Missouri State

GRADUATE COLLEGE

33rd Annual
Einhellig Interdisciplinary Forum
Friday, April 17, 2026

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Schedule

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Oral Presentation Session 2 11:30 P.M. – 12:30 P.M.
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PSU Theater (2nd floor)

Abstracts

College of Business (COB)

Presenter – Nguyen, Ha
Author – Ha Nguyen
Oral Presentation – 1-PSU 308C
Information Technology and Cybersecurity
MEDIRAD-MRI: AI-DRIVEN RADIOMICS CLASSIFICATION OF ANTERIOR MEDIASTINAL TUMORS ON MRI
Purpose: To evaluate MRI-based radiomics, with and without clinical and morphologic features, for non-invasive classification of anterior mediastinal tumors across two clinically relevant endpoints: low grade versus high grade and benign versus malignant. Methods: This retrospective study included 120 adults who underwent contrast-enhanced mediastinal MRI. Manual segmentations were performed, and 851 handcrafted radiomic features were extracted. Two experiments were conducted: (Exp. 1) radiomics-only, and (Exp. 2) radiomics combined with clinical and morphologic features. Variance and correlation filtering followed by recursive feature elimination was applied, and multiple machine-learning classifiers were evaluated using patient-grouped 5-fold cross-validation. Calibration and decision-curve analyses were performed to assess clinical utility. Results: For low-grade vs. high-grade classification, the best model in Exp. 2 (Random Forest) achieved a test AUC of 0.8636, outperforming radiomics-only models (best AUC 0.5985). In contrast, for benign vs. malignant classification, integrating morphologic and clinical variables markedly improved discrimination, with several models (e.g., Extra Trees, Logistic Regression, RBF SVM) achieving perfect or near-perfect test AUCs (0.94–1.00) and excellent calibration (slope = 1.0, low ECE < 0.15). Radiomics-only models achieved moderate

performance (best test AUC = 0.6842). Across both endpoints, feature reduction exceeded 97% while maintaining discriminative power. Decision-curve analysis confirmed superior net benefit for radiomics + clinical models, especially within clinically relevant threshold ranges (0.1–0.9). Conclusion: MRI-based radiomics combined with clinical and morphologic features enable accurate and well-calibrated prediction of tumor malignancy and grade in anterior mediastinal masses. While benign–malignant discrimination was highly robust, grade stratification remained less distinct, reflecting the limited visibility of histologic differences on MRI. Compact, interpretable radiomics–clinical panels show promise for aiding non-invasive risk stratification and clinical decision-making pending multi-center validation.

Presenters – Happy, Kamrunnahar
Authors – Kamrunnahar Happy, Dr. Ismet Anitsal, Dr. Melek Meral Anitsal
Poster # A17
School of Construction, Design, and Project Management
AI-DRIVEN CUSTOMER CO-CREATION IN SOLO VENTURES
Artificial intelligence (AI) is transforming solo entrepreneurship by enabling solo entrepreneurs to manage tasks, make strategic decisions, and engage with customers more quickly, cost-effectively, and efficiently than would be possible with multiple employees. AI-powered knowledge substitution enables entrepreneurs to manage human, financial, and institutional constraints by analyzing data, evaluating options, and making structured decisions, which ultimately reduces the dependence on external expertise. In addition to functioning as a technical tool, AI influences how entrepreneurs think, learn, and make decisions when resources, experience, or time are limited. By following a structured review and synthesis of the existing literature related to artificial intelligence, solo entrepreneurship, resource constraints, and customer co-creation methodology, this study presents a conceptual framework with five key propositions that explain how AI supports resource allocation, customer engagement, innovation, collaboration, and sustainable growth in solo service ventures. Moreover, this paper explores the way AI can reshape solo entrepreneurs to innovate, interact, and scale despite limited resources. This study concludes with the managerial and research implications by providing insights for entrepreneurs and researchers who seek to understand how AI can be used to build resilient, adaptable, and sustainable ventures.

Presenters – Mosabbir, Md; Anitsal, Ismet
Authors – Md Mosabbir, Dr. Ismet Anitsal, Dr. Nebil Buyurgan
Poster # B35
Marketing Department
UNDERSTANDING GENERATIVE AI ON ACADEMIC INTEGRITY
While Generative Artificial Intelligence (GenAI) tools are transforming higher education, their effects on academic integrity are still not well understood. This study explores how GenAI influences academic integrity across pedagogy, governance, and institutional operations, with a focus on ethical use, policy development, and institutional readiness.

Through a comprehensive literature review, the study presents a structured framework that maps GenAI's impact on assessment, authorship, data management, and operational processes. Findings reveal that while GenAI enhances instructional efficiency, accessibility, and inclusion, it also introduces risks such as plagiarism, reduced critical thinking, authorship ambiguity, and uneven adoption due to infrastructure gaps. Institutions lacking policy frameworks and technological readiness are particularly vulnerable to these harms. The study concludes that ethical considerations must be considered in GenAI integration strategies in higher education. Institutions should develop inclusive governance frameworks, invest in infrastructure, and promote GenAI literacy to balance innovation with accountability. Responsible adoption is essential to preserving trust and academic standards.

College of Natural and Applied Sciences (CNAS)

Presenter – Danso, Bezali
Authors – Bezali Kwame Danso, Mélida Gutiérrez
Poster # A9
School of Earth, Environment and Sustainability
INSTRUCTIONS AND ANALYTICAL WORKFLOW OF THE VANTA EVIDENT HANDHELD XRF ANALYZER FOR METAL DETECTION
Conducting geochemical analyses has become increasingly important for identifying pollution sources and assessing contaminants in soil and water systems. Among the available analytical techniques, handheld X-ray fluorescence (XRF) analyzers provide a rapid, cost-effective, and user-friendly approach for elemental analysis. This poster presents the safe operating procedure (SOP) for the Vanta Evident handheld XRF analyzer, which is used to measure metal concentrations such as Pb, Zn, Fe, Mn, and Cu. The SOP emphasizes proper instrument handling, adherence to safety protocols, and standardized analytical procedures to ensure accurate and reproducible results. Key operational steps include pre-use instrument inspection, secure sample placement, selection of the appropriate analytical method, and consistent measurement conditions. The workflow incorporates systematic data review and export processes to support efficient data management and interpretation. Adherence to this SOP ensures both user safety and the acquisition of high-quality geochemical data in laboratory settings.

Presenters – Valdez, Benjamin
Authors – Benjamin Valdez, Dr. Sarah Morrison
Poster # A46
Physics, Astronomy and Material Science Department
USING MACHINE LEARNING TO PREDICT LONG-TERM STABILITY OF PLANET ORBITS IN THE HABITABLE ZONE
The study of planetary habitability parameters requires understanding of conditions necessary for sustaining life on planets within our solar system and extrasolar systems. Due to the diversity of these conditions, assessing whether planets can remain within the

habitable zone over long timescales is key for understanding whether potentially habitable planets can maintain life-supporting conditions over long time scales. Traditional N-body simulations provide accurate insights into orbital stability but are computationally expensive, and their usage can be limited over these large timescales. This project explores the effectiveness of machine-learning methods, specifically the SPOCK classifier, in predicting long-term orbital stability within planetary systems.
Using simulations generated with the Mercury N-body integrator and analyzed using Python code, this work first investigates varying epoch timescales in the simulation data that SPOCK uses to make a stability score (range 0-1). Additionally, this work explores how stellar metallicity, planetary parameters, and orbital architectures influence stability predictions in simulations with and without a gas giant present.

Presenter – Neal, Matthew
Authors – Matthew Neal, Dr. Kevin Mickus, Ahmed Moamen
Poster # A34
School of Earth, Environment and Sustainability
LOCATION OF ORE DEPOSITS IN NORTHERN MICHIGAN USING GRAVITY AND MAGNETIC DATA
The Marquette Rane Supergroup of northern Michigan contains a complex assemblage of Paleoproterozoic volcano-sedimentary rocks that host significant iron-formation and banded iron formations. This is in part due to multiple phases of tectonism within the formation of the Penokean Orogeny and the foreland. To have a better framework and understand lithological variances across the region, gravity and magnetic data were integrated and analyzed to produce cohesive geophysical interpretations. Bouguer gravity anomalies and magnetic data will be processed using filtering and derivative enhancements for 2-D modeling techniques to delineate density and magnetic susceptibility contrast associated with tectonic features, intrusive bodies and structural discontinuities. We seek to highlight results of anomalies consistent with the Iron formations of the Marquette Range Supergroup as well as other deposits that have been overlooked and could be associated with Rare Earth Elements like Cobalt, Platinum, Palladium, Silver, Gold and Chromium for economic exploration and extraction. Understanding new insights into the tectono-stratigraphic framework of the Marquette Range will also provide more insight and support for ongoing mineral resources mapping efforts in northern Michigan.

Presenters – Mia, Rifat
Authors – Rifat Mia, Moin Uddin Ahmed Babar, Sourav Dhar, Md Emran Hossain, Kartik Ghosh
Poster # A29
Physics, Astronomy and Materials Science
EFFECT OF REDUCTION ANNEALING ON THE STRUCTURAL AND ELECTRICAL PROPERTIES OF ER-DOPED ZNO THIN FILMS
Zinc oxide (ZnO) is one of the most significant functional materials with a wide direct band gap and large exciton binding energy which make it extremely promising. In this study, we

investigate the effects of reduction annealing on the structural and electrical properties of 3% Er-doped Zinc Oxide thin films. The films were deposited on Si/SiO_2-boron-doped p-type substrates under a vacuum pressure of 2.5*10-2 mbar via pulsed laser deposition. X-ray diffraction showed nanocrystalline structures with a favored (002) plane orientation, reduction annealing created highly crystalline hexagonal (Wurtzite) structure with smaller unit cell volume. The hexagonal structure was validated by Raman Spectroscopy. Band gap reduction from 3.37 eV to 3.28 eV was observed using UV-Vis's spectroscopy. Preliminary field effect transistor (FET) measurements indicated that the annealed samples retained their semiconducting behavior, as confirmed by the IDS vs VDS characteristics demonstrating effective structural and band gap tuning through reduction annealing.

Presenters – Dhar, Sourav
Authors – Sourav Dhar, Rifat Mia, Moin Uddin Ahmed Babar, Md Emran Hossain, Kartik Ghosh
Poster # B14
Physics, Astronomy and Materials Science
MOLECULAR LEVEL INVESTIGATION OF ZNO-L TRYPTOPHAN INTERACTIONS USING OPTICAL SPECTROSCOPY
Zinc oxide (ZnO) nanoparticles are significant due to their defect states, which markedly affect optical properties and surface interactions. This study examines the interaction between ZnO nanoparticles and the amino acid L-tryptophan (Trp) in aqueous solution through photoluminescence, UV-Vis absorption spectroscopy, and X-ray diffraction techniques. Photoluminescence results indicate systematic alterations in visible defect emission correlated with elevated Trp content, implying surface adsorption, and defect-state modification. The UV-Vis spectra of ZnO-Trp mixtures are different from those of pure ZnO. This means that there is electronic interaction at the surface level. X-ray diffraction shows that ZnO still has its wurtzite crystal structure after it interacts with Trp. These results indicate that L-tryptophan changes the surface properties of ZnO without changing the bulk crystal phase. This makes this system a useful model for studying nano-bio interfaces. In future research, we will use Raman spectroscopy and photoluminescence that depend on the magnetic field to learn more about how defects change recombination mechanisms.

Presenter – Lopez -Sierra , Juan
Authors – Juan Lopez-Sierra, Melida Gutierrez
Poster # A25
Department: School of Earth, Environment, and Sustainability
A GEOSPATIAL ASSESSMENT OF GROUNDWATER SALINIZATION IN A MULTI-AQUIFER SYSTEM: DURANGO, MEXICO
Groundwater salinization poses a critical environmental concern for water resource sustainability in arid and semi-arid regions. This study evaluates spatial and temporal patterns of groundwater salinity across the state of Durango, Mexico, using total dissolved solids (TDS), sodium adsorption ratio (SAR), as salinity indicators and nitrate-nitrogen

(NO_3–N) as an anthropogenic indicator. Groundwater quality data were obtained from (CONAGUA), a Mexican water agency. To assess salinization variations with respect to time, while minimizing interannual sampling bias, two multi-year sampling periods were selected: 2012-2013, and 2020-2021. Final datasets consisted of 122 wells for 2012–2013 and 131 wells for 2020–2021. Groundwater wells were spatially classified into exorheic (open-basin) and endorheic (closed-basin) hydrologic regions using watershed boundaries in ArcGIS Pro. Spatial distribution maps were generated using Empirical Bayesian Kriging interpolation. Descriptive statistics and Spearman's rho correlation coefficient analyses were applied separately to each hydrologic system and sampling period. Statistical results indicated consistently higher salinity within the endorheic system across both periods. Mean TDS concentrations in the endorheic system increased from approximately 583 mg/L (2012–2013) to 628 mg/L (2020–2021), with maximum values exceeding 2,000 mg/L, whereas the exorheic system maintained lower mean TDS values (≈282–320 mg/L) and maximum concentrations below 750 mg/L. The endorheic system also exhibited stronger positive correlations between TDS and NO_3–N ($\rho = 0.535$ in 2012–2013; $\rho = 0.498$ in 2020–2021), reflecting solute accumulation processes under restricted drainage conditions. In contrast, exorheic systems displayed weak correlations between NO_3–N and TDS (|ρ| < 0.25) and persistent negative correlations between NO_3–N and SAR ($\rho \approx -0.46$ to -0.56). A water chemistry analysis was conducted as part of a hands-on water quality monitoring assessment of three springs in Northwest Arkansas to develop practical experience, as the water chemistry analyses for the Durango were conducted by CONAGUA.

Presenter – Hossain, Md Emran
Authors – Md Emran Hossain, Moin Uddin Ahmed Babar, Rifat Mia, Sourav Dhar, Kartik Ghosh
Poster # B26
PAMS
FABRICATION AND CHARACTERIZATION OF TIN–TIO_2 NANOCOMPOSITE THIN FILMS BY PLD FOR ENHANCED VISIBLE-LIGHT PHOTOCATALYSIS
Titanium dioxide (TiO_2) is a widely studied photocatalyst owing to its chemical stability, earth abundance, and biocompatibility; however, its large bandgap (~3.2 eV) restricts photoactivity to the ultraviolet region, which represents only ~4–5% of the solar spectrum. To overcome this fundamental limitation, this work investigates the fabrication and characterization of TiN–TiO_2 nanocomposite thin films deposited by Pulsed Laser Deposition (PLD) for enhanced photocatalytic applications. Composite targets were prepared by planetary ball-milling TiO_2 (anatase, 99.9%) and TiN (cubic, 99.5%) powders in a 1:1 molar ratio, followed by hydraulic pressing at 3.7 Ton and sintering at 1000°C to achieve a relative density of ≥95%. Films will be deposited onto glass substrates using a KrF excimer laser ($\lambda = 248$ nm, 25 ns pulse) at a fluence of 2–3 J/cm^2 and a repetition rate of 5 Hz, with substrate temperatures maintained between 300–600°C and background oxygen partial pressures of 1–100 mTorr to control phase composition and nitrogen-to-oxygen stoichiometry. Post-deposition annealing at 400–600°C will perform to promote crystallization into the photo catalytically active anatase phase. Structural properties were

analyzed by X-ray diffraction (XRD) and Raman spectroscopy, while surface morphology and elemental composition were examined by field-emission scanning electron microscopy (SEM) with energy-dispersive X-ray spectroscopy (EDX). Optical bandgap energies were extracted from UV–Vis diffuse reflectance spectra via Tauc plot analysis. The TiN component in the heterostructure introduces localized surface plasmon resonance (LSPR) in the visible range (~600–900 nm) and facilitates hot-electron injection into the TiO_2 conduction band, while the TiN/TiO_2 interface establishes a built-in electric field that suppresses electron–hole recombination. The TiN–TiO_2 composite films are expected to exhibit a red-shifted absorption edge with a reduced bandgap of 2.4–2.8 eV and an apparent degradation rate constant more than three times greater than that of bare TiO_2 films. These results demonstrate the potential of PLD-grown TiN–TiO_2 heterostructures for solar-driven photocatalytic applications including wastewater treatment, air purification, and self-cleaning surface coatings.

