compared to a matched group of individuals with type II diabetes without neuropathy. Pilot ECochG data is expected to indicate cochlear synaptopathy (hidden hearing loss), along with reduced ABR wave I amplitude at fast click rates, suggesting auditory neuropathy at the auditory cranial nerve level in the diabetic neuropathy group. These findings could have clinical implications for counseling and hearing aid recommendations, particularly in addressing difficulties with speech perception in background noise due to potential cochlear synaptopathy.

Reynolds College of Arts, Social Sciences and Humanities (RCASH)

Author – Farhana Akter
Oral Presentation – 2-SICL 222
Writing
SPICE, SOIL, AND STORY: MIGRATION RHETORIC AND THE FRAMING OF BANGLADESHI BELONGING IN U.S.
As of March 2024, the foreign-born population in the United States reached an estimated 51.6 million, constituting approximately 15.2% of the total U.S. population. According to the U.S. Census Bureau, this marks a significant increase from 2022, when the foreign-born population was 46.2 million, or 13.9% of the total population. This rate is increasing every year. Drawing from Translingualism, cultural rhetoric, and migration studies, this research will investigate the rhetoric of migration and the framing of Bangladeshi cultural identity within U.S. diversity, equity, and inclusion (DEI) discourses. This study will use rhetorical analysis and ethnographic methods, including interviews with Bangladeshi immigrant students and content analysis of institutional DEI policies, to examine how Bangladeshi identity is represented and negotiated in academic spaces. By highlighting Bangladeshi voices and experiences, this study promotes a more nuanced and inclusive approach to DEI beyond existing racial groupings. It argues that a translingual and culturally rhetorical approach to DEI discourse can create more inclusive and representative frameworks. By highlighting the limitations of current DEI rhetoric, this study promotes policies that recognize the specific cultural and linguistic contributions of Bangladeshi immigrants, fostering a more unbiased and nuanced discourse on migration and identity. Besides, this project will contribute to scholarship on migration rhetoric, translingual identity formation,

and the evolving discourse of DEI in the U.S., offering insights into how institutions can better engage with underrepresented immigrant voices in shaping inclusive policies and narratives.

Author – Nnenne Ben-Ekechukwu
Poster # – A3
Applied Second Language Acquisition
ENHANCING THE ACCESSIBILITY OF WRITING CENTERS FOR LOW-LEVEL ENGLISH LEARNERS A CASE STUDY OF REFUGEES AND IMMIGRANTS.
This paper explores strategies to make writing centers more attractive and practical for low-level adult English language learners (ELLs) from refugee and immigrant backgrounds. The study focuses on a diverse group of learners from different countries in Springfield who studied conversational English at the Family Welcome Program, an institute affiliated with Missouri State University. The research examines the historical use of writing centers and their specific application to refugee and immigrant populations. It proposes logistical solutions to improve accessibility, including transportation and childcare services, by synthesizing existing literature and presenting new approaches.

Author – Nnenne Ben-Ekechukwu
Poster # – B8
Applied Second Language Acquisition
THE IMPACT OF LOW-TECH LEARNING ENVIRONMENTS ON SECOND LANGUAGE ACQUISITION IN ADULT ESL LEARNERS
This study investigates the impact of a low-tech learning environment on second language acquisition among adult ESL learners. This study addresses the following questions: Does a low-tech learning environment significantly affect the rate of language acquisition in adult ESL learners? How do specific low-tech instructional methods (e.g., hands-on activities, group work, realia) contribute to different aspects of language acquisition (vocabulary, grammar, speaking, listening)? What are the learner perceptions and attitudes towards a low-tech learning environment in the context of ESL acquisition?

Author – M Mujahed Butt
Oral Presentation – 1-SICL 125
Dramatic Writing
REDEMPTION GAMES
This research explores a narrative set within a Whac-a-mole carnival game console. Six distinct anthropomorphic characters experience repeated rotation and violent impact by a mallet, eliciting diverse reactions from fear to excitement and purpose. The study delves into their psychological and emotional depth, examining themes of self-awareness, suffering, resilience, and the search for meaning in their game-like existence. An audio proof of concept serves as the primary research method. Production techniques, voice casting, and performance convey the characters' emotions, allowing for an embodied exploration of their psychological states. Voice acting and tropes of adult animated comedy enhance the existential commentary, symbolising the cyclical nature of torment inherent in the game's design. This mirrors human suffering and highlights the futility of individual agency, raising questions about free will and the player's role in the system. The Redemption Games audio proof of concept offered valuable insights into the process of casting character-specific voice actors and employing performance techniques to enhance psychological depth. It further demonstrates how voice-over styles and animation tropes contribute to the

thematic exploration of repetitive existence, reinforcing the project's existential commentary.