Presenters – Reiner, Justin
Authors – Justin Reiner, Emilee Dees, Jacklyn White, Santimukul Santra and Tuhina Banerjee
Poster # B41
Chemistry
INVESTIGATING THE ROLE OF GANGLIOSIDES IN INFLUENZA MEMBRANE FUSION USING LIPOSOME-COATED IRON OXIDE NANOSENSORS
Influenza remains a major global public health threat, causing millions of illnesses and hundreds of thousands of deaths annually. Viral entry into host cells is mediated by the surface glycoprotein hemagglutinin (HA), which binds to sialic acid residues on host membranes. This study uses liposome-coated iron oxide nanosensors (LIONs) to mimic host cell membranes and quantitatively measure influenza binding to the membrane and fusion in real time. Membrane binding and fusion are detected through changes in T2 relaxation caused by alterations in water protons near the nanoparticle surface and the results are validated using calcein-liposome fluorescence assays. The gangliosides GM1, GD1a, and GD1b are incorporated into the lipid bilayer to evaluate how differences in the number and arrangement of sialic acid residues affect the interactions driven by hemagglutinin. These findings provide insight into how host membrane composition can influence influenza binding and fusion.

Presenters – Pope-Buss, Riley
Authors – Riley Pope-Buss, Mary Fakunle, Blessing Akintayo, Jake Churchman, Matthew Knoll, Babur Mirza, Aldeyemi Adeleye, Nubia Zuverza-Mena, Jason White, Blaire Steven, Cyren Rico
Poster # B38
Chemistry and Biochemistry
EFFECTS OF PERFLUOROOCTANESULFONIC ACID ON SOYBEAN PERFORMANCE, METABOLOMICS, AND ELEMENTAL COMPOSITION

Perfluorooctanesulfonic acid (PFOS) is a persistent and toxic pollutant in the environment known for bioaccumulating in organisms such as plants. In this study, soybeans were exposed to 0 mg/kg, 25 mg/kg, and 50 mg/kg of PFOS for 131 days in a long-term study and 96 days in a midlife study. An elemental analysis of the soybean roots, leaves, and seeds was conducted from the soybean plants in the long-term study using inductively coupled plasma mass spectrometry (ICP-MS). Furthermore, the metabolite composition of the seeds, biomass, plant height, and PFOS uptake were measured. From the midlife study, lipid peroxidation, chlorophyll content, and enzyme activity (ascorbate peroxidase and catalase) were analyzed. Results showed unaffected or elevated plant growth and no clear sign of oxidative stress in the PFOS-treated soybean plants despite changes in macronutrients such as calcium and potassium in the roots or leaves. The results of the metabolic analysis also showed that there were 44 affected metabolites at both PFOS concentration. 38 of those metabolites had the same trend at both experimental PFOS concentrations, despite only the 50 mg/kg PFOS-treated seeds having accumulated more PFOS and decreased biomass than the control.

Presenters – Burrow, Jenny
Authors – Jenny K. Burrow, Katelin M. Meek, Anthony Moth T. Castagna, Oscar V. Peterson, Ashley N. White, Maev Winchester, Alaina K. Morrissey, James D. Bynum, Caleb S. O'Neal, Andrew L. Thomas, and Avery L. Russell
Oral Presentation – 2-PSU 317A
Department of Biology
AMERICAN ELDERBERRY'S NEXT TOP POLLINATOR: EVALUATING THE ROLE OF ARTHROPODS IN POLLINATION
American elderberry (Sambucus nigra subsp. canadensis) is a woody deciduous shrub native to eastern North America. Despite its long history of use by indigenous peoples for food and medicine and renewed interest in commercialization of American elderberry, its pollination ecology is poorly understood. In this field study, we characterized American elderberry pollination ecology by assessing the (1) identity and abundance of flower visitors, (2) relative importance of visitor taxa to pollen transport, and (3) effect of arthropod visitation on pollination (i.e., fruit set). Diverse arthropods visited elderberry flowers, 40% of which belonged to traditional pollinator taxa. Visitor pollen loads varied considerably, from 0 to > 221,000 elderberry pollen grains. Arthropod families with large elderberry pollen loads also generally had higher quality pollen loads (i.e., greater proportion of conspecific pollen). Arthropod visitation had consequences for pollination success, as attempting to exclude arthropod pollination significantly reduced proportion ripe fruit set, although this pattern differed among cultivars. Altogether, our results indicate arthropods can play a significant role in the pollination ecology of American elderberry.

Presenters – Silwal, Arjun
Authors – Arjun Silwal
Poster # A41
Computer Science

AN AGENTIC DECISION-MAKING FRAMEWORK FOR AUTONOMOUS SURFACE VESSEL COLLISION AVOIDANCE UNDER COLREGS

Autonomous surface vessels (ASVs) operating in shared maritime environments require safe, rule-compliant agentic decision-making under conditions of partial observability, conflicting traffic, and communication uncertainty. This paper presents MARS-Agent (Maritime Autonomous Reasoning System), a decentralized multi-agent framework integrating large language model (LLM) reasoning with deterministic COLREGs enforcement for autonomous surface vessel collision avoidance. Each vessel agent operates a four-stage decision cycle - perception, belief update, threat analysis, and planning - augmented by adaptive memory, AIS-based sensor fusion, inter-vessel negotiation, and hierarchical goal planning. A hard COLREGs guard ensures that LLM-generated decisions can enhance but never weaken the minimum safe maneuver prescribed by Rules 10, 13–17, and 18. The proposed framework was evaluated across 900 simulation runs spanning six scenarios - three simple (crossing, head-on, overtaking) and three complexes (multi-vessel convergence, traffic separation scheme, dense fog) under five ablation conditions. All conditions achieved perfect safety scores across every simple scenario over 30 repetitions. In the traffic separation scheme scenario, mean safety scores ranged from 93.33 to 95.42 across modes, with no pairwise comparison reaching statistical significance after Bonferroni correction (|Cohen's d| ≤ 0.33), attributable to ceiling effects observed in five of six scenarios. MARS-Agent achieved 100% COLREGs compliance and full latency SLA adherence across all standard runs. Mission success rate reached 91.67%, with multi-lane TSS collisions as the primary limiting factor. Circuit breaker activations occurred in 28.33% of runs, of which 76.47% resolved without collision through the COLREGs fallback pathway. Robustness evaluation confirmed complete stability on simple scenarios (CV = 0%, WCS = 100), while fog scenarios exhibited high sensitivity to initial position perturbation (safety degradation: -90 points). These results demonstrate that integrating formal COLREGs rule enforcement with LLM-based contextual reasoning yields a reliable agentic decision-making framework for autonomous surface vessel collision avoidance in routine encounter classes, while complex continuous traffic scenarios remain an open challenge toward IMO MASS Code compliant autonomous systems.

Presenters – Babar, Moin Uddin Ahmed
Authors – Moin Uddin Ahmed Babar, Rifat Mia, Sourav Dhar, Md Emran Hossain, Kartik Ghosh

Poster # B4

Physics, Astronomy and Materials Science

EFFECT OF REDUCTION ANNEALING ON THE STRUCTURAL & ELECTRICAL PROPERTIES OF DY DOPED α-MoO3 THIN FILMS

Molybdenum trioxide (MoO_3) thin films have been gaining interest in research for its optoelectronic and photocatalytic applications. It is mainly because of their tunable bandgap and structural versatility. In this study we analyze the structural, optical and electrical properties of 5% Dysprosium (Dy)-doped MoO_3 thin films. The films were synthesized through Pulsed Laser Deposition (PLD) technique under a vacuum pressure of

10^{-4} mbar on Si/SiO_2 substrates. The films were annealed in H2/Ar (5%/95%) atmosphere for different durations (20 min, 40 min, 2 h). Orthorhombic α-MoO_3 phase was confirmed by X-ray diffraction (XRD) analysis. It also revealed reducing crystallite sizes due to Dy incorporation inducing lattice distortion. Longer annealing time shifted the XRD peaks, which indicates unit cell contraction because of Oxygen vacancy formation. Raman spectroscopy identified characteristic Mo-O vibrational stretching modes at 666 cm^{-1} and bending modes at 818 cm^{-1}. Intensity reductions were observed due to oxygen deficiency. UV-Vis spectroscopy demonstrated bandgap reduction from 3.25 eV to 2.85 eV after 2 h annealing. Reduction annealing facilitates the formation of oxygen vacancies, thereby modulating carrier concentration and resulting in a significant improvement in electrical conductivity by several orders of magnitude. Despite this notable increase in conductivity, preliminary field-effect transistor (FET) measurements indicate the material retains its semiconducting behavior, and further investigations are underway. Photoluminescence spectra revealed Dy^{3+}-related emissions at 480 nm and 575 nm, with quenching effects observed at longer annealing times due to non-radiative recombination at defect sites. These findings demonstrate that controlled reduction annealing enables precise tuning of MoO3: Dy's optoelectronic properties for applications in nanoelectronics and optoelectronic applications.

Presenters – Toth, Marcell
Authors – Marcell Toth, Dr. Tasnuba Jerin
Poster # A45
School of Earth, Environment and Sustainability
SPATIAL PATTERNS OF SINKHOLES IN KARST-DOMINATED WATERSHEDS AND THE INFLUENCE OF GEOMORPHIC AND WATERSHED PROPERTIES
Sinkholes are characteristic enclosed depressions with internal drainage connecting the surface and subsurface karst hydrologic system. Their morphological evolution involves gradual subsidence of the ground surface and often hazardous collapses. Therefore, understanding sinkhole morphometry and linked spatial distribution is critical for managing geohazards in karst watersheds. Sinkhole occurrence shows spatial variability based on watershed geomorphological attributes, surficial hydrological patterns, hydrogeological and geological settings. The aim of this research is to investigate morphometric properties and distribution of sinkholes in the carbonate karst-dominated lands of Mark Twain National Forest in Missouri, USA. The specific objectives were to (1) identify sinkhole clusters based on their morphometry; (2) define the morphometric characteristics and the evolutionary trajectory of the sinkhole clusters; (3) linking the identified sinkhole clusters with geomorphic and watershed drainage properties. A sequence of geospatial and statistical analysis was conducted using intrinsic and extrinsic variables collected for sinkholes. K-means clustering method was used to develop sinkhole clusters. Clusters were then investigated using Classification & Regression Tree (CART) algorithm to analyze their characteristics. Multinomial Logistic Regression was used to select the most important geomorphic and drainage properties that shape sinkholes. The results identified four distinct morphometric clusters. Cluster-1 and 3 show strong spatial

dependence within each cluster across the study area. Cluster-1 was identified as uvalas, which are large order-of-magnitude karst depressions with valley-like features. Cluster-3 includes medium-sized deep sinkholes, formed by cover collapses and subsequent degradation. Cluster-2 includes medium-sized shallow subsidence sinkholes, while Cluster-4 contains the smallest, circular solution sinkholes with uniform occurrence pattern and minimal management concerns. These four classes of sinkholes also provide insights into the evolutionary trajectory of sinkholes in the study area. This research, identifying sinkhole clusters, contributes to our understanding by mapping geohazard prone locations requiring attention for management.

Presenters – Trujillo, Carly
Authors – Carly R. Trujillo, Giorgia G. Auteri
Oral Presentation – 2-PSU 315A
Biology
EXPLORING FACTORS MEDIATING WHITE-NOSE SYNDROME ADAPTATION IN LITTLE BROWN BATS
The little brown bat (*Myotis lucifigus*) has experienced drastic population declines across North America due to the recent disease white-nose syndrome (WNS). Previous studies have identified putatively adaptive alleles (PAAs) that may give individuals a greater likelihood of survival. But there may be energetic trade-offs between disease survival and reproductive output that could impact long-term survival. To evaluate these trade-offs, I screened young-of-the-year (YOY) bats from five disparate populations for the previously identified PAAs; PAAs were also screened for phenotypes that may be related to reproductive output. I found PAAs are typically present in YOY at similar or greater frequencies compared to historical populations, there is no overall geographic structuring of adaptation, and PAAs associated with potential reproductive issues were found less often among YOY compared to other PAAs. These results suggest that genetically adapted survivors are reproducing, but their adaptation may have come at the cost of reduced reproductive output. I hope this study can inform management and conservation decisions for little brown bats across their range by identifying where and to what extent populations are adapting to WNS.

Presenters – Conwell, Tanner
Authors – Tanner L. Conwell, Debra S. Finn
Poster # B10
Biology
SEASONAL EMERGENCE PATTERNS OF DIVERSE MAYFLIES, STONEFLIES, AND CADDISFLIES IN TWO INTERMITTENT HEADWATER STREAMS
Streams provide energy subsidies to terrestrial ecosystems via emergent aquatic insects, which predators rely on during low terrestrial arthropod prey, like winter and early spring. However, most studies are on perennial streams, not intermittent streams. We quantified seasonal emergence patterns of mayflies, stoneflies, and caddisflies (MSC) from two zero-order intermittent streams in the Ozarks. Fish colonize one of the streams during floods,

and the other stream is fishless. We deployed Malaise and emergence traps during 6 two-week periods spanning the four intermittent stream seasons to collect emergent insects. From both streams we documented 25 species (14 stoneflies, 11 caddisflies) and 8 morphospecies (8 mayflies). MSC abundance increased through the full flow season, peaking in June. Malaise traps captured 64% of ~2300 emergent individuals, including 487 winter stoneflies in February. Interestingly, the stream with fish produced >2X the abundance, largely due to mayflies, whereas the fishless stream had more species (25 vs 23). These results show that small intermittent streams provide substantial seasonally important subsidies, emphasizing their conservation value.

Presenters – Munyithya, Ruth
Authors – Ruth Munyithya, Dr Santra Santimukul
Poster # A31
Chemistry and Biochemistry
DESIGNER DENDRITIC POLYMERS AS DRUG DELIVERY SYSTEMS: TARGETED DRUG DELIVERY AND TREATMENT OF LUNG CANCER
"The clinical use of anticancer drugs is limited mainly by their hydrophobic nature, which often leads to low bioavailability and poor retention in systemic circulation. Lung cancer is the leading cause of death among all cancer-related deaths, according to the American Cancer Society in 2022, lung cancer accounts for 1 in every 5 deaths. Clinically, it's divided into 2 major groups: small cell lung cancer (SCLC)-15% and non-small cell lung cancer (NSCLC)-85%. Although extensive research has been conducted on targeted drug delivery systems for cancer therapy, effectively delivering hydrophobic drugs to tumor cells remains a significant challenge. Clinicians rely on linear polymer-based drug delivery systems, which are limited because of their lower solubility and drug loading capacity. To overcome these issues, we designed and synthesized a novel amino acid-based hyperbranched polymer for targeted delivery of hydrophobic anticancer drugs using an AB_2-type monomer system, which was designed using beta alanine, ethyl acrylate, and ethylene glycol. The monomer design enables the formation of higher-molecular-weight polymers with well dendritic structures and hydrophobic cavities, thereby enabling efficient encapsulation of poorly water-soluble therapeutic agents. We characterized the polymer using various analytical techniques, including NMR, FT-IR, DSC, TGA, and GPC, which confirmed its dendritic architecture, thermal stability, and amorphous nature, making it suitable for drug delivery. After characterization, we developed theranostic nanoplatforms via a one-pot solvent diffusion method to co-encapsulate hydrophobic drugs such as taxol and doxorubicin. For targeted delivery to lung cancer (A549) cells, we functionalized the surface of the polymeric nanoparticles with folic acid to improve cellular uptake. The therapeutic potential of the system was evaluated through in vitro studies, including cytotoxicity, cellular internalization, and apoptosis assays. The results showed enhanced drug delivery, increased uptake by cancer cells, and improved therapeutic effectiveness compared to non-targeted systems, which suggests that the synthesized dendritic polymer is a promising carrier for hydrophobic anticancer drugs, providing better biocompatibility, stability, and targeted treatment for cancer.

Presenters – Mia, Md Shetu
Authors – Md Shetu Mia, Professor Dr. Kartik C. Ghosh
Poster # B33
Department of Physics, Astronomy and Materials Science
DEVELOPMENT AND FABRICATION OF MnO2-BASED ZINC-ION BATTERIES AS GREEN AND LOW-COST ALTERNATIVE TO LITHIUM-ION BATTERY Sy
The prime concern of our research was to develop a green and sustainable method energy storage system using MnO2-based zinc-ion batteries (ZIBs) as a low-cost and safer alternative to conventional lithium-ion battery technologies. The MnO2 based cathode was fabricated by making a homogeneous slurry, using polyvinylidene fluoride (PVDF) as the binder, and N-methyl-2-pyrrolidone (NMP) as the activator solvent. Then, the slurry was uniformly coated onto Cu foil and dried to form the working electrode. Zn metal foil was used as the anode, while an aqueous ZnSO4 electrolyte was used to ensure efficient ion transport within the cell. The morphological, structural, and compositional analysis of the development cathode were investigated using scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). Also, Electrochemical performance of the ZIBs was evaluated through cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) to evaluate charge storage characteristics, charge transfer resistance, redox activity. The research aims to achieve improved power density, energy density, and cycling stability with enhanced safety and environmental compatibility. The results show that MnO2-based ZIBs exhibit significant electrochemical properties and performance, demonstrating their potential as sustainable and cost-effective alternatives to Li-ion batteries for future energy storage applications.

Presenters – Davis, Jackson
Authors – J. Davis, I. Qureshi, B. Edwards, M. Owen, B. Mirza
Oral Presentation – 1-PSU 308C
Biology
IDENTIFYING AND TRACKING FECAL COLIFORM CONTAMINATION AND WATERBORNE PATHOGENS WITHIN MISSOURI SURFACE WATERS
This study aimed to evaluate fecal contamination sources, waterborne pathogens, and the microbial community dynamics within The Blue River, Pearson Creek, and The James River—all classified as 303(d) impaired waters for Escherichia coli contamination. Employing IDEXX testing, host-specific qPCR, and 16S rRNA gene sequencing, we identified human-associated Bacteroides markers in urbanized sites within The Blue River and Pearson Creek, and bovine-specific markers in The James River, reflecting localized agricultural activity. Within The Blue River, high abundances of fecal associated ASVs were observed with temporal variance. While The Blue River's contamination was determined to be from wastewater overflow at a nearby facility, Pearson Creek's contamination is believed to be from aging sewer infrastructure in nearby neighborhoods. Significant spatial structuring of bacterial communities highlights the prevalence of potential pathogens, *Aeromonas caviae* and *Legionella spp*., particularly in Pearson Creek and The James River.

These findings underscore the utility of using molecular and culture-based methods for microbial source tracking and advocate for site-specific remediation strategies based on land use and contamination profiles.

Presenters – Nath, Pronob Deb
Authors – Pronob Deb Nath, Saibal Mitra, Daniel A. Moreno-German
Poster # A33
Physics, Astronomy and Materials Science
AN INTEGRATED DFT–MD–PLD FRAMEWORK FOR ENGINEERING Si–GE THIN FILMS FOR ENERGY AND ELECTRONIC APPLICATIONS
This work presents an integrated multiscale framework combining density functional theory (DFT), molecular dynamics (MD), and pulsed laser deposition (PLD) to rationally engineer Si–Ge thin films for advanced energy and electronic applications. DFT calculations are employed to predict lattice parameters, strain-dependent stability, and electronic structure across $Si_{1-x}Ge_x$ compositions, providing a theoretical foundation for identifying optimal alloy ratios and guiding target stoichiometry. MD simulations capture plume–substrate interactions and early-stage nucleation under PLD-relevant conditions, enabling detailed insight into adatom mobility, film densification, and the development of nanoscale disorder. Guided by these predictions, Si–Ge thin films are deposited under systematically varied substrate temperatures, laser fluences, and background pressures to evaluate their structural and electronic responses. X-ray diffraction is used to assess crystallinity, lattice strain, and alloy formation, while UV–Vis spectroscopy reveals optical bandgaps that align with DFT-predicted trends. Electrical measurements further correlate microstructural evolution with charge-transport behavior. The combined computational–experimental approach establishes clear process–structure–property relationships, enabling the controlled tuning of Si–Ge thin-film performance. This integrated framework demonstrates a scalable path toward the design of Si–Ge materials optimized for next-generation electronic devices and energy-relevant systems.

Presenters – Jarrett, Bryce
Authors – Bryce F. Jarrett and Brian D. Greene
Oral Presentation – 2-PSU 308C
Biology Department
VARIABLE PREY HANDLING BEHAVIORS AND THE EFFECTS OF BODY TEMPERATURE ON POST-STRIKE PREY TRAILING IN COTTONMOUTHS
The foraging strategy of vipers is typically characterized by a sequence of behaviors known as strike-induced chemosensory searching (SICS). During SICS, prey are struck, envenomated, released, and followed via an odiferous trail. Trailing is facilitated by increasing the tongue flicking rate (TFR). Depending on the prey type, vipers may choose alternative prey-handling behaviors. Additionally, there are no studies examining the accuracy of post-strike scent trailing in relation to body temperature. I conducted two experiments: one offering northern cottonmouths (Agkistrodon piscivorus) three different ecologically relevant live prey types, and one measuring the accuracy of SICS in

cottonmouths after striking mice at three different body temperature conditions. Harmless and un-trailable prey types were held post-strike and consumed alive while mice tended to be released post-strike and were consumed dead. Post-strike TFRs were lower at lower body temperatures, but body temperature did not significantly impact trailing accuracy during SICS. These findings provide insight into the dynamic foraging behaviors of pit vipers and offer a greater understanding of how body temperature impacts their foraging ecology.

Presenters – Galib, Mohammad
Authors – Mohammad Galib, Moupia T. Oyshi, Robert A. Mayanovic
Poster # B16
Physics, Astronomy, and Materials Science
SYNTHESIS OF NOVEL NIO@〖MN〗_X 〖CR〗_(3-X) O_4 CORE-SHELL NANOPARTICLES
Core-shell nanoparticles, having an antiferromagnetic (AFM) core and a ferromagnetic (FM) or ferrimagnetic (FiM) shell, are of considerable current interest due to the tunability of their magnetic properties. To our knowledge, the NiO@〖Mn〗_x 〖Cr〗_(3-x) O_4 core-shell nanoparticles have not yet been synthesized. In this study, we hypothesize for the synthesis of NiO@〖Mn〗_x 〖Cr〗_(3-x) O_4 core-shell nanoparticles using NiO as the core and overgrowth of 〖Mn〗_x 〖Cr〗_(3-x) O_4 spinel nanophase can be accomplished using the hydrothermal method. Following the synthesis of NiO nanoparticles using thermal decomposition, 〖Mn〗^(2+) and 〖Cr〗^(3+)salts were mixed in a 1:2 ratio with the NiO NPs in a hydrothermal autoclave and kept at 200 ℃ for 22h. Afterwards, the resultant nanoparticles were centrifuged and dried for XRD, SEM, and EDS analysis. To study the overgrowth of 〖Mn〗_x 〖Cr〗_(3-x) O_4 regular spinel (when x=1) structure or inverse spinel structure (when x=2), both pH dependent and concentration dependent synthesis was carried out. From Rietveld refinement analysis, formation of regular tetragonal distorted spinel phase is favorable at lower pH value whereas inverse spinel structure is favored at higher pH value. On the other hand, synthesis at variable metal salt concentration (0.08 to 0.12M), lower amounts of overgrowth occurred whereas saturation of overgrowth phases occurred at 0.12M concentration.

Presenters – Oyshi, Moupia Tajrin
Authors – Moupia Tajrin Oyshi, Mohammad Galib, Abhishu Chand, Madi Frerichs, F. Sheridan, K. Kim, R. Mayanovic
Poster # A36
Physics, Astronomy, and Materials Science
SYNTHESIS AND CHARACTERIZATION OF O-CARBOXYMETHYL CHITOSAN NANOPARTICLES FOR TARGETED DRUG DELIVERY IN CANCER CELLS
Doxorubicin (DOX) is a common chemotherapy agent used in the treatment of a wide range of cancer cells. A major limitation of this drug is its inability to distinguish between malignant and normal cells, which can lead to systemic toxicity and decreased efficacy. Polymer-based delivery systems are a good way to improve chemotherapy efficiency and decrease the side effects. Chitosan, which is a biopolymer derived from crustacean chitin, has excellent biodegradability suitable for drug transport. Our objective is to investigate

whether loading DOX to O-carboxymethyl chitosan (OCM) nanoparticles (OCM-NPs) covalently will contribute to drug stability and release in a controlled manner. To further optimize the system, folic acid is conjugated and used to target folate-receptor-positive cells (i.e., HeLa cells). In addition, polyethylene glycol (PEG) and an adjuvant (77KS) are used to enhance the stability of nanoparticles. The nanoparticles are being synthesized through the ionic gelation technique, and their characteristics are being studied with the help of FTIR, XRD, SEM, and DLS. Lastly, culture studies based on XTT assays on HeLa and HepG2 cells will determine which formulation of OCM-NPs causes the maximum reduction in the viability of cancer cells.

Presenters – Faruqui, Zubair
Authors – Zubair Faruqui, Rahul Dubey
Oral Presentation – 2-PSU 312C
Computer Science
IMPROVING CLINICALLY ALIGNED DISEASE LOCALIZATION VIA EXPLANATION-AWARE TRAINING AND QUANTITATIVE ANALYSIS
Deep neural networks for medical image diagnosis achieve high accuracy but often lack interpretability, limiting clinical trust. This work aims to improve model transparency by encouraging models to localize disease-relevant regions more accurately during training through multiple loss formulations and by quantitatively analyzing the resulting improvements in explanation quality. An explanation-aware training framework is proposed that augments binary cross-entropy by penalizing model attention outside expert-annotated disease regions. Results show that stronger supervision produces more focused and clinically meaningful localization, albeit with reduced spatial coverage. Increasing the explanation loss weight introduces a trade-off between broader coverage and concentrated saliency. Additionally, logit-based loss formulations outperform probability-based alternatives. These findings demonstrate that explanation-aware training leads to more clinically aligned localization of disease regions while maintaining predictive performance.

Presenters – Gichuru, Caroline
Authors – Caroline Gichuru, Mephalyne Ombasa, Tuhina Banerjee and Santimukul Santra
Poster # A14
Chemistry and Biochemistry
DEVELOPING MAGNETO-NANOCERIA AS A MULTIMODAL NANOZYME FOR POINT-OF-CARE DETECTION OF CANCER BIOMARKERS
Early and accurate detection of cancer biomarkers is critical for the diagnosis and detection of carcinomas. Prostate specific antigen (PSA) remains a key biomarker for early detection and monitoring of prostate cancer. According to the National Cancer Institute, there were an estimated 313,780 new prostate cancer cases and 35,770 deaths in the United States in 2025.Conventional methods such as Enzyme linked immunosorbent assay (ELISA), electrochemiluminescence assay (ECLA), chemiluminescence assay (CLIA), and radioimmunoassay (RIA) are widely used due to their sensitivity and reliability. However,

they are often limited by long assay time, high cost of operation, dependence on complex instrumentation, and lack of portability. Recent studies have explored the use of nanoparticles as nanozymes for enhancing point-of-care-detection of disease biomarkers through their enzyme-mimetic catalytic activities for sensitive and rapid signal generation. In this study, a novel dual functional nanozyme, magneto-nanoceria (MnC), is developed for rapid detection of prostate specific antigen (PSA). This is by bringing together the magnetic properties of iron oxide nanoparticles, redox properties of cerium oxide nanoparticles, and together the synergistic enzyme-mimetic catalytic activity of MnC. The synthesized Mnc exhibits peroxidase-like activity which allows it to oxidize 3,3'5,5' tetramethylbenzidine (TMB) in the presence of hydrogen peroxide. This color change was used in an ELISA base detection system through the specific interaction between PSA antigen and antibody. In addition, the magnetic properties of MnC were also used for T2 relaxation-based detection, providing another method for sensing the biomarker. By combining antibody-antigen recognition, colorimetric signal generation, and magnetic detection, this platform shows strong potential for point-of-care cancer biomarker.

Presenter – Churchman, Jacob
Authors – Jacob Churchman, Dr. Cyren Rico, Mary Fukunle
Poster # A8
Chemistry and Biochemistry
DEVELOPING THE METHOD FOR DETECTION OF ATRAZINE AND DEGRADATION PRODUCTS IN WATER SYSTEMS USING LC-MS AND SPE
Atrazine is a widely applied herbicide that is frequently detected in groundwater, spring systems, and hydrologically connected surface waters due to its persistence and mobility in subsurface environments. Its transformation product desethylatrazine is of particular importance, as it is often more persistent and serves as indicators of long-term transport and degradation in aquatic systems. This study focuses on the development and validation of a sensitive analytical method for the detection of atrazine and desethylatrazine in environmental waters, with particular emphasis on method optimization to support future analysis of field-collected samples. A solid phase extraction (SPE) protocol was established to preconcentrate analytes from aqueous matrices, followed by analysis in liquid chromatography–mass spectrometry (LC–MS), with instrumental and optimized extraction parameters for improved sensitivity, reproducibility, and matrix tolerance. Simulated environmental samples were prepared using a commercial atrazine herbicide () at 2.5 and 5 ppb to evaluate method performance under environmentally relevant conditions, while a calibration curve was constructed across 2.5, 5, 10, and 25 ppb to establish linearity and quantitative reliability. A d5-atrazine internal standard was introduced in all calibration standard solutions to verify extraction efficiency, confirm the absence of contamination, and ensure that method optimization and instrument performance were functioning as intended. Calibration performance, recovery, limits of detection, and limits of quantification were evaluated to characterize analytical capability at low concentrations. The developed SPE–LC–MS method demonstrated reliable detection of atrazine at low ppb levels with strong reproducibility and effective analyte recovery, providing a robust and validated

framework for the analysis of groundwater, spring water, and related aquatic systems. This work establishes a methodologically focused foundation for future environmental monitoring efforts and supports improved detection of atrazine and its transformation products in vulnerable water resources.

Presenters – Moul, Tabitha
Authors – Tabitha E. Moul, N. Edge, Anthony M. T. Castagna, Charlotte C. Davis, Rita N. Afagwu, Leo P. Carpenter, Success C. Ekemezie, Jenny K. Burrow, Maev Winchester, James D. Bynum, Ashley N. White, Kierstin C. I. Howard, Avery L. Russell
Poster # B36
Biology
INTRASPECIFIC COMPETITION IS THE PRIMARY
DRIVER OF RESOURCE PARTITIONING AMONG PRAIRIE BUMBLE BEES
Diverse species often coexist in sympatry by engaging in resource partitioning, which occurs when different species that would otherwise share the same resources instead specialize on non-overlapping subsets. Resource availability and competition within and between species are thought to be major drivers of resource partitioning, particularly among generalist animals. Yet whether these drivers simultaneously influence resource partitioning in generalist pollinators such as bumble bees remains unknown. In this field study we assessed resource partitioning of pollen host plants by bumble bee species across 12 remnant tallgrass prairies in southwest Missouri using Roughgarden's WIC/TNW index. To assess competition and resource availability, we characterized bumble bee and flower abundance and richness at each prairie. We found that all six recorded bumble bee species engaged in resource partitioning. Across bee species, resource partitioning increased as intraspecific competition increased. This was likely a result of high bee population sizes across prairies. However, competition had a much stronger effect than resource availability, which might suggest that overall floral abundance does not strongly correspond to the abundance of floral host taxa. Interspecific competition did not influence resource partitioning, likely because there was comparatively little variation in bumble bee species richness among prairies and the same two species constituted the majority of individuals, likely further reducing the effect of among-prairie variation in bee richness. Our work provides rare empirical evidence of resource partitioning by pollinators and suggests that intraspecific competition may be the primary driver of resource partitioning.