Author – Kexi Chen
Virtual Presentation
Communication
THE IMPACT OF SOCIAL MEDIA ON INTERCULTURAL ADAPTATION OF CHINESE INTERNATIONAL STUDENTS
More Chinese students are studying abroad, facing cultural differences upon arrival. This study examines the role of social media in intercultural communication and explores strategies to aid their adaptation. I investigated how Chinese students use social media to connect with local culture and ease their struggles. Through in-depth interviews with 26 Chinese students at Missouri State University, I found that most maintain their social media habits after arriving in the U.S. They are cautious about using non-Chinese social media, and their engagement is closely tied to their motivations for studying abroad. Social media helps students stay connected to their home country, offering emotional support and academic resources. However, it is ineffective in fostering connections with local communities. Non-Chinese social media can also be a stressor due to unfamiliarity with its culture and functions. When facing challenges, students prefer seeking help from peers over social media. Additionally, the American media landscape poses a challenge to Chinese students' cultural identity. Social media should be seen as an additional cultural space they must navigate. Support systems are needed to help them adapt to American social media.

Author – Johnny Dickens
Oral Presentation – 2-SICL 119
Dramatic Writing
POLICE-CAM
Police-Cam is a short film exploring a viewer's relationship to police violence relative to the presentation and framing of said violence. It tells the story of a home invasion in two different formats: (1) in the style of an 80's action film, and (2) emulating chest-mounted bodycam footage of real police officers that one commonly sees online on YouTube or the news. The script was written for a Summer 2024 intersession course focused on writing short form media content, MED 600. It was further developed in MED 766, and was produced as part of MED 767 over the course of two shooting days, with cast and crew comprised of Missouri State film students and Ozark's Film Foundry members. The intended outcome is to create a conversation on the double standard of how a media-viewing audience is more likely to excuse or even support unjust or questionable acts of violence when the setting is clearly fictional, but more likely to show more scrutiny when the setting feels real. The working philosophy while writing this project was, "Dirty Harry is really cool, but you probably wouldn't want him coming to your house if you called 9-1-1."

Author – Caleb Friedrich
Oral Presentation – 2-SICL 127
Dramatic Writing
THE ESCAPE ROOM
"The Escape Room" is an original short film written by Caleb Friedrich. The film tells the story of a family trying to solve an escape room on their last day of summer. The family begins the escape room with vim and vigor, but soon they begin to bicker and fight. Just when it seems that they will not solve the escape room and their summer is ruined, they manage to find a clue and pull together as a family. In just the nick of time, they solve the

room and have fun as a family. The purpose of this project is to get “The Escape Room” into film festivals. “The Escape Room” was birthed out of the experiences of my friends and my own family’s experiences. It is a reflection on the pressure that family members, especially mothers, experience in trying to create a perfect experience for their family in a social media driven world. This script was inspired by family comedy sitcoms and films such as “The Middle”, “Mr. Hobbs Takes a Vacation”, and “Full House.” The script was first written in MED 610 with Cristina Pippa, revised in MED600 with Rich Amberg, and finally in MED 766 and MED767 with Conci Nelson. This project was filmed at 417 Escape Artist in Springfield, MO. Filming took place over the course of three days.

Author – Megan M. Grissom-Walbridge
Poster # – A20
Communication
DESTIGMATIZING BIPOLAR DISORDER: AN ANALYSIS OF AMAZON PRIME'S MODERN LOVE
In this piece of rhetorical criticism, I delve into the interplay of identity and media representation. Season 1, Episode 3 of Amazon Prime’s Modern Love, titled “Take Me as I Am, Whoever I Am,” undergoes analysis through the perspectives of realism, narrative form, and the stigmatization of bipolar disorder in Western culture. The episode serves as a focal point to illustrate and substantiate the argument regarding destigmatization and the rhetorical mechanisms employed. A comprehensive exploration of these mechanisms sheds light on the fundamental elements of the episode, laying the groundwork for a discussion on critical implications for future endeavors.