Presenters – Altman-Orbach, Marxe
Authors – Marxe Altman-Orbach, Giorgia G. Auteri
Oral Presentation – 1-PSU 308C
Biology
GENOMIC SIGNATURES OF DECLINE AND RECOVERY IN AN ENDANGERED BAT, MYOTIS GRISESCENS
Tremendous population declines may result in the loss of genetic diversity, which can, in turn, lead to reduced phenotypic health, reduced adaptive potential, and further population declines. In other words, a severe demographic decline may ultimately lead to an extinction

vortex. Therefore, understanding genetic diversity is vital for assessing the health of species that have undergone declines, and can even reflect the effectiveness of management actions. I investigated signatures of genetic bottlenecks in the gray bat (Myotis grisescens), a species that has been the subject of focused management efforts since its 1976 listing as endangered in the US. I used whole genome sequencing to calculate genetic diversity metrics, including inbreeding coefficients, Tajima's D, and heterozygosity, and to infer effective population size and structuring. I found a loss of rare alleles and heterozygosity excess, in line with strong declines in relative abundance of the census population. However, I did not detect inbreeding, increase of population substructure, or low effective population size. Despite an apparent bottleneck, the gray bat appears to have avoided detrimental genetic consequences associated with population declines, likely due to the conservation of connected populations of adequate effective size. My findings highlight the importance and effectiveness of timely conservation interventions for preserving the genetic health of species. Strong declines in relative abundance (i.e., based on percentage of the initial population) do not necessarily lead to inbreeding when there is still adequate absolute abundance (i.e., number of individuals).

Presenters – Saini, Ravindra
Authors – Ravindra Kumar, Saini, Yassine Belkhouche
Poster # A39
Department of Computer Science
CHARACTERIZING MISCLASSIFIED IMAGES TO ENHANCE DEEP LEARNING–BASED STEGANALYSIS
Images are widely used as a cover medium for concealing and transmitting hidden messages due to their rich data characteristics and the difficulty of detecting subtle modifications. Previous studies indicate that deep learning–based steganalysis models can effectively detect embedded hidden information in some images, while others are more challenging to detect. This work proposes a framework for systematically characterizing misclassified images to improve detection performance. A pre-trained deep learning model is used to identify misclassified image samples, and their feature distributions are analyzed to uncover patterns associated with detection failure. We extract complementary image descriptors—Histogram of Oriented Gradients (HOG), entropy, and lacunarity—to capture structural, statistical, and textural properties, and use them to group images with similar characteristics. This characterization enables the targeted prioritization of challenging image samples during training, facilitating the development of more robust and accurate steganalysis models.

Presenters – Braun, Emma
Authors – Emma Braun, Mileah Metcalf, Kyoungtae Kim
Oral Presentation – 2-PSU 308C
Biology
INVESTIGATION OF THE TOXIC EFFECTS OF TIRE ANTIOZONANTS, 6PPD AND 6PPDQ, ON SACCHAROMYCES CEREVISIAE

N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine or 6PPD is a tire coating that prevents the degradation of rubber bonds. When introduced to atmospheric ozone, 6PPD oxidizes to 6PPD-Quinone (6PPDq). Both 6PPD and 6PPDq have been found in road water runoff, dust particles, and various rubber products. The discovery of the toxicological effects of 6PPD and its quinone derivative is new and not thoroughly understood. Understanding the underlying toxic mechanism in various model organisms is essential to further our knowledge base and help establish regulations on the use of these chemicals. 6PPD and 6PPDq were tested for toxicity in Saccharomyces cerevisiae yeast. The yeast cell viability, after 6 hours, showed a stepwise decrease when exposed to 6PPD. When exposed to 6PPDq the optical density for the yeast increased in a stepwise manner. Mitochondrial staining was assessed for 6PPD. The fluorescence intensity of treated cells compared to the non-treated control showed a significant decrease, indicating a reduction in mitochondrial activity. RNA sequencing indicated that oxidative phosphorylation KEGG pathway genes were downregulated for 6PPD and 6PPDq. 6PPD caused an upregulation in pyruvate metabolism while 6PPDq caused an increase in starch and sucrose metabolism. Future studies will focus on ATP generation and RT-qPCR.

Presenters – Ghaderibarmi, Fatemeh
Authors – Fatemeh Ghaderibarmi[1], Takehiro Kado[1]
Poster # B19
Biology Department
INVESTIGATING DIBUCAINE-ANTIBIOTIC ADJUVANT THERAPY TO IMPROVE INTRACELLULAR MYCOBACTERIUM AVIUM CLEARANCE
Mycobacterium avium complex (MAC) infections represent a growing clinical challenge due to their ability to persist within macrophages, prolonged treatment regimens, high relapse rates, and increasing antibiotic resistance. Conventional therapies often fail to achieve complete bacterial clearance, highlighting the need for novel adjunctive or host-directed treatment strategies. Emerging evidence suggests that certain anesthetic-associated compounds may possess unexpected antimycobacterial activity.
This study investigates the potential of dibucaine, alone, and in combination with antibiotics, to reduce mycobacterial viability and enhance intracellular clearance. Previous work in the pathogenic model organism Mycobacterium abscessus demonstrated that dibucaine, both as a single agent and in combination with antibiotics, exhibited low minimum inhibitory concentrations (MICs), indicating strong antibacterial activity. Building on these findings, the current work extends this approach to the clinically relevant pathogen M. avium. Ongoing experiments assess bacterial susceptibility using MIC assays and evaluate intracellular survival following infection of RAW264.7 macrophages treated with dibucaine, antibiotics, or their combinations. In parallel, macrophage immune responses are being examined by measuring cytokine production, including IL-6, to determine whether treatment modulates host antimicrobial activity. Together, this work aims to define whether dibucaine-based combination strategies can enhance macrophage-mediated clearance of intracellular M. avium. These findings may provide a foundation for developing supportive therapies to improve outcomes for chronic MAC infections.

Presenters – Abusaqer, Mahmoud
Authors – Mahmoud Abusaqer, Jamil M Saquer
Poster # B1
Computer Science
MULTICLASS HATE SPEECH DETECTION: EVALUATING 303 CONFIGURATIONS ACROSS TRADITIONAL ML, DEEP LEARNING, AND TRANSFORMERS
Multiclass hate speech detection across demographic categories remains challenging due to implicit targeting strategies and linguistic variability in social media content. This study provides an evaluation of 303 model configurations across three methodological paradigms: traditional machine learning (147 configurations), deep learning with pre-trained embeddings (144 configurations), and transformer models (12 implementations). Using 39,747 tweets spanning five demographic hate speech categories (age, ethnicity, gender, religion, other hate), we conducted 5-fold cross-validation to establish performance benchmarks across all approaches.
Results reveal a clear performance hierarchy with RoBERTa achieving 95.02% accuracy and 95.04% weighted F1-score, followed by Word2Vec-enhanced InceptionCNN at 94.31% accuracy and 94.35% F1-score. Traditional machine learning demonstrates exceptional efficiency, with SGDClassifier achieving 94.10% accuracy and 94.17% F1-score in only 11.5 seconds for a complete cross-validation cycle. Gender-based and other hate speech categories prove most challenging across all methodologies, exhibiting distinct linguistic patterns that complicate automated detection. These findings provide empirical guidance for developing scalable hate speech detection systems capable of fine-grained demographic targeting identification.

Presenters – Bebensee, Kaitlyn
Authors – Kaitlyn J. Bebensee, Sean P. Maher
Oral Presentation – 1-PSU 312C
Department of Biology
COMMUNITY COMPOSITION AND DIETARY ANALYSES OF DOMINANT SMALL MAMMALS IN SOUTHWESTERN MISSOURI PRAIRIES
Land alterations can reduce the amount of suitable habitat necessary for persistence of an associated species. Within such constrained habitats, limited resources may elicit competition, which could cause shifts in abundance and occurrence of species. Missouri prairies have been declining in size, making it imperative to collect reference data on mammal populations. For this study, I trapped small mammals in Southwestern Missouri prairies because they can be indicators of environmental health and can vary in abundance between prairies. I focus on the diet of the two dominant small mammals, Peromyscus maniculatus and Microtus ochrogaster, and assess evidence of competition. To study such interactions, I used stable isotope analysis to reveal the trophic niche of individuals and compare resource consumption across species and locations. I show that P. maniculatus and M. ochrogaster are not in competition for food resources and do not consume similar diets. I found the presence of M. ochrogaster does not change the size or position of P. maniculatus' tropic niche breadth. At the end of the spring season, P. maniculatus had a broad, non-

overlapping niche breadth to that of M. ochrogaster, who consumed a less diverse diet. There were no shifts in niche breadth across years. My results provide insight into small mammal interactions and document species food consumption in Missouri prairies. Land managers can use these results to monitor shifts in small mammal populations and ensure vegetation needed for species coexistence is included in prairie restoration efforts.

Presenters – Mostafiz, Kaiser
Authors – Kaiser Mostafiz, Tasnuba Jerin, Ranbir S. Kang
Oral Presentation – 1-PSU 315A
School of Earth, Environment and Sustainability
SPATIAL PATTERNS OF FLOOD MAGNITUDE CHANGE ACROSS THE LOWER MIDWEST (1960–2020)
The Lower Midwest has experienced several major floods in recent decades, including the events of 1993, 2011, and 2019, which caused extensive damage to agriculture, infrastructure, and communities across Iowa, Nebraska, Kansas, and Missouri. These repeated large flood events highlight growing concerns that flood magnitudes have increased in recent decades, posing significant impacts on river systems, surrounding landforms, and regional communities. This research investigates long-term changes in flood magnitude and frequency across the Lower Midwest of the United States, focusing on Kansas, Iowa, Nebraska, and Missouri. Annual peak streamflow data from 1,452 U.S. Geological Survey (USGS) gaging stations spanning 1960–2020 were obtained from the National Water Information System (NWIS). After quality control and data screening, 191 stations with continuous records were retained for analysis. Flood frequency analysis was conducted using L-moments with the Log-Pearson Type III distribution following USGS Bulletin 17C guidelines to estimate flood magnitudes for standard recurrence intervals (2-, 5-, 10-, 25-, 50-, and 100-year events).Comparative analysis between two climatic periods (1960–1990 and 1991–2020) reveals a regional shift toward higher-magnitude flooding. Smaller floods (Q2–Q10) have declined in frequency since the early 1990s, while larger floods (Q50–Q100) have become more frequent, suggesting increasing vulnerability to extreme hydrological events across the region. Based on this dataset, a spatial clustering analysis using k-means was conducted to identify regions with similar flood-response patterns. The clustering results reveal three distinct hydrologic regimes that represent different combinations of increasing extreme floods, declining smaller floods, and mixed responses. These spatially coherent clusters highlight that flood regime shifts across the Lower Midwest are not uniform but vary regionally across watersheds and river systems. Together, these findings provide new insight into how flood regimes are evolving across the Lower Midwest under changing hydroclimatic conditions and demonstrate the value of combining flood frequency analysis with spatial clustering approaches for regional flood risk assessment.

Presenters – Akano, Busayo
Authors – Busayo Akano, Rahab Kanogo, Nyabayo Tony, Tuhina Banerjee
Poster # B2

Department of Chemistry and Biochemistry
EFFECT OF PEGYLATED GOLD NANOPARTICLES ON ALPHA-SYNUCLEIN FIBRILLATION
Parkinson's disease is a neurodegenerative disorder associated with the misfolding and aggregation of α-synuclein into amyloid fibrils that accumulate in Lewy bodies, a pathological hallmark of the disease. α-Synuclein aggregation occurs through a nucleation-dependent fibrillation mechanism involving oligomeric intermediates that are considered more toxic than mature fibrils due to their ability to disrupt cellular membranes and impair neuronal function. Nanoparticles have been reported to influence protein aggregation by interacting with aggregation-prone regions and altering fibrillation kinetics.
In this study, the effect of PEGylated gold nanoparticles on α-synuclein fibrillation was investigated. Gold nanoparticles were functionalized with thiolated polyethylene glycol to improve colloidal stability and regulate protein–nanoparticle interactions. The nanoparticles were synthesized and characterized, and their interactions with α-synuclein were analyzed using SDS-PAGE, circular dichroism spectroscopy, surface plasmon resonance, and molecular dynamics simulations. Results indicate that PEGylated gold nanoparticles modulate α-synuclein aggregation in a manner dependent on nanoparticle concentration and PEG surface properties.

Presenters – Fahad, Md Abdur Rahman
Authors – Md Abdur Rahman Fahad, Dr. Razib Iqbal
Poster # B15
Computer Science
ADAPTIVE SMART-HOME ACTUATION WITH RESOURCE-EFFICIENT TRANSFORMERS
Smart environments generate continuous streams of sensor and actuator events that reflect occupant behavior and environmental context. Learning meaningful relationships from these heterogeneous event streams is essential for enabling adaptive automation without relying on manually defined rules. This work presents a data-driven framework for predicting actuator state changes by modeling temporal dependencies within sensor-actuator event sequences. The proposed approach employs Transformer-based sequence modeling to capture complex contextual interactions among multiple sensors and actuators in smart environments. To improve contextual awareness, we introduce an Actuator State Embedding, which explicitly encodes the states of other actuators within the input representation. This allows the model to learn how devices influence each other when making future actuation decisions. In addition, we design resource-efficient Transformer architectures that significantly reduce parameter count and computational cost while maintaining strong predictive performance, enabling deployment on resource-constrained edge devices (such as home hubs or embedded controllers). The framework is evaluated across multiple real-world smart environment testbeds with diverse sensors and actuators representing daily human activities. Experimental results show that incorporating actuator-state context improves prediction accuracy, while lightweight Transformer configurations achieve a strong balance between performance and efficiency. These findings support the feasibility of adaptive, autonomous smart environment systems that learn directly from sensor-actuator interactions and operate efficiently on edge hardware.

Presenters – Sandul, Ta'lor
Authors – Ta'lor Z Sandul and Kyoungtae Kim
Poster # B44
Biology
PERFLUOROOCTANE SULFONATE (PFOS) TOXICITY ON YEAST CELLS: CELL VIABILITY, MITOCHONDRIA MODIFICATIONS, AND RNA SEQUENCING
Several studies about perfluorooctane sulfonate (PFOS) and its toxicity in certain eukaryotic cells have been reported; however, studies about PFOS and its toxicity within yeast remain to be accomplished. A budding yeast strain was cultured in YPD media exposed to PFOS with varying concentrations. A cell viability assay, mitochondria staining, an ATP assay, RNA sequencing, and RT-PCR were used to determine possible toxic effects. Cell viability decreased with increasing incubation times. To determine decreasing viability, the mitochondria distribution patterns and the quantity of ATP produced in response to PFOS were examined. An RNAseq analysis was performed where total RNA from control and treated cells were isolated. The RNA was converted to cDNA for the next generation sequencing. A bioinformatic approach was employed to reveal global gene expression in PFOS-treated cells, which was helpful in finding specific biological pathways that are being downregulated or upregulated in response to PFOS. The standard RTPCR method was used to validate the gene expression data from the RNAseq analysis. Showcasing the toxicity of PFOS in yeast will offer a new insight into the underlying molecular mechanisms of PFOS-mediated toxicity.

Presenters – Tanvir, Md Asif
Authors – Md Asif Tanvir
Oral Presentation – 1-PSU 312C
Computer Science
OPTIMIZING GRAPH NEURAL NETWORKS FOR EFFICIENT IOT ANOMALY FORECASTING IN SMART ENVIRONMENTS
The rapid proliferation of Internet of Things (IoT) devices across smart environments, including homes, offices, and classrooms, has significantly increased the risk of anomalous activities that can compromise these systems. Such anomalies take many forms, including sensor malfunctions, irregular human behavior, and physical or network intrusions. Substantial research has focused on detecting these events using machine learning techniques. Among these, Graph Neural Networks (GNNs), a deep learning approach for modeling relationships between connected entities, have proven particularly effective for anomaly detection in sensor networks, as they capture the topological relationships between sensors and forecast expected behavior. However, the computational cost of GNNs makes them impractical for resource-constrained edge devices. To address this limitation, this work proposes a lightweight GNN framework for real-time anomaly detection in IoT environments. Rather than learning the graph structure during training, the proposed model uses pre-defined sensor groupings as input, eliminating the overhead of computing graph topology. This significantly reduces the number of learnable parameters and overall

model complexity. Experiments across three custom datasets and one public dataset show that incorporating pre-defined sensor groupings results in a substantial reduction in learnable parameters compared to conventional approaches. This also enables faster inference, meeting the computational efficiency requirements of edge-deployed IoT systems.

Presenters – Danso, Bezali
Authors – Bezali Kwame Danso, Gary Michelfelder
Oral Presentation – 2-PSU 312C
School of Earth, Environment, and Sustainability
INSIDE ANDEAN LARGE SILICIC DOMES: MAGMA STORAGE AND TIMESCALES
Quantifying the timescales of magma storage and mobilization is fundamental to understanding the evolution of large silicic systems and assessing their associated volcanic hazards. This study applies diffusion chronometry to plagioclase crystals from the Chao, Chillahuita, and Tocopuri domes in the Central Volcanic Zone (CVZ) of the Andes to constrain the thermal history of the magmatic system. We modeled Sr and Mg diffusion across 51 compositional transects using a finite-difference forward model, with diffusion coefficients referenced to a rheologically critical temperature of 750 °C. Our results yield diffusion timescales ranging from decades to millennia (10^1 to 10^3 years) with most crystals recording short-lived thermal reactivation (<10^3 years) at temperatures ≥ 750 °C. These short durations indicate that the magmatic system resided at sub-solidus, non-eruptible conditions for much of its history. The plagioclase crystals record complex growth zonation and diverse crystallization environments, reflecting long-term chemical heterogeneity within the reservoir. However, the brief high-temperature timescales derived from diffusion modeling imply that eruptible, mobile magma was only generated transiently, likely in response to short-lived reheating events such as magma recharge. We conclude that the CVZ magmatic system existed predominantly in a cool, crystal-rich, and immobile state, with punctuated thermal perturbations that remobilized magma and triggered eruption.

Presenters – Pettenger, Andrew
Authors – Andrew Pettenger, Shayd Gothard, Tuhina Banerjee, Santimukul Santra
Oral Presentation – 2-PSU 308C
Chemistry and Biochemistry
DECOUPLING COLLOIDAL STABILITY AND CATALYTIC ACTIVITY OF GOLD NANOCATALYSTS VIA IN-SITU SACRIFICIAL PHYSISORBED PEG COAT
Gold nanoparticles stabilized by sodium citrate (GNPs–citrate) are highly effective catalysts but often suffer from colloidal instability. Polymeric stabilizers can improve dispersion stability, yet chemisorbed polymer layers are canonically associated with suppressed catalytic activity. Herein, we evaluate an in-situ sacrificial stabilizing system (ISSS) based on physisorbed hydroxyl-terminated poly(ethylene glycol) (PEG) on GNPs–citrate. GNPs–PEG were prepared using PEG (1.5, 4.0, and 6.0 kDa) at Au:PEG molar ratios of 1:2, 1:7, and 1:12. Dynamic light scattering showed substantially increased hydrodynamic diameter (Dh) and decreased magnitude of ζ-potential with increasing PEG loading, while UV–visible

spectroscopy indicated invariant surface plasmon resonance (λSPR) features relative to GNPs–citrate. In the NaBH4 reduction of p-nitrophenol to p-aminophenol, GNPs–PEG exhibited pseudo-first-order rate constants with no statistically significant difference to those of GNPs–citrate across the series; at 8.0 μM Au, the mean activity differed from the citrate control by only ∼3% and no induction period was observed. Six-month storage preserved Dh, ζ-potential, and λSPR, whereas stability tests under reaction conditions showed declining activity and increasing Dh over time, consistent with expected loss of the physisorbed PEG layer. Collectively, these data support physisorbed PEG as a storage-stabilizing coating that is labile under reducing catalytic conditions, enabling stability without sacrifice to initial catalytic performance.

Presenters – Ahmadi, Mohammad Fahim
Authors – Mohammad Fahim Ahmadi
Poster # A2
SEES
LEAD CONTAMINATION IN SEDIMENTS IN NEWTON COUNTY
This study examines the distribution and concentration of lead contamination in sediment across Newton County, Missouri, with particular emphasis on the environmental impact of historical and ongoing mining activities. To achieve this objective, sediment samples were systematically collected along an east–west transect of the county, primarily from Shoal Creek, Center Creek, and several additional strategically selected locations to ensure representative spatial coverage.
Following field collection, all samples were air-dried under controlled conditions to preserve their integrity and then sieved using 10- and 18-mesh screens to isolate fine-grained sediment fractions suitable for geochemical analysis. The prepared samples were subsequently analyzed in a laboratory setting using X-ray fluorescence (XRF), a reliable and non-destructive analytical technique for quantifying elemental concentrations, including lead.
The primary objective of this research is to evaluate the spatial variability of lead concentrations and to determine the extent to which mining operations have contributed to elevated levels of contamination in local sediment. The findings of this study are expected to provide valuable insights into the environmental consequences of mining practices and to support future monitoring, risk assessment, and remediation strategies within the region.

Presenters – Dankwa, Josephine
Authors – Josephine Opare Dankwa, Gary Michelfelder, Frank Ramos, Andriano Pimentel, Angelo Garcia
Poster # B12
School of Earth, Environment and Sustainability
MAGMATIC EVOLUTION OF ÁGUA DE PAU VOLCANO: INSIGHTS FROM ZIRCON TRACE ELEMENT GEOCHEMISTRY AND U–TH GEOCHRONOLOGY.
Silicic volcanic systems commonly entrain plutonic fragments during eruption, providing rare insight into the structure and evolution of magma reservoirs beneath caldera systems.

At Fogo volcano (Água de Pau) on São Miguel Island in the Azores, eruptions eject syenite clasts together with trachytic pumice; however, the origin of these plutonic fragments and their relationship to the erupted products remain poorly constrained due to limited geochronological data.
To investigate this relationship, we analyzed U–Th zircon geochronology and zircon trace-element geochemistry from syenite clasts and pumices across the stratigraphically successive eruption units: Fogo B, Fogo A, Ribeira Chã, and Pisão.
Weighted mean zircon crystallization ages from syenite clasts range from 13.78 ± 0.52 ka to 24.6 ± 1.4 ka, whereas zircons from its associated Fogo "A" pumice yield an age of 50 ± 3.5 ka. Zircons from syenite xenoliths and Fogo "A" pumices show similar REE patterns and overlapping Hf concentrations and Zr/Hf ratios, indicating crystallization from a chemically similar magma source.
These results suggest that the syenite clasts did not form by fractional crystallization directly related to the erupted Fogo "A" pumice but rather crystallized from an evolved magma and were later entrained during eruption. Trace element data further indicate that eruptions at Fogo Volcano from 12 ka to 3.2 ka were sourced from a single long-lived magma reservoir.

Presenters – Meservey, Warren
Authors – Warren Meservey
Poster # B33
School of Earth, Environment, and Sustainability
TECTONIC TIMING IN THE MISSOURI OZARKS: STRATIGRAPHIC AND KINEMATIC INDICATORS SHOWING LEFT-LATERAL STRIKE-SLIP MOVEMENT
The landscape of the southern Missouri Ozarks contains a complex structural history that remains a topic of active investigation. This research provides a detailed investigation of the southern Ava District of the Mark Twain National Forest, focusing on the relationship between major fault systems and regional deformation. The study area follows the ridge tops of the Glade Top Trail, where lower Ordovician dolomites meet younger Mississippian limestone remnants. By integrating field mapping with advanced geospatial analysis, I investigated the Foil and Skyline Fault systems to identify diagnostic kinematic indicators. The identification of Riedel shear fractures, oriented between 40° and 60° while the Skyline Fault looks like a conjugate Riedel shear that intersects the Foil Fault at a high angle. This provides the first definitive field-scale evidence for a left-lateral strike-slip fault system. Beyond the structural implications, my observations show that these tectonic fractures dictate modern surface patterns, specifically the distribution of cedar and post oak trees in thin-soiled glades. Furthermore, the absence of these specific shear patterns in Mississippian strata—despite a 12-meter vertical displacement—offers a critical constraint on the timing of tectonic activity. By establishing these kinematic links, this study advances our understanding of how ancient lateral movements shaped the broader structural and ecological evolution of the Ozark Plateau.

Presenters – Chastain, Logan
Authors – Logan Chastain, Dr. Melida Gutierrez
Poster # B9
School of Earth Environment and Sustainability
MAPPING METAL CONTAMINATION OF STREAM SEDIMENTS AND SOIL WITHIN THE SPRINGFIELD PLATEAU OF THE TRI-STATE MINING DISTRICT
This study determines the spatial distribution and extent of legacy metal contaminants—primarily Lead (Pb), Zinc (Zn), and Iron (Fe)—within the Mississippian-age Boone Formation of the Missouri Tri-State Mining District (TSMD). Hosted in karstified limestone and chert, these Mississippi Valley- type (MVT) deposits left a complex environmental footprint across the Springfield Plateau. Stream sediments and soils were sampled from the top two inches of material, sieved to the fine fraction, and analyzed via X-Ray Fluorescence (XRF), with 20% verification by Inductively Coupled Plasma- Mass Spectrometry (ICP-MS). Preliminary results confirm significant, persistent contamination mobilized through the fractured carbonate landscape far from historical mining centers; for example, Pierson Creek yielded Zinc concentrations up to 2,385 mg/kg and Lead at 119 mg/kg.

Presenters – Karn, Christine
Authors – Christine Karn
Oral Presentation – 1-PSU 317A
Biology
USING THE NOVEL NATIVE KEYSTONE SPECIES GIANT RIVER CANE FOR PHYTOREMEDIATION ON CULTURAL LANDSCAPES
Heavy metals, such as lead, can negatively impact the environment and organisms living in it. Many plants can be harmed by the uptake of lead; however, there are species that are able to tolerate lead accumulation. These plants have the potential to be used as phytoremediators. Bamboo species have been previously found to take up lead which helps support the possibility of giant river cane being a successful phytoremediator. Phytoremediation is important for soil remediation in areas where little to no disturbance can take place. The Quapaw Nation's land in Oklahoma is one of these areas that requires a low disturbance remediation tactic. The goals of this study are to find if giant river cane can take up lead and how lead will impact giant rivercane growth. I will plant, harvest, and analyze giant river cane samples that I plant on Quapaw land to study the impacts of lead exposure on giant river cane and giant river cane's phytoremediation potential. It is predicted that giant river cane will be a successful phytoremediator. This would allow for a native phytoremediator to be available for its abilities across 22 states in the U.S. and could be used for remediation purposes in places such as the Mark Twain national forest.

Presenters – Jegede, Oluwatomisin
Authors – Oluwatomisin Helen Jegede, Tuhina Banerjee, Eden Tanner, Priyavrat Vashisth
Poster # B28

Chemistry and biochemistry
Proteins have been known to be one of the important workhorses of life. It is one of the most essential building blocks in almost every living organism. It has been proven over time that protein structure usually equals its function.
Sometimes these proteins misfold and lose their normal function, causing disease to the body.
Alpha-syn an intrinsically disordered protein found in the brain which helps neurons release neurotransmitters such as dopamine, misfolds and aggregates causing the neurological disease known as Parkinson's disease (PD) which has no cure, progressive, and rampant among the aged.
PD is currently being researched by scientists who are still trying to understand the mechanism of the disease and
develop treatments that can either slow or stop its progression.
The aim of my research is to use Ionic coated gold nanoparticle and observe its effect on Alpha-syn whether it inhibits the aggregation or if it pushes Alpha-syn to form fibrils faster, which is less toxic. The results from this research can in turn be used for drug development and a deeper understanding of Alpha-syn itself.

Presenters – Aardema Faigh, Donovan
Authors – Donovan Aardema Faigh, PI: Dr. Paul Durham
Oral Presentation – 1-PSU 315A
Biology
ATP STIMULATION OF BRAINSTEM GLIAL CELLS: IMPLICATIONS FOR UNDERSTANDING MIGRAINE AND TMD PATHOLOGY
Migraine and temporomandibular joint disorder (TMD) are debilitating orofacial pain disorders that negatively impact quality of life and are characterized by central sensitization and enhanced pain signaling. The goal of my study was to characterize the effects of ATP on intracellular calcium levels in central nervous system glial cells including astrocytes, microglia, and oligodendrocytes to better understand the role of ATP in promoting central sensitization. Primary cultures of brainstem tissue were established from Sprague Dawley neonatal rats. Eight days post plating, all glial cells were shown to express P2X3 and P2X7 ATP-gated calcium channel receptors. Incubation of cultures with 100 μM ATP increased the amplitude and duration of the intracellular calcium response in astrocytes and microglia but did not in oligodendrocytes. The culture conditions allowed for growth of all three glial cell types, but mRNA and protein expression of other proteins implicated in central sensitization were suppressed compared to in vivo brainstem tissue. Findings from my study provide evidence that ATP can stimulate astrocytes and microglia, which can release pro-inflammatory mediators known to promote central sensitization in migraine and TMD.

Presenters – Pettington, Ophelia
Authors – Ophelia Pettington and La Toya Kissoon-Charles
Oral Presentation – 2-PSU 312C

Biology
REMEDIATION AND METAL TOLERANT BACTERIA IN THE MISSOURI 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 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. Relationships between microbes and 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. Metals and bacterial community composition differed between sites but not soil parts. Metal concentrations decreased as remediation progressed and was related to bacterial community composition. These findings indicate that current techniques are successful and provide insight for future endeavors.

Presenters – Ganji, Purna
Authors – Purna Ganji, Dr. Toby Dogwiler
Poster # A13
School of Earth, Environment and Sustainability
EXPLAINABLE AI FOR GEOSPATIAL DEEP LEARNING: INTERPRETING STRUCTURE DETECTION IN UAV IMAGERY
This project investigates explainable AI (XAI) methods for interpreting deep learning models used in structure detection from high-resolution UAV imagery in Treasure Beach, Jamaica. Two Mask R-CNN models with ResNet-152 backbones—a multi-class detector and a binary structure detector—were analyzed using LIME, LIMEcraft, RISE, and Occlusion. XAI methods were evaluated using deletion AUC, SSIM, and Spearman rank correlation, and explored through an interactive dashboard with saliency maps, segmentation overlays, and ROI-based controls. Analysis was conducted on over 30 UAV image chips, while the binary model separately achieved ~85% detection accuracy on the overall raster dataset. Results show that the multi-class model produced more stable explanations, while LIMEcraft improved localized interpretability and RISE provided consistent global attribution patterns. This work highlights that higher accuracy does not necessarily lead to more reliable explanations in geospatial AI.

Presenter – Chand, Abhishu
Authors – Abhishu Chand, Elijah Billue, Tony Astuhuaman, Ridwan Sakidja, Kyoungtae Kim
Poster # A7
Biology

QUANTUM DOTS INTERACTION WITH A-ACTININ DISRUPT ACTIN CYTOSKELETAL DYNAMICS

Quantum dots (QDs) are biocompatible nanoparticles with unique optical and fluorescent properties, making them a promising medical diagnostic tool for applications in cell labeling, bioimaging, and drug administration. However, their biological integration has been hindered by QDs' ability to non-specifically interact with the cells and intracellular proteins. As such, this study investigates QDs' interaction with cytoskeletal proteins such as actin and α-actinin, through biochemical and computational approaches to unravel the consequences on cytoskeletal dynamics. Our spin-down experiment showed that high concentrations of QDs cause bundling of actin filaments. However, in the presence of both α-actinin and high QD concentration, actin bundling does not occur. This indicates an interaction between QD and α-actinin, which was confirmed by the quenching assay. These QDs – α-actinin interactions also weaken the stabilizing effect of actinin on actin depolymerization. Furthermore, the physics-based modeling and simulations carried out in physiological temperature supported these findings by identifying stable interaction surfaces between QDs and α-actinin. The integration of computational prediction provides a framework to identify binding surfaces and potential drug discovery and nanoparticle design. Understanding these molecular interactions between QDs and proteins is essential to maximize their potential in biomedical applications while mitigating any side effects.

Presenters – Muhammad, Ali
Authors – Ali Muhammad
Poster # A30

School of Earth, Environment and Sustainability

SATELLITE-BASED LAND USE/LAND COVER CHANGE DETECTION IN GILGIT-BALTISTAN (2000–2025)

This study examines the impacts of climate change and human activities on land use/land cover (LULC) in Gilgit-Baltistan, Pakistan. The research focuses on detecting changes between 2000 and 2025 and analyzing their relationship with temperature and precipitation trends. Multi-temporal Landsat imagery was classified using a Support Vector Machine (SVM) algorithm in ArcGIS Pro to generate LULC maps, including glacier, vegetation, water, barren land, and built-up classes. Post-classification change detection was performed to quantify spatial transitions and identify areas of significant change. Preliminary results indicate notable glacier retreat and expansion of built-up areas, particularly in urbanizing regions such as Gilgit and surrounding valleys. Change detection maps highlight both transformed and stable regions, emphasizing spatial variability in environmental change. Ongoing analysis of temperature and precipitation data suggests a potential correlation between rising temperatures and glacier loss, along with changes in precipitation patterns influencing vegetation and water availability.