Author – Rawan Hegazy
Oral Presentation – 1-SICL 119
Communication
COMMUNICATION AND AMBIGUITY: A FRAMEWORK FOR UNDERSTANDING POWER AND IDENTITY
This study explains communication not just as an exchange of information but as a more complex and ambiguous process involving constructing, contesting, and renegotiating power and identity. The study is based on remarkable scholars in the field, such as Michel Foucault, Edward Said, and Homi Bhabha. Furthermore, the research sheds light on how ambiguity in communication is not incidental but rather crucial for the power relations in social structures. The paper aims to create a theoretical model that perceives communication as potentially ambiguous and relational, influenced by history, culture, and politics, and much used to legitimize or challenge the prevailing power. Methods: This paper uses qualitative interpretive research and critical communication theory. It also employs case-based analysis of significant social movements, such as the Arab Spring, Black Lives Matter, and #MeToo, which reveal how power is exercised, resisted, and transformed via communication. The framework relies on critical and postcolonial theorists. For example, Foucault's discourse on relational power, Said's Orientalism and binaries, and Bhabha's hybridity and third space. Moreover, the research highlights rhetorical historical communication artifacts, such as Martin Luther King Jr.'s "I Have a Dream" Speech and grassroots mobilizations on social media platforms. Results: The analysis demonstrates that communication is not fixed but fluctuates in the sender, receiver, context, and medium. These factors operate in relation to each other to generate ambiguity, which enables or limits power. For example, Martin Luther King Jr.'s speech was interpreted differently according to racial and political context, which further illustrates power's interference in meaning-making. Similarly, movements, including Black Lives Matter and the Arab Spring, have utilized social media to raise awareness of injustice. However, the opponents viewed

their acts as violent and subversive. The research suggests that ambiguous communication, on the one hand, strengthens the dominant ideology while, on the other, it empowers the subaltern voice. Gramsci's cultural hegemony and Bakhtin's dialogism reflect strategic ambiguity, which offers an appropriate space for dominant powers to maintain control and the subalterns to simultaneously resist. Moreover, this research provides insights into how communication is constructed and contested through multiple cultural dialectics. For instance, the personal-contextual, past-present-future, and privilege-disadvantage, which allow for fluid identity formation and social transformation. Also, the paper discusses how power plays out in day-to-day language and institutional narratives by producing and regulating norms, identities, and knowledge. For example, the imposition of English into the Indian education system during colonialism gave rise to the marginalization of the indigenous languages but, at the same time, allowed for resistance through the reclamation and hybridization of language. Again, cinema representations of the Middle East through films like Aladdin reflect the Orientalist binary that reinforces stereotypes. Yet, these are being increasingly challenged through hybrid representation in world literature and art. Conclusion: In conclusion, this work argues that communication does not equivalently exchange information but is more of a flexible, subtly layered process fought over by power relations. It is this very ambiguity that sustains hegemonic ideologies while enabling a space for resistance for the silenced. In this sense, communication is an arena for contestation and transformation. This study aims to articulate such contestation through examples from struggles such as Black Lives Matter and theoretical insights from Foucault, Said, and Bhabha; hence, identity and meaning are fastened together by acts of communication. These acts allow for ambiguity, allowing for more inclusive and critical readings of power, identity, and culture. Thus, charting new pathways for theorizing and doing work in communication studies.

Author – Brett Jones
Poster # – B24
Dramatic Writing
WAITING
Waiting is an original theatrical piece written by Brett Jones. An intimate experience that takes the claustrophobic nature of 12 Angry Men, but with the emotional turmoil and modern aspect of a group of five high schoolers in a hospital waiting room. The five teenagers, Aly, Zaine, Cassie, Levi, and Yasmin, all wait for the news of Connor, who is getting surgery after a dangerous car crash. Each teen is connected to Connor in their unique way which amplifies the story and presents a tense feeling on how one would react while impatiently waiting for news of a loved one. Emotions of love, betrayal, masculinity, queerness, and faith are all intertwined into one play. The finished product of the play was pitched in Professor Cristina Pippa's MED 610 Playwriting I course. With raving reviews from Pippa and classmates alike, Waiting was able to be fully established and realized. The script has undergone three revisions from back in 2019 to Cristina Pippa's course and throughout MED 766 with Professor Conci Nelson. Waiting is an emotional drama that is meant to strike at the hearts of the audience and show the complexities that surround the idea of the ever-looming doom of death. The play opens with Aly and Zaine, Connor's beautiful picture-perfect girlfriend and hot-headed football player best friend. It's past midnight in a small town hospital, practically dead, but the storm arises throughout the night. The pair are asked to come by Connor's younger religious sister, Cassie, an emotional trainwreck who doesn't know what to do as their parents are out of the country and won't be able to arrive for hours. No one knows why Connor was out late, and the police have no answers for them except for the fact that he's in critical condition. Soon, they're welcomed