These findings demonstrate the combined influence of climatic and anthropogenic factors on landscape transformation. The study contributes to understanding climate-driven environmental change and supports the development of geospatial frameworks for climate adaptation planning in high mountain regions.

Presenters – Edge, Kendra
Authors – Kendra N. Edge, Kristopher W. Lopez, Joaquin B. Londres, Nivetha Umapriya, Srinivasan, and Avery L. Russell
Poster # A10
Natural & Applied Science-BI-MNAS
EFFECTS OF ENVIRONMENTAL TEMPERATURE ON POLLEN-MICROBE INTERACTIONS
Climate change frequently modifies interspecific interactions. Microbes, including bacteria and yeast, often live in the nectar of flowering plants, but how these interactions are influenced by variation in environmental temperature is not well understood. Nectar is carbohydrate-rich but is poor in amino acids required for microbial growth. Yet protein-rich pollen frequently falls into nectar and could serve as an amino acid source if microbes were able to burst or germinate the pollen. Given that microbial metabolic processes are temperature-dependent, changes in environmental temperature might affect the capacity of nectar microbes to burst pollen grains. In this study, we therefore examined how bursting of pollen by different nectar yeast and bacteria was influenced by variation in environmental temperature. We incubated solutions of pollen and nectar (controls) or pollen, nectar, and a given microbe type for 60 minutes at 20°- 40° C (reflecting extremes in temperature variation and microbe and pollen metabolic optima) and counted the proportion of intact pollen grains. Overall, pollen grains burst more frequently as environmental temperature decreased. Similarly, microbes generally increased this effect, although patterns differed among taxa, with temperature having no effect on some microbe-pollen interactions. Our results thus suggest that rising environmental temperature generally has negative or neutral effects on pollen-microbe interactions. Furthermore, our work suggests that temperature-mediated effects on flower-microbe interactions could also influence plant-pollinator interactions via associated changes to nectar reward quality.

Presenters – Brand, Katherine
Authors – Katherine Brand, Dr. Tasnuba Jerin
Oral Presentation – 2-PSU 315A
School of Earth, Environment, and Sustainability
FLOW REGIME SHIFTS AND CHANNEL ADJUSTMENTS IN RESPONSE TO SHIFTING CLIMATE PATTERNS: EXAMPLE FROM GASCONADE RIVER
Shifting climate patterns alter precipitation regimes, driving changes in flood magnitude and frequency and prompting adjustments in river morphology. The Gasconade River, a tributary of the Missouri River located in southcentral Missouri, USA, has exhibited increasing patterns of bank erosion, with limited knowledge of its causes and impacts. This study evaluates how shifts in hydrologic flow regimes and land use have influenced erosion and channel morphology across three climate periods (1930–1960, 1960–1990, and 1990–2020). Flood frequency analysis was conducted and showed notable increases in 2-, 5-, 10-, 50-, and 100-year flood magnitudes after 1990. Aerial imagery analysis of 14 reaches along the Gasconade River indicated significant increases in channel area and width. Land use analysis revealed declines in forest cover and increases in agriculture before 1990, followed by rising urbanization after 1990. Multiple linear regression results indicate strong

relationships between changes in discharge, land use, and channel morphology. Ultimately, contributing to knowledge about the influence that flood magnitude and land use have on fluvial processes.

Presenters – Adenola, Oluwatobiloba
Authors – Oluwatobiloba Adenola, H. Jaxson Priest, Debra S. Finn
Poster # A1
Biology
EFFECTS OF FISH ON MACROINVERTEBRATE COMMUNITY STRUCTURE IN NON-PERENNIAL STREAMS
Fish can influence aquatic insects both by consuming them and by changing their behavior and life histories. While these effects are well studied in perennial streams, less is known about streams that dry periodically. I compared macroinvertebrate communities in two similar non-perennial streams in the Ozark Highlands: one that is fishless and one that periodically gets fish during floods. I sampled communities in February and April during the flow season in 2021 and 2025, across bedrock and gravel habitats. Community differences between streams were stronger than year-to-year differences. The fishless stream had higher diversity, while the fish stream had higher overall abundance, driven in part by mayfly taxa. The fish stream also had more insects with traits linked to predator resistance, such as increased mobility and faster development, patterns consistent with non-lethal effects of fish. In contrast, crustaceans and longer-lived insects were more common in the fishless stream. Macroinvertebrate densities tended to be lower on bedrock than on gravel. Overall, results suggest that macroinvertebrates in non-perennial streams respond to fish in ways similar to patterns observed in perennial systems.

Presenters – Cooper, Benjamin
Authors – Benjamin Cooper, Terressa Kruit, and La Toya Kissoon-Charles
Poster # B11
Biology
AZOLLA CAROLINIANA ABSENCE IS ASSOCIATED WITH HIGH NUTRIENT CONCENTRATIONS IN LAKE SPRINGFIELD, MISSOURI
Lake Springfield, a shallow reservoir fed by Galloway Creek and the James River, suffers from frequent algal blooms. Several aquatic plants inhabit the lake, including *Azolla caroliniana*, a free-floating aquatic fern that has a symbiotic relationship with nitrogen-fixing Anabaena azollae. It forms thick mats on the surface of water and blocks light from native plants and algae below. Decomposing Azolla releases nutrients in the water leading to algal blooms, which leads to decreased dissolved oxygen and biodiversity. Rapid growth of this plant in Lake Springfield can further enrich this reservoir with nutrients and compound its excessive algae problem. Monitoring and controlling *Azolla* growth can limit a chain reaction of these negative impacts. We aimed to assess *Azolla's* impact on the lake's water quality. We hypothesized that when *Azolla* is dormant or senescing, nutrient concentrations will increase. We collected water samples over a three-year period every three months from Lake Springfield to quantify seasonal nutrient and chlorophyll

concentrations. Preliminary results showed that *Azolla* absence was associated with high nitrates. This indicates that *Azolla* could be a source of fixed nitrogen that could fuel algal blooms.

Darr College of Agriculture (COA)

Presenters – McGee, Sydney
Authors – Sydney McGee
Oral Presentation – 1-PSU 317A
School of Agriculture Science and Conservation
INTESTINAL PARASITES AND PROTOZOA PREVALENCE IN SHELTER DOGS: PERSISTENCE AND TREATMENT EFFICACY
Canine overpopulation strains shelters at capacity. Parasitosis poses risks to animals and the public, making monitoring essential to prevent outbreaks, especially of zoonotic species. In this study, fecal samples from a rural shelter dog population were analyzed over a span of 12 months. Weather, soil temperature, age, sex, flooring type, and length of stay were evaluated as potential factors. Fecal samples were collected from all dogs housed in the shelter at two-week intervals during sampling periods conducted every other month to run fecal egg reduction counts. Analysis used two quantitative fecal flotation methods: Mini-FLOTAC with Sheather's sugar and a Modified Wisconsin technique with zinc sulfate to optimize parasite detection sensitivity. In preliminary sampling of 64 dogs, hookworms were the most prevalent parasite (9.4%) by both methods. Whipworms were found in 6.3% of dogs, while roundworms and coccidia were less prevalent at 3.1-3.4%, respectively. The modified Wisconsin method showed slightly greater sensitivity for roundworms and coccidia. Despite deworming protocols, some dogs remained persistently positive, suggesting reinfection from environmental contamination or reduced treatment efficacy.

Presenters – Tucker, Edwin
Authors – Edwin James Tucker III
Oral Presentation – 2-PSU 312C
School of Agricultural Science and Conservation
EXTENDING THE FRUITING SEASON WITH PRIMOCANE-FRUITING BLACKBERRIES GROWN IN A HIGH-TUNNEL
Blackberry production has become an important part of many small fruit orchard operations because they're easy to grow, produce a large crop, and sell well at market. The current blackberry season in Missouri extends from mid-June to mid-August, depending on the cultivar chosen. This fruiting season is common for floricane-fruiting blackberry cultivars (cultivars that fruit on one-year old canes). Primocane-fruiting blackberry, or blackberries that fruit on current season growth, have the potential to further extend the harvest season of blackberry into September and October, especially if grown in a high-tunnel. This study had two objectives. The first objective was to evaluate primocane fruiting blackberry, 'Arkansas Traveler', for its potential season extension on Missouri State University's Fruit Experiment Station. The second objective was to assess the feasibility of

container-grown, primocane-fruiting blackberries in the Midwest. Forty plants were planted in grow-bags filled with potting media. This study assessed four different treatments to evaluate whether primocane-fruiting blackberries would provide an extension to the season both within the field, or within a high-tunnel. These treatments were; full high-tunnel production, full field production, rotation from high-tunnel to field, and rotation from field to high-tunnel. The last two treatments were added to determine if there was a possibility of freeing up space within the high-tunnel for other crops while conditions in the field were favorable for blackberry growth. Over the first year of this study cane count, cane length, cane diameter, yield, berry weight, cull weight, and berry quality were analyzed. The results concluded that plants grown in the high tunnel had a significantly greater yield than plants grown in the field. Plants grown in the high-tunnel were also significantly taller than all other treatments.

Presenter – McMillen, Grant
Authors – Grant McMillen, Dr. Lacy Sukovaty
Poster # A28
Animal Science
ASSESSMENT OF DEWORMING EFFECTIVENESS AND ANALYST VARIABILITY IN FECAL EGG COUNT REDUCTION TESTS OF WEANED BEEF CALVES
This study evaluated the effectiveness of deworming protocols in beef calves at weaning to assess parasite control and identify parasite persistence. Effective parasite management during this critical stage is essential for animal health and production efficiency. Two groups of calves from separate farms were sampled at weaning prior to anthelmintic administration and again two weeks post-treatment. Fecal samples were analyzed in duplicate by a trained technician and a graduate student. Parasite burden was recorded using a semi-quantitative scale (0, +, ++, +++), and fecal egg count reduction tests (FECRT) were calculated overall, by parasite, and by farm. Overall FECRT was 88.7%, indicating reduced efficacy. Farm-level differences were observed, with Farm A showing greater reduction (92.0%) than Farm B (84.4%). Stomach worms and Cooperia showed high reduction (>90%), whereas tapeworm (58.9%) and coccidia (27.4%) showed poor response. Post-treatment prevalence remained high for stomach worms (62.5%) and coccidia (72.5%). Reader agreement was moderate (77.5%, κ=0.24), with variability between observers. These findings suggest reduced anthelmintic efficacy, highlighting the need for ongoing monitoring and standardized diagnostic approaches in beef cattle systems.

Presenters – Hargrove, Dillon
Authors – Wenping Qiu, Sylvia Petersen, Dillon Hargrove
Poster # B21
Darr College of Agriculture
INFLUENCE OF PLANT GROWTH REGULATORS ON CALLUS INDUCTION OF MONSTERA DELICIOSA 'ALBO VARIEGATA'
Monstera *albo variegata* is in high demand for its distinctive white/green mosaic foliage; however, it remains difficult to propagate via micropropagation. This study aims to

determine whether M. *albo variegata* can be successfully propagated using tissue culture. Leaf, midrib, petiole, and root explants were cultured in vitro on Murashige and Skoog (MS) medium supplemented with varying concentrations and combinations of plant growth regulators (PGRs), including the *cytokinins* BAP and TDZ and the auxins NAA and IBA. Explants were monitored for callus initiation across four treatments. Preliminary results show that PGR composition strongly influences callus formation, with specific cytokinin–auxin combinations producing more consistent and vigorous callus development. To date, no shoot regeneration or retention of variegation has been observed. Ongoing work focuses on optimizing regeneration conditions to evaluate variegation stability during shoot induction. This research aims to establish reliable micropropagation protocols for variegated Monstera and other chimeric plants to meet consumer demand.

Presenters – Branstetter, Katlyn
Authors – K. Branstetter*, E. Walker*, W. McClain*, R. Bicalho+, A. McGee*
Oral Presentation – 1-PSU 312C
School of Agricultural Science and Conservation
THE IMPACT OF MATERNAL BOVINE APPEASING SUBSTANCE ON BEHAVIOR OF BEEF HEIFERS AT FIXED TIME AI
Maternal bovine appeasing substances (mBAS) have demonstrated the ability to reduce indicators of stress such as cortisol. This experiment was designed to evaluate the impact of utilizing mBAS on behavior and conception rates of heifers at Fixed time artificial insemination (FTAI). In Exp. 1, 91 virgin heifers were blocked by weight and randomly assigned to one of two treatments, control (no mBAS (CON)), and those receiving mBAS (mBAS). In exp. 2, 143 virgin heifers were randomly assigned to the same two treatments of mBAS and CON. Exp. 1 used the seven-day CO-Synch + CIDR FTAI protocol for estrus synchronization and the 14-day CIDR-PG protocol was used in Exp. 2. The mBAS treatment received mBAS on the nuchal skin area (5mL) and muzzle (5mL). Chute exit scores had significant interactions for trt x day (P < 0.01) in both exp. 1 and 2. Chute behavior scores had a significant effect of day (P < 0.01) in Exp. 1 and trt x day (P<0.01) in Exp. 2. Exp.1 and 2 were combined to analyze conception rates and there was no effect of farm (P > 0.87) or trt (P > 0.62). While we did find behavioral differences by day, there does not appear to be a significant impact of mBAS on behavior or conception rates of heifers during FTAI.

Presenters – Bunch, Kyra
Authors – Kyra Bunch, Andrew Thomas, Dr. Michael Goerndt
Oral Presentation – 2-PSU 317A
William H. Darr College of Agriculture
OPTIMIZING GERMINATION RATES IN BLACK WALNUT (JUGLANS NIGRA): A COMPARATIVE STUDY OF WALNUT CURING AND STRATIFICATION
Black Walnut (Juglans nigra) is a valuable tree species in the Missouri Ozarks and across the eastern United States, providing both high-value timber and edible nuts while supporting agroforestry and ecological diversity. Improving germination success in cultivated black

walnut is essential for advancing reforestation, conservation, and nursery production. This study examined the effects of pre-stratification drying treatments on germination rates of two cultivars, Kwik Krop and Sparrow.
A total of 3,500 walnuts were harvested from the MSU Fruit Experiment Station (Mountain Grove, MO) and MU Southwest Research, Extension and Education Center (Mount Vernon, MO). Treatments consisted of air-drying for 0 (control), 1, 2, 3, and 4 days before stratification. Experimental units (80–100 nuts each) were replicated across cultivars and sites, with subsamples oven-dried to quantify moisture content. Stratification occurred under two conditions: outdoor bed stratification and refrigerated stratification.
First-year analyses indicate significant main effects of drying treatment on walnut moisture loss, as well as cultivar-level differences in initial nut moisture content. A significant three-way interaction among cultivar, site, and treatment was detected (ANOVA, p < 0.05). Germination trials completed in 2024 revealed differences in emergence rates between cultivars and treatments, with drying duration influencing both germination percentage and vigor. Second-year analysis will evaluate fungal pathogen presence (Fusarium spp.) and repeat drying/curing trials.
These findings contribute to identifying optimal drying and stratification protocols for maximizing germination in improved black walnut cultivars, with direct implications for tree nurseries, agroforestry adoption, and long-term sustainability of Juglans nigra in the Midwest.

Presenters – Sanders, Kyle
Authors – Steven J. Schneider, Kyle Sanders
Poster # A40
Environmental Plant Science
STUDY AND IMAGING OF TREE ARCHITECTURE IN BLACK WALNUTS (JUGLANS NIGRA)
Abstract
Tree architecture influences nut load, mechanical stability, and overall productivity in black walnut (Juglans nigra). The purpose of this research is to determine whether three-dimensional structural traits, such as branch order, branch angles, branch arrangement, and overall canopy form can be measured accurately enough to help explain differences in yield potential and structural performance among black walnut trees. By quantifying these architectural features, the study aims to support the development of more efficient phenotyping methods for black walnut improvement and management.
Video and image data were collected from 15 individual black walnut trees and processed through a photogrammetry workflow. FFmpeg was used to extract image frames from the video files. These frames were then analyzed in COLMAP for feature detection, image matching, and sparse three-dimensional reconstruction. CMVS/PMVS was applied to expand the sparse reconstruction into a denser point cloud, allowing more complete capture of canopy and branch architecture. The resulting point clouds were cleaned in Cloud Compare to remove outliers. Finally, PyTLidar, a Python-based TreeQSM module, was used to generate cylinders on the point clouds for analysis.
When compared to other methods, such as PlantCV, ImageJ, and TreeQSM the workflow

presented above is much cheaper, has easier access to software, and is faster but dependent on processing power. Images were successfully processed and comparable. Future work entails testing accuracy and validation of the model across 125 trees in our mapping population.

McQueary College of Health and Human Services (MCHHS)

Presenters – Anselm, Mara; Hill, Jasmine
Authors – Mara Anselm, B.S., Jasmine Hill, B.S., Wafaa Kaf, MD, MSc, PhD
Poster # A4
Communication Sci & Disorders
DIABETES TYPE 2 WITH AND WITHOUT DIABETIC NEUROPATHY: IS THERE ANY EVIDENCE OF COCHLEAR SYNAPTOPATHY AND AUDITORY BRAINS
Type 2 diabetes (T2D) is associated with adverse effects on the inner ear, and emerging evidence suggests that diabetic neuropathy, a serious complication of T2D, impairs neural conduction along the auditory pathway. This study investigated these effects in participants with and without diabetic neuropathy (N = 25 per group) using simultaneous auditory brainstem response (ABR) and electrocochleography (ECochG) testing. Recordings were obtained at slow (7.10/s) and fast (234.4/s) rates to stress the auditory neurons and assess potential breakdowns in neural signal transmission associated with neuropathy. Data are analyzed using independent t-tests with Bonferroni correction applied. Preliminary results indicate that participants with diabetic neuropathy demonstrated significantly prolonged ABR wave I, III, and V latencies at faster stimulus rates, along with elevated ECochG SP/AP ratios compared to controls, suggesting impaired neural conduction and possible cochlear synaptopathy.

Presenters – Lal, Nima; Lancaster, Molly
Authors – Nima K Lal, Dr. Molly Lancaster Rodriguez
Poster # A23
School of Health Sciences
MISSOURI RURAL DROWNING RISK ANALYSIS FOR 2020-2025
Drowning is a leading cause of unintentional injury fatalities in the United States, with rural communities vulnerable due to limited swim education and proximity to emergency services. Missouri's waterways and rural population create elevated drowning risk, yet rural-nonrural surveillance data remains limited. We conducted a multi-level analysis of Missouri State Highway Patrol (MSHP) drowning and near-drowning reports (2020-2025), examining demographics and incident type stratified by Missouri's DHSS rural-urban classification (i.e., <150 people/sq mile), with county-level geographic patterns compared against a community survey (n=88). Among 254 incidents, rural counties accounted for 87.6% of fatal drownings. Males comprised 86.2%; 16.1% were juveniles under 18. Mean victim age was 39.6 years (SD=22.7). Peak incidents occurred in 2021. Near-drowning reporting varied across nine MSHP Troops and comprised only 9.8% of near-drowning

incidents versus 31.8% among community respondents. This study demonstrates rural disparities in fatal outcomes and near-drowning underreporting, underscoring critical surveillance gaps. Standardized MSHP protocols and community partnerships can strengthen surveillance to guide equitable rural drowning prevention.

Presenters – Elam, Sloane
Authors – Bonnie Slavych, Sloane Elam, Abby Gengtes, Erin McKinzie, Megan Gearhart, Aspen White, Macia Metz, Meghan Cox
Poster # A11
School of Health Care Professions: Communication Sciences and Disorders
NORMATIVE DATA FOR YOUNG ADULTS USING PENTAX MEDICAL PHONATORY AERODYNAMIC SYSTEM MODEL 6600
Purpose: The purpose of this study is to establish normative data for phonatory aerodynamic measures of vocal efficiency and output in vocally healthy adults, with a focus on Voicing Efficiency (VOEF) and Variation in Sound Pressure Level (VSPL). These measures provide insight into the relationship between airflow, pressure, and acoustic output during speech production and are clinically relevant for evaluating vocal function.
Methods: Data collection is being conducted using the PENTAX Medical Phonatory Aerodynamic System (PAS) Model 6600 in the CLEAR Lab at Missouri State University. Participants (ages 18–40) complete a series of structured phonatory tasks following standard calibration procedures. This project focuses on Domain 2 protocols, including VOEF and VSPL, which assess vocal efficiency during repeated syllable productions and variation in vocal intensity across controlled loudness conditions. A brief aerodynamic phonatory screening protocol (APSC) is administered to ensure participants demonstrate adequate vocal function prior to completing experimental tasks. Demographic and physiological data are collected via questionnaire.
Results: Data collection is currently ongoing, and no results are available at this time. Planned analyses will examine the influence of demographic and physiological variables on VOEF and VSPL, with attention to clinically meaningful differences in vocal efficiency and output.
Conclusions: This study is expected to contribute normative reference values for phonatory aerodynamic measures of vocal efficiency and output, supporting improved clinical interpretation in voice assessment. Final results will be presented upon completion of data collection.

Presenter – Boone, Jesica
Authors – Jesica Boone, Clay Franklin
Poster # A6
Communication Sciences and Disorders
TURNING INDIFFERENCE INTO ACTION: CONSIDERATIONS FOR CREATING BEHAVIORAL CHANGE IN RECREATIONAL NOISE
Noise-induced hearing loss and tinnitus (NIHL/T) are preventable, yet increasingly prevalent conditions associated with recreational noise exposure, particularly among young

adults (Keppler et al., 2015). Unlike occupational noise, which is regulated by standards such as those established by the U.S. Department of Labor, recreational noise from activities like concerts, personal audio devices, and sporting events remains largely unregulated (American Public Health Association, 2021). Compounding this issue is a lack of concern by young adults regarding the long-term and secondary consequences of noise exposure and hearing loss (NIH, 2019).

By examining current data on awareness and attitudes of recreational noise exposure, behavioral and psychosocial factors influencing use of hearing protection by young adults, and evaluation barriers to adopting protective behaviors, this paper aims to identify strategies based on theoretical frameworks of health behaviors that may produce positive results in a public health campaign designed to encourage young adults to utilize hearing protection during exposure to recreational noise.

Presenters – Gentges, Abby
Authors – Abby Gentges, B.S, Bonnie Slavych, Assistant Professor
Poster # B18

Communication Sciences and Disorders

NORMATIVE DATA FOR YOUNG ADULTS USING PENTAX MEDICAL PHONATORY AERODYNAMIC SYSTEM MODEL 6600

Purpose: The purpose of this study is to establish a normative database for the PENTAX Medical Phonatory Aerodynamic System (PAS) Model 6600 in young adults, while examining the effects of gender and vocal training on selected phonatory aerodynamic measures. The PAS 6600 provides speech-language pathologists (SLPs) with objective measures of airflow, pressure, and vocal efficiency to support evaluation and treatment of voice disorders (PENTAX Medical, n.d.).

Methods: Data collection is being conducted in the CLEAR Lab (Clinical Literacy, Eating, Airway, and Rehabilitation Laboratory) at Missouri State University. Participants (ages 18–40) complete a sociodemographic questionnaire prior to testing. Following calibration procedures, participants complete selected PAS protocols. This project focuses on paired tasks that reflect respiratory and phonatory control, including Vital Capacity (VTCP) and Maximum Phonation Time (MXPH), as well as Comfortable Sustained Phonation (CSPH). Standardized instructions and practice trials are provided prior to data collection.

Results: Data collection is currently ongoing, and no results are available at this time. Planned analyses will examine differences in phonatory aerodynamic measures across gender and vocal training status, with attention to clinically meaningful patterns in airflow, pressure, and phonatory efficiency.

Conclusions: This study is expected to contribute normative reference values for the PAS 6600 in young adults and improve clinical interpretation of phonatory aerodynamic measures. Final results will be presented upon completion of data collection.

Presenters – Miller, Abby; Arthur, Karsyn; Lindauer, Kennedy
Authors – Authors- Abby Miller, Karsyn Arthur, Kennedy Lindauer, and Wafaa Kaf
Poster # B34

School of Health Care Professions
ELECTROPHYSIOLOGIC CHANGES IN THE AUDITORY SYSTEM DURING EPISODIC MIGRAINE
Individuals with episodic migraine frequently report hypersensitivity to sound; however, objective changes in auditory neural transmission at brainstem and cortical levels remain unclear. This study examined behavioral and electrophysiologic differences between interictal (baseline) and ictal (migraine) states using a within-subject design. Participants completed pure-tone audiometry, uncomfortable loudness levels (ULLs), acoustic reflex thresholds, auditory brainstem response (ABR), and cortical (N1–P2) testing. No changes in hearing thresholds were observed. Reduced ULLs during migraine episodes indicate increased sound intolerance, consistent with central hypersensitization. Acoustic reflex thresholds were elevated in the ictal state, suggesting possible brainstem involvement. Preliminary findings of both ABR and cortical N1–P2 measures revealed no statistically significant differences across ears or stimulus rates (p ? .05), most likely due to small sample size. Overall, despite unmeasurable objective changes at the brainstem and cortical levels, increased sound intolerance and elevated reflex thresholds support reported hypersensitivity and central gain mechanism at the brainstem in episodic migraine.

Presenters – Johnson, Kaitlyn; Smith, Mattie
Authors – Mattie Smith, Kaitlyn Johnson, Dr. Thomas Franklin
Poster # B29
School of Health Care Professions
EVALUATING THE ACCURACY AND EFFICACY OF APPLE'S HEARING TEST AND HEARING AID FEATURES: A PILOT STUDY
In 2024, Apple introduced the Hearing Test Feature (HTF) which allows users to conduct a basic pure tone threshold hearing test using the AirPods Pro. If the hearing test reveals mild to moderate hearing loss, the individual has the option to activate the Hearing Aid Feature (HAF), which allows the AirPods Pro 2nd Generation to be used as over-the-counter hearing aids. This study aims to evaluate the accuracy and efficacy of the HTF and HAF of the Apple AirPods Pro. Two subjects completed the HTF and a comprehensive hearing evaluation conducted by an audiology graduate student. The subjects also completed tests of speech understanding in noise in various conditions with and without the HAF activated. Probe microphone measures (PMM) were conducted to compare the output of the HAF for soft, moderate, and loud input levels to standard prescriptive targets. Results revealed minimal clinically significant differences in hearing thresholds between the HTF and the comprehensive hearing evaluation. Speech understanding in noise improved using the HAF. PMM results were variable between subjects. This study suggests that a larger research study is warranted to assess the efficacy of the HAF in subjects with a wide variety of hearing loss.

Presenters – Gearhart, Megan
Authors – Megan Gearhart, Dr. Bonnie Slavych
Poster # B17
School of Health Care Professions

THICKENING NUTRICIA NEOCATE®: COMPATIBILITY AND CONSISTENCY OUTCOMES ACROSS MULTIPLE THICKENING AGENTS

Purpose: The purpose of this study is to evaluate the feasibility, consistency, and stability of commonly used commercial thickening agents when combined with amino acid-based formulas. Amino acid-based formulas present unique challenges for thickening, and limited data exist to guide safe and effective clinical practice.

Methods: This study examines three commercial thickening agents: Gelmix® Infant Thickener (carob bean gum), Thick-It® Original (cornstarch), and SimplyThick® EasyMix™ (xanthan gum). Each thickener is tested with amino acid-based formulas Nutricia Neocate® Infant DHA/ARA and Nutricia Neocate® Junior Unflavored. Samples are prepared according to manufacturer-recommended instructions to target International Dysphagia Diet Standardization Initiative (IDDSI) Levels 2 (mildly thick) and 3 (moderately thick). Flow characteristics are assessed using the IDDSI Flow Test, and spreadability is measured using the Line Spread Test (LST). Measurements are collected at 0, 5, 10, and 20 minutes post-mixing to reflect typical feeding durations. Qualitative observations, including clumping, separation, and ease of preparation, are also recorded.

Results: Data collection is currently ongoing, and no results are available at this time. Planned analyses will examine differences in viscosity, flow consistency, and stability across thickener types, formula types, and time points.

Conclusions: This study is expected to provide clinically relevant evidence regarding which commercial thickeners achieve and maintain target consistencies with amino acid-based formulas. Findings will inform clinical decision-making for speech-language pathologists, dietitians, and caregivers to support safe and effective feeding practices.

Presenters – Beck, Cassidy; Eggleston, Olivia
Authors – Cassidy Beck, Olivia Eggleston
Poster # B6

Communication Sciences & Disorders

BARRIERS TO HEARING AID USE: UNDERSTANDING THE PROBLEM, HEARING THE SOLUTIONS

This doctoral project analyzes factors contributing to low hearing aid adoption among individuals with hearing loss. Despite advancements in hearing aid technology and growing availability of options for amplification, utilization rates remain disproportionately low. A comprehensive analysis of current literature was conducted to explore the factors influencing hearing aid use, including stigma, financial barriers, perceptions of hearing loss, counseling, and systemic healthcare limitations. Findings indicate that stigma remains a leading barrier, restricting individuals from seeking and accepting hearing healthcare. Financial burden and inconsistent insurance coverage further restrict access, especially to those of lower socioeconomic status. While technology and access to over the counter hearing aids are improving utilization rates, there are still major limitations to make amplification accessible to all who need it. Improving hearing aid adoption rates requires a multifaceted approach, including effective, patient centered counseling, increased public awareness and acceptance, and policy reform, to address these barriers.

Presenters – Sanders, Ian
Authors – Ian Sanders
Poster # B43
Communication Sciences and Disorders
MANAGING TINNITUS, THE TENACIOUS TASK OF FINDING THE RIGHT PLAN
Tinnitus is a symptom of the auditory and/or neural system. Tinnitus presents as an unwanted sound or head noise (ringing, buzzing, static, humming, hissing etc.) perceived by the individual. The sound is not physically present or heard by others. Many times, it is referred to as a "phantom sound". It may result from several etiologies, including hearing loss, ear infections, head and neck injuries, medication side effects, and chronic illnesses. Due to these factors, treatment methods will vary. The most common cause of tinnitus is damage within the auditory system. Tinnitus can affect concentration, sleep, cause anxiety, be frustrating, aggravating, and overall diminish quality of life. This study reviewed and compared several strategic management methods pertaining to possible treatments and their effectiveness. Strengths and weaknesses of the plans are discussed.

Presenters – Lakey, Jared
Authors – Jared Lakey
Poster # B30
School of Health Care Professions
ENVIRONMENTAL NOISE ASSESSMENT AND POLICY IN THE UNITED STATES AND THE EUROPEAN UNION: A COMPARATIVE STUDY
This study explores the presence and impact of environmental noise in urban environments, particularly road traffic noise. The purpose is to compare noise data collection and mitigation methods utilized in Europe and the United States. A comparative review of noise mapping methodologies and a policy analysis of action plans were conducted using data produced under the Environmental Noise Directive in Europe and various Federal agencies in the United States. Results indicate an upward trend in noise exposure in urban environments in Europe despite the use of structured action planning, which suggests limitations in policy implementation and uneven compliance across EU member states. Conversely, no equivalent large-scale noise mitigation framework exists for the United States. Although current strategies have demonstrated limited effectiveness in reducing noise exposure, the overall objective of the Environmental Noise Directive remains important and provides a valuable framework for identifying noise burdens and highlighting populations most affected by environmental noise. Strengthening noise mapping practices, action planning, and policy implementation is necessary to address increasing urban noise exposure.

Presenters – Poteet, Gracie; Pezley, Zane
Authors – Gracie Poteet, Zane Pezley, Bonnie Slavych, & Wafaa Kaf
Poster # B39
Communication Sciences and Disorders

PATIENT-REPORTED COPING IN TINNITUS: A THEMATIC ANALYSIS OF 4C QUESTIONNAIRE RESPONSES

Tinnitus affects an estimated 10–15% of adults, and many individuals report significant challenges in coping with its impact on daily life. This study examines how adults with tinnitus describe their coping experiences and identify strategies they perceive as helpful, using the 4C questionnaire: carrying out daily tasks, calmness and relaxation, contentment, and confidence without avoidance. A qualitative study using a deductive thematic analysis was conducted on pre-treatment responses to the 4C questionnaire from 220 participants enrolled in an internet-based cognitive behavioral therapy (iCBT) program for tinnitus. This approach allowed for systematic exploration of coping patterns within the four domains while remaining sensitive to participant-driven insights. Preliminary analyses indicate patterns in coping experiences across the 4C domains, with 22 initial codes organized into five possible broader categories related to daily functioning, rest and relaxation, enjoyment of life, and confidence without avoidance. These findings provide clinically relevant insight into how individuals with tinnitus describe and manage their experiences, with implications for iCBT and intervention programs to strengthen coping skills.