by Levi and Yasmin, Connor's antsy childhood best friend and Levi's angsty best friend who only joins for emotional support for Levi as she hates Connor. The mixed group doesn't handle the situation as Zaine questions Levi's arrival. Yasmin doesn't want to be there and consistently gets into it with Zaine for picking on Levi and getting annoyed by Cassie's religious pleas. Levi is silent, harboring a secret that he fears may ruin Connor's life but might also be the reason why Connor was out late into the night. Aly tries to keep everyone as sane as possible, but even she has her breaking points. As secrets unravel, uncovering a hidden relationship between Connor and Levi, Cassie begins to lose it as she's twisted with these secrets of her brother that have her question who he truly was and why he was afraid to tell her about his sexuality. By the end of the night, as the storm tames and the teens recoup, Connor's fate is revealed to the characters and the audience. This play was to bring human emotion to the stage. After losing my grandmother, death, or the idea of death, causes humans to react in a variety of ways. She passed during the summer before my freshman year at college, a similar age to that of the characters in the play. Each character's perspective is similar to my own or that of loved ones as we watched my grandmother slowly die in hospice. Others are optimistic, the women who try to keep everyone together, the silent ones, and my perspective of anger. How could life take away my grandmother, even if she was one of the nicest people I knew? That's where I brought it to the stage. A film wouldn't have brought the closeness I wanted with a staged production, and watching the human emotion live brings tears to the eyes. Pre-production began in 2024 with casting, finding tech people, and acquiring a venue to present the play. Thankfully, The Creamery Arts Center had us, and the casting process went swiftly with the talented theatre students at Missouri State University as well as friends who wanted to put their acting foot out there. Rehearsals began in January of 2025, and we've consistently had rehearsals every Monday, Wednesday, and Friday (with the occasional Thursday & Sunday), excluding holidays. The rehearsal process grew from reading lines to blocking to using props to focusing on the emotions of the characters. The results of the actors are immaculate as they've brought the emotion to life and with early screenigns of the play, a tear has been shed by every attendee. They take direction well and are insistent on doing better and being accurate by the script. Our sound and technical engineers have worked hard to ensure the sound and lighting are reflected within the production to continue the fantasy of the story. With the help of the university and The Creamery, we've done our best to create the illusion of a hospital waiting room, but in the perspective of a small town with fewer resources for a higher-end hospital. Emotion is the highest form of art, and to capture that in the crisis of someone's worst moments is what brings this play to life, because the waiting is the hardest part.

Author – Carson Lolley
Oral Presentation – 2-SICL 222
Dramatic Writing
FINDING PORKIS
Finding Porkis is a four-part, micro-episodic web series written by Carson Lolley. Plans go awry when an enthusiastic team of investigators goes too far to prove the existence of Porkis, a mythic cryptid that takes the form of a divine cat. While investigating a local Porkis encounter at Missouri State University, protagonist Jackie and her team find a trail of clues that lead them to make direct contact with the creature. They confirm that Porkis is indeed very real… and very dangerous. Drawing influence from reality shows like *Ghost Adventures* and *Finding Bigfoot* and found-footage horror like *The Blair Witch Project*, the script honors both genres while leaning heavily into the comedic and the absurd. The project was first conceptualized in MED 610 Playwriting with Cristina Pippa. It then underwent a series of rewrites in MED 600 Sketch, Web Series, and Shorts with Rich Amberg and MED 766 Pre-

Production Practicum for Stage and Screen with Conci Nelson. The production process was an essential component to fully realize the vision of the web series and cement the themes of the script. Not only did the actors bring characters and comedic moments to life through line reads and improv alike, intentional camera movement and diegetic light and sound took on roles of their own to establish the genre and build tension throughout the series. What starts as a parody ends as a love letter to absurdist comedy and horror as the series unravels a unique world rich with lore and tension, and the protagonists explore the mythology of the titular "Porkis" deity.

Author – Nomin Munkhbaatar
Oral Presentation – 2-SICL 125
Communication
BETWEEN WORLDS: AN AUTOETHNOGRAPHY OF AN INTERNATIONAL STUDENT
Over one million international students contribute nearly $44 billion to the U.S. economy and facilitate nearly 380,000 jobs (Stewart, 2024). Yet, there is a notable research gap regarding the unique and personal experiences of this student population. Hence, this paper explores the multifaceted and liminal experiences of international students navigating the U.S. higher education through the lens of autoethnography. Through my personal narrative as a student who has experienced multiple levels of international education, this study shows the social, cultural, and academic obstacles and opportunities throughout this journey. Furthermore, the paper sheds light on the complexity of identity construction and the ongoing negotiation of self in liminal spaces drawing from theoretical frameworks such as cross-cultural communication, identity, acculturation, and liminality. The paper demonstrates the complex and interconnected nature of these experiences, and calls for further exploration across multiple disciplines, including communication, culture, politics, and policy making.

Author – Blessing Nlemedim
Oral Presentation – 1-SICL 127
Communication
TWO TRUTHS AND A LIE: PRESENTING YOURSELF AS A SPEAKER AND BUILDING CREDIBILITY THROUGH DELIVERY.
This teaching activity is designed to help students in a public speaking course develop self-presentation skills while fostering confidence and audience engagement. By modifying this everyday icebreaker game, students create two truthful statements and one false statement about themselves, which they will present to the class, but this time, they are delivering these statements extemporaneously following a proper speech pattern with an introduction, a body, and a conclusion. The goal is to deliver all three statements convincingly, demonstrating the importance of body language, vocal delivery, and credibility in speech. After the presentation, classmates will guess the lie, encouraging interaction and critical thinking. This activity utilizes speech tools such as clarity of speech, vocal variation, eye contact, and non-verbal communication while building students' ability to manage audience perceptions and engage listeners. The activity also helps students become more aware of how to come up with believable narratives and find the balance between confidence and authenticity in public speaking.

Author – Amaka Onyeka
Poster # – A36
Dramatic Writing
THE PAST AND THE PRESENT
The Past and Present began as an exploration of key events that are significant to the lives of a Nigerian youth in the modern day. It expanded further incorporating Nigerians in the diaspora, intertwining both experiences and bringing it to the forefront. The core themes of this story which include: the struggle for connection amidst uncertainty and fear, the impact of trauma on personal identity and the intersection of personal and political are all universal themes that are relatable to a sizable percentage of people especially in the world today where political unrest is prevalent in various countries. The screenplay was written drawing from lived experiences, with the story intentionally moving between flashbacks and present-day fears, using visuals and voice to carry the emotional weight. The filmmaker recorded the narration herself and worked with one actor for the live-action scenes, keeping the performance focused and intimate. She also assembled a small team consisting of a cinematographer, editor, illustrator, and composer. Each person was selected not just for their skill, but for their connection to the story's tone and message. Right now, the film is in post-production. The rough cut is done, the final sketches are being added, and music is coming together. It should be completed by April 2025. The goal is to premiere *The Past and the Present* at a recognized film festival in the fall of 2025. This short film is the Proof of Concept for a feature-length screenplay currently reviewed in Portfolio II with Professor Amberg Richard and MED 766&767 for Conci Nelson.

Author – Damilola Oyedeji
Oral Presentation – 2-SICL 125
English
WOMAN-TO-WOMAN: AN AFRIFEMINIST AND TRAUMA READING OF 'THE SON OF THE HOUSE'
Since the 1980s, African feminist scholars like Filomena Chioma Steady, Patricia McFadden, and M. Bahati Kuumba have challenged the misconception that feminism is merely a Western import by creating indigenous conceptualization of women's subjugation and resistance. This includes the formation of various African feminist theories and movements such as Womanism, Motherism, Stiwanism, and other frameworks. This paper seeks to contribute to African feminist scholarship through a textual analysis of Cheluchi Onyemelukwe-Onuobia's The Son of the House, applying Jennifer Gomez's Cultural Betrayal Trauma Theory (CBTT) as the primary interpretive framework. CBTT, which examines how betrayal and trauma are enacted within shared cultural spaces, is particularly suitable for understanding the complex dynamics of women's subjugation within patriarchal African societies. Within this framework, I recognize three overarching ideas—cultural trust violation, cultural outcomes, and cultural pressures—adaptable to an African context without risking imposition or generalization. With such integration, CBBT reveals how African women might be culturally conditioned to perpetuate trauma within their communities through cultural pressures, upholding structures that harm other women under the guise of cultural norms. Therefore, as revealed in The Son of The House, I argue that patriarchal constructs may result in betrayal and insidious trauma that shape Nigerian women into agents who reinforce these oppressive norms and, at times, perpetuate cycles of trauma within their communities. Trauma theory, in tandem with feminist theory, emphasizes that an intersectional outlook remains critical in articulating the lived realities of post-colonial, contemporary Nigerian women.

Author – Hayden Pyle
Poster # – B34
Music Composition
GENERALIZED OMNIBUS PROGRESSIONS: HARMONIC PROGRESSIONS CONTAINING CHROMATIC CONTRARY MOTION AND TERTIAN SONORITIES
Eric Regener's *interval notation* (1974) inspires mathematical definitions that describe pitch-class segments containing four elements of $\mathbf{Z}_{12}$ that are a musical major (or minor) third apart. The parenthetical representation of harmonically adjacent intervallic distances as a *consecutive interval vector* (CIV) is comparable to Regener's *interval normal form*, but the CIV permits repeated pitches in a four-voice texture, unlike Regener's framework. Additionally, the CIV framework incorporates the work of Cannas et. al. (2017) by underlining the roots of these 4-voice chords, which permits the distinction between certain inversions of the perfectly even chords—a component not previously engaged with in the literature of mathematical music theory in terms of how musical chords may be perceived in the context of a given progression. This framework offers the potential not only for an intervallic-voicing classification of individual chords, but also for the representation of the standard omnibus progression between 4-voice triads and seventh chords as *function compositions* between sets containing all of the 4-voice chords. Generalized tertian variations on the standard set of omnibus progressions—named and codified by Victor Yellin (1998) and Paula Telesco (1998), including the inverted form by Bernhard Ziehn (1912)—are fascinating consequences of this framework. The *lament bass omnibus function* is defined as a set of functions describing the chromatic descent of the bass voice and, simultaneously, the chromatic ascent of each upper voice as its own function, denoted f_S, f_A, *and* f_T, respectively. These functions reveal the novel observation that any generalized omnibus progression containing four voices will have at least three, but at most six, unique chord types before a mutation occurs. This framework opens the door to consider the *function mappings* of harmonic progressions within the universe of four-voice chords, which may reveal clues as to how smooth and chromatic voice leading gradually transformed Classical-era tonal practices. These function mappings can also be represented as graphical networks, similar to Hook's use of *transformational networks* (2007), which facilitate a visualization of the multiple voice-leading possibilities of the generalized omnibus progressions given an arbitrary starting chord. Some tertian chords are not frequently heard in music due to their atypical harmonic function. However, there are compositional vistas that these chords, and their associated generalized omnibus progressions, offer–an example of this is found in the fourth string quartet of Dmitri Klebanov (1907-1987). This progression chromatically alters Ziehn's inverted form of the standard omnibus by voice-leading the major triads of Ziehn's form into augmented-major seventh chords instead. The difference lies in which voice moves chromatically from a root position half-diminished seventh chord. Another result is that the standard omnibus progression can be chromatically altered to incorporate minor-major seventh chords, and the inclusion of the atypical tertian chords reveals how some chord types lend themselves to multiple voice-leading possibilities, with the largest network containing six unique sonorities that all chromatically lead to each other.

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Poster # – B35
English
POWER, PROMISES, AND POETIC AUTHORITY IN CHAUCER'S "LEGEND OF GOOD WOMEN"
In Chaucer's *Legend of Good Women*, the narrative framework centers the god of Love's intention to punish the poet for his negative portrayals of women in his previous works.

However, the legendary figure, Alceste, saves him by requiring him to write a legend of virtuous women who suffered because they loved—typically untrustworthy—men. My paper explores how the women in these legends become "interchangeable" in their experiences of exploitation, as Laura Getty has suggested. I extend this analysis by exploring three parallel relationships between the Prologue and Ariadne's Legend: 1) Alceste and Ariadne– the good women, 2) Chaucer (as character) and Theseus– the untrustworthy men, and 3) Cupid and Minos– the powerful rulers with questionable justice systems. Both sections feature a virtuous woman who saves a man from peril only to be subsequently abandoned. Theseus abandons Ariadne on Naxos after she helps him defeat the Minotaur. Similarly, Chaucer abandons the *Legend* project, leaving it unfinished, and ironically becoming one of the untrustworthy men he rebukes. This abandonment forces the reader to reexamine their perception of the poet, since Chaucer built his authorial persona on being a trustworthy and likeable source.

Author – Bachchu Shekh
Oral Presentation – 1-SICL 222
Communication
THE PRESS RELEASE AS COMMUNICATION TECHNOLOGY: A MEDIA ECOLOGY OF A KEY PUBLIC RELATIONS TOOL
The historical emergence of press releases has become an integral part of public relations research as Public Relations strategies are being tremendously influenced by modern communication technologies. The paper aims to study press releases as communication technology under the purview of media ecology theory. Public relations practitioners mainly consider press releases as communication tools, glorifying companies, and organizations' familiarity with the public and target groups. This paper critically identifies and defines their structural traits and biases which have an ecological role in society as well as the political sphere too. This ubiquitous and multipurpose role of press releases as public relations tools often disseminate information from various organizations while creating social and political campaigns to reach target groups. Despite this fact, organizations choose press releases as a mode of communication to accomplish and glorify the company, subsequently, biased, and sensationalizing information through press releases generates mistrust and favoritism in the organization and makes them questionable to the media and public.

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Oral Presentation – 2-SICL 127
Communication
WHY PEOPLE ARE INCREASINGLY RELYING ON SOCIAL MEDIA FOR SEEKING HEALTHCARE INFORMATION: A THEORETICAL ANALYSIS
With the increasing influence of social media in our everyday lives, this study explores the reasons for the growing dependency of using Facebook for mental-health related issues. Using Media Ecology, Communication as Relationality, Social Cognitive Theory, and Uses and Gratifications Theories, this study provides a theoretical analysis showing how social media shapes our mental- health related behavior. Grounded by qualitative content analysis, this study reviewed related literature and theoretical perspectives to understand the nature of behavior of people to understand their health-seeking behavior on social media. Findings indicate that Facebook creates a common platform for engagement through two-way communication, group discussions, and various pages, influencing individuals to share and perceive health-related issues and problems. The study also provides some concerns over privacy risks, misinformation and the reliability of auto-generated content

that encounter users. This study concludes that Facebook is an easily accessible social media for getting health-related information but needs more scrutiny about the source of information. This suggests that media literacy could possibly determine us to have secured credible information on social media.

Author – Erin Tyler
Poster # – B42
Visual Studies
ORDINARY SIGNS, PRACTICAL MAGIC
Ordinary Signs, Practical Magic outlines my personal wrestling with belief - in art, in spiritual intervention, in self, and in the quiet forces that guide us through the world. Using the frameworks of ordinary signs - tactile and visual cues that ground and orient me - and practical magic - what I define as human intervention and the act of creation this work examines how attention, care, and materiality shape my understanding of meaning and connection. Through visual data collection, photography, assemblage, collage, drawing, painting and found objects alongside poetic writing and personal narrative, my thesis navigates the tension between control and chance, presence and absence, belief and doubt. It reflects on how I transform the ordinary into something symbolic, how process becomes ritual, and how the act of making becomes an expression of care. This thesis project culminates in a public exhibition and visual collection, inviting viewers to engage in their own process of noticing and believing, encouraging a slower, more attentive way of moving through the world - one where every object holds potential, and every act carries meaning.

Author – Abigail Zajac
Poster # – A45
Writing
A CASE STUDY OF CRISIS COMMUNICATION: MSU'S RESPONSE TO FEDERAL AND STATE DEI MANDATES
Crisis communication is essential for maintaining trust and stability during institutional challenges. Missouri State University (MSU) has recently faced significant disruptions due to federal funding freezes and mandates to eliminate Diversity, Equity, and Inclusion (DEI) policies. These changes have sparked widespread student protests and coalitions, highlighting dissatisfaction with the administration's response. However, the specific shortcomings in the President's communication remain unclear, complicating efforts to rebuild trust between students and leadership. This study applies crisis communication principles from the Society for Technical Communication's (STC) Applied Theory and Seeger's best practices to analyze the President's messaging. Using grounded theory, I will compare the President's response to those of other MSU administrators or departments to identify missing elements in his crisis communication. Specifically, I will examine how his messaging addressed (or failed to address) the long-term impact of DEI policy changes on the university community. By pinpointing key weaknesses in MSU's crisis communication, this research aims to provide actionable recommendations for future responses to systemic social changes. As institutions nationwide navigate similar challenges, understanding effective crisis communication strategies will be crucial for fostering transparency and trust in university leadership.