Presenters – Love, Jessica; Graham, Barcley; Weimer, Delaney
Authors – Barcley Graham, Charles Hill, Jessica Love, Jon Rattenborg, Delaney Weimer, Daniel Wilson, Ph.D.
Poster # B31
School of Health Sciences

RELATIONSHIPS BETWEEN ULTRASONOGRAPHIC MEASURES OF THE QUADRICEPS AND JUMP PERFORMANCE

The purpose of this study was to investigate the relationship between muscle thickness (MT) and echo intensity (EI) with counter-movement jump (CMJ) and depth-jump (DJ) performance. Using B-mode ultrasonography, images of a given muscle can be taken in the sagittal plane to measure MT and EI , which has been shown to be a valid measure of intramuscular quality. Associations between MT and power have been shown, and EI has been negatively associated with peak torques, even when normalized for total mass. Little is known about relationships between MT, EI, and performance of powerful movements such as the CMJ and DJ. [HC1.1][WDJ1.2][LJ1.3]The medial gastrocnemius (MG) and vastus lateralis (VL) are two muscles associated with athletic movements such as squatting, jumping, and sprinting. We measured MT and EI of the MG and VL in seven college aged (23 ± 3 years) males and females. Ultrasonography was followed by three CMJ and three DJ tests. Ground contact time (GCT), reactive strength index (RSI), and ground reaction force (GRF) were collected using force plates during both jumps.

Presenters – Hermansen-Wells, Clara; Hawkins, Haley; McElroy, Jazmin
Authors – Haley Hawkins, Clara Hermansen-Wells, Jazmin McElroy, & Wafaa Kaf
Poster # B23
School of Health Care Professions

BEHAVIORAL AND ELECTROPHYSIOLOGICAL AUDITORY INVESTIGATION AMONG YOUNG ADULT HEAVY VAPERS

There is growing concern that e-cigarettes may induce neurotoxic effects on the auditory system. This IRB-approved, ongoing study examines electrophysiologic differences between e-cigarette users and matched controls. Participants undergo simultaneous electrocochleography (ECochG) and auditory brainstem response (ABR) recordings at slow and fast click rates, and auditory middle latency response (AMLR) testing to assess the auditory pathway from the cochlea and auditory nerve through the brainstem to the thalamocortical levels. Preliminary findings suggest no subjective differences in hearing thresholds. Objectively, slow rate ABR waves I, III, and V show larger amplitudes in vapers (0.73, 0.28, 0.46) compared to the controls (0.075, 0.1, 0.26). Wave II amplitude was smaller in vapers (0.15 μV) than in controls (0.31 μV) at the slow rate yet remained detectable at the fast rate, where it was absent in controls. The AMLR Na-Pa wave amplitude was much smaller in vapers (1.07 μV) versus controls (1.87 μV). For ECochG, no differences at the cochlear synapse level. Preliminary findings suggest that e-cigarette users exhibit potential brainstem and thalamocortical neural changes; further research is warranted.

Presenters – Ohlson, Kaylee
Authors – Kaylee Ohlson, Christopher Lupfer, Randi J. Ulbricht
Poster # A35

McQueary College of Health and Human Services (MCHHS)

EBP1 AS A MEDIATOR OF INFLAMMASOME SIGNALING AND EPIGENETIC GENE REGULATION IN EARLY EMBRYOGENESIS

The inflammasome is a protein complex that regulates inflammation in early embryonic development. Inflammasome activation increases levels of DNA methylation, an inherited mark on DNA affecting gene expression. This inflammasome-mediated regulation of DNA methylation occurs through an unknown mechanism, which we postulate to include a protein essential to regulatory cellular processes, EBP1. EBP1 knockout cells are generated using gene editing. Because EBP1 has previously been shown to be essential in HEK 293 cells, we adjusted the gene editing strategy to complement EBP1 expression to maintain the knockout line. Once successful knockouts are generated, the amount of DNA methylation is quantified using a colorimetric ELISA. It is expected that the cells lacking EBP1 will have an increased amount of global DNA methylation compared to cells expressing EBP1. Our data show that EBP1-deficient cultured human cells exhibit increased levels of global DNA methylation following inflammasome protein overexpression compared to cells expressing EBP1. This work will increase our understanding of the influence inflammation has on epigenetic regulation in embryonic development, a potentially important part of preventing recurring pregnancy loss.

Presenters – Maxey, Regan; Traum, Harry; Hodes, Madison; Escobar, Rudy; Higginbottom, Caleb; Jenkins, James
Authors – Rudy Escobar, Caleb Higginbottom, Madison Hodes, James Jennings, Reagan Maxey, Harry Traum, Daniel Wilson, Ph.D.

Poster # A27

Kinesiology

DOES RPE-BASED LOADING OR PERCENTAGE-BASED LOADING MAINTAIN BETTER MECHANICS UNDER FATIGUE?

The main goal of weight training is to apply enough stress to move athletes beyond their current level. In the science of strength and conditioning, coaches prescribe various ways of loading athletes to maximize results (e.g., increased strength, hypertrophy, endurance, and (or) power). Through the use of two different loading methods, we will measure the accuracy of the effects of prescribed training loads. Previous research shows that there are two main systems of load management, or ways of prescribing the weight an athlete should be lifting. These two ways are percentage-based estimates of a one repetition max effort (1RM) and autoregulated repetitions in reserve (RIR, also referred to as rate of perceived exertion [RPE]). The research also suggests that velocity-based training provides a practical way to monitor fatigue, as reductions in bar velocity or variation in bar path are closely related to decreases in force output and athlete readiness. However, monitoring barbell path during a lift can also be utilized to monitor an athlete's fatigue level, because altered movement patterns are often associated with decreased force output and technical breakdown. Therefore, relying on fixed percentage-based loading may not accurately reflect an athlete's daily performance capacity, while autoregulated methods such as RIR may allow for better adjustments based on fatigue levels. The study was conducted using nine participants consisting of Division I football players, specifically offensive linemen. Their 1RM was calculated by conducting a 3RM test on their back squat days prior to their actual testing days. During the first day of testing, athletes completed three warm up sets of 5 reps, followed by 4 reps, then 3 reps to get up to the appropriate weight for their working sets. They completed a repetition scheme of 4x6 on their back squat and were instructed to do so at a 3 RIR (7 RPE) with their first and last sets recorded through the app "WL Analysis" to compare bar path through fatigue. Four days later, athletes completed the same test protocol, using 70% of their estimated 1RM instead of at a 3 RIR.

Presenters – Murphy, Ellie

Authors – Ellie Murphy, Dr. Sapna Chakraborty, Jessica Bennett.

Poster # A32

Occupational Therapy Program

PERCEPTIONS AND OUTCOMES OF PEDIATRIC TELEHEALTH OCCUPATIONAL THERAPY

Rationale: Recent increases in telehealth use indicated the need for a scoping review that examined client and provider perceptions and occupational performance outcomes of pediatric telehealth occupational therapy.

Design: The study is a scoping review of literature on pediatric telehealth occupational therapy using PRISMA-ScR reporting guidelines.

Inclusion Criteria: Articles published between 2015-2026 which were peer-reviewed and investigated pediatric telehealth occupational therapy were included in the review. ublications before 2015, non-peer-reviewed sources, and topics regarding in-person pediatric occupational therapy or other disciplines were excluded.

Intervention: The scoping review examined telehealth, which is the provision of services over the internet or phone, and may include synchronous or asynchronous communication.
Outcomes and Measures: Data were extracted using a custom table and McMaster's Critical Review Forms. The first author conducted a thematic analysis. The authors met to discuss the findings and reach consensus on results.
Results: Ongoing thematic analysis indicates preliminary efficacy of telehealth for improving children's occupational performance and general satisfaction among clients and providers. Telehealth was not found to be appropriate for all pediatric populations. Administrative, technological, and other barriers exist to telehealth service delivery.
Conclusions and Relevance: The study suggested that caregiver involvement, parent coaching, support for caregivers, and additional resources for providers may improve telehealth efficacy and feasibility. Pediatric occupational therapy practitioners should consider client and family characteristics and needs while determining the appropriateness of telehealth services.

Presenters – Barrett, Madelyn; Deposki, Angela; Pierce, Bailey; Webb, Price
Authors – Emily McDaniel, Meghan Amos, Madelyn Barrett, Angela Deposki, Bailey Pierce, Price Webb
Poster # B5
Health Care Professions
CORRELATION BETWEEN BALANCE CONFIDENCE SCORES AND TIMED UP AND GO SCORES IN COMMUNITY DWELLING OLDER ADULTS
The purpose of this study was to determine whether self-reported balance confidence measured by the Activities-specific Balance Confidence Scale (ABC) correlates with fall risk as measured by the Timed Up and Go Test (TUG).
Forty-two healthy community-dwelling adults over the age of 55 (mean age = 78.3, Male = 14, Female = 28) participated in this study. They were excluded if they were taking medication that could affect balance performance and could not stand independently for 20 minutes with or without an assistive device.
We hypothesized that ABC Scale scores would significantly predict TUG performance, with lower balance confidence associated with longer TUG times and greater fall risk.
Results indicated a moderate inverse relationship between balance confidence and mobility performance, indicating that individuals with higher perceived balance confidence were able to complete the TUG more quickly. These results reinforce the importance of assessing both objective mobility performance and patient reported balance confidence during physical therapy evaluation.

Presenters – Helm, Katie
Authors – Katie Helm, Lauren Stepanek, Josh Gill, John Finger, Jr., Meghan Kelley
Poster # B22
Biomedical Sciences
THE EFFECT OF STRESS ON GENE REGULATION INVOLVED IN PAIN SIGNALING AND WOUND HEALING IN AMERICAN ALLIGATORS

Stress response can cause a variety of physiological effects, from a decrease in insulin secretion to an increase in alertness, with most of these symptoms being well studied. According to the American Psychological Association, 76% of the population reports stress to the point of having physiological symptoms, making stress a prevalent issue. Any stimulus that causes an upset in organismal homeostasis could be deemed a "stressor", and as such, pain itself could be an example of a stress stimulus. In this study, we aimed to explore how pain and stress interact in juvenile American alligators (Alligator mississippiensis) as a model organism by using scute marking, a common identification method, to create a wound and measure the healing rate, as well as the genetic expression of PICK1, NPY, and CXCL8, both at the site of the cut and systemically. Since little is known about these processes, which are both highly conserved across taxa, including in humans, this project will provide important implications in understanding how molecular markers in pain and stress interact for individual health.

Presenters – Smith, Madisen
Authors – Dr. Hillary Roberts, Dr. Sarah Murray, Madison Borden, and Madisen Smith
Poster # B46
School of Health Sciences
EXPLORING THE IMPACT OF VIRTUAL JOURNAL CLUBS ON DIETETIC PRECEPTOR CONFIDENCE, SELF-EFFICACY, AND INTERPERSONAL SUPPORT
Dietetic preceptors play a vital role in dietetic intern development, yet many preceptors report feeling underprepared or not supported. Virtual journal clubs (VJCs) offer flexible professional development, though research on their impact on preceptor barriers is limited. This study aims to assess changes in preceptor's perceived self-efficacy, preparedness, and support following a VJC series, while also identifying participation barriers.
Dietetic preceptors at a public university were invited to participate in three VJC sessions. Electronic pre- and post-surveys were administered before and after the intervention and included Likert-scale items assessing perceived self-efficacy, preparedness, and support. VJC articles were selected through a needs assessment survey. A follow-up survey was sent to preceptors to identify potential barriers to attendance.
One participant completed the study in full, reporting an increase in perceived support, self-efficacy, and preparedness. Among those who did not attend, 8 responded to the follow-up survey; 75% stating they were too busy at work to attend. These results align with our hypothesis; however, sample size limits generalizability throughout this study.

Presenters – Sprague, Madlyn
Authors – Madlyn Sprague
Poster # B47
Audiology
BEYOND THE WORKPLACE: HIDDEN RISKS OF NOISE-INDUCED HEARING LOSS IN ENTERTAINMENT VENUES
Noise-induced hearing loss (NIHL) is a common concern among people with prolonged noise exposure, primarily in occupational settings. However, high-intensity sound exposure

is also prevalent in recreational environments, such as live music venues. While music is often considered a "wanted" sound, it can reach levels that are hazardous to employees and patrons who are unaware of the risk for auditory damage. The purpose of this study was to measure noise exposure levels in two live music settings, a local brewery and a restaurant in Springfield, Missouri, and compare these levels to Occupational Safety and Health Administration (OSHA) guidelines. Noise dosimetry was performed during three live music events. Although results revealed that levels did not exceed OSHA limits for an 8-hour workday, they represent substantial exposure over relatively short durations. These findings suggest that repeated exposure in similar environments may contribute to cumulative auditory damage over time. Increased awareness and implementation of hearing conservation strategies may help reduce the risk of NIHL in entertainment settings.

Presenters – Vavruska, Lakyn
Authors – Lakyn Vavruska
Poster # A47
School of Health Care Professions
MOVEMENT-BASED INTERVENTIONS AND THEIR RELATIONSHIP TO LANGUAGE DEVELOPMENT IN YOUNG CHILDREN: A SCOPING REVIEW
Language development is affected by a range of cognitive, environmental, and physical factors, including motor development. Growing evidence suggests that both gross and fine motor skills play a meaningful role in children's language acquisition. This scoping review reviews existing literature examining the relationship between movement-based interventions and language outcomes in children from birth to 18 years of age. Five scientific databases, PubMed, Google Scholar, Taylor & Francis, Web of Science, and the National Library of Medicine, were used for studies published between 2015 and July 2025. Data taken from each study included study design, population, motor domain, intervention type, and language outcomes. Findings showed consistent associations between motor functioning and language development. Gross motor skills were most strongly related to early language milestones such as vocabulary acquisition, while fine motor skills were linked to more advanced linguistic outcomes including grammar and narrative ability. Movement-based interventions showed small improvements in vocabulary and comprehension. Evidence also suggests integrated motor-language interventions may be helpful for neurodiverse populations. Overall, the research highlights motor development as an important contributor to language outcomes and identifies movement-based interventions as a promising strategy for supporting communication development in children.

Presenters – Walker-Schaefer, Micah; Thomas, Christina; Krohn, Ryan; Cobleigh, Kaane; Inao, Ryuki; Powell-Long, Marcus
Authors – Kaane Cobleigh, Ryuki Inao, Ryan Krohn, Marcus Powell-Long, Christina Thomas, Micah Walker-Schaefer
Poster # B49
School of Health Sciences

EFFECTS OF REAR-FOOT ELEVATED SPLIT SQUAT LOADING POSITIONS ON BIOMECHANICAL FORCES AND INJURY RISK

The rear-foot elevated split squat (RFESS) is commonly used in strength and conditioning programs to develop lower-extremity strength. Different loading positions alter biomechanical demands and may influence variables associated with lower-extremity risk. This study examined force-plate derived biomechanical metrics during the RFESS between two loading positions and groups. This data will indicate whether specific loading patterns are associated with biomechanical variables linked to injury risk, while comparing force metrics between soccer players and the general population. Ten participants, including five collegiate soccer players and five recreationally active adults, performed two RFESS variations with the dominant foot on the force plate. The variations were a barbell back-loaded position and a dumbbell anterior-loaded position. Ground reaction forces were recorded in vertical, anterior-posterior, and medial-lateral directions. These metrics will be interpreted using existing literature to determine whether variation-dependent biomechanical variables are linked to increased lower-extremity injury risk. Findings may help determine whether loading position has an effect on injury risk in general populations and athletes.

Presenters – Thomure, Chloe; Wolfe, Ella
Authors – Chloe Thomure, Ella Wolfe, Natalie Allen, Sarah Murray
Poster # A44

Nutrition and Dietetics, School of Health Sciences

SOCIAL MEDIA AND RECRUITMENT IN HIGHER EDUCATION

Background: This study explores how social media influences college students' decisions regarding enrollment and engagement in higher education institutions. As recruitment and retention strategies evolve in the digital landscape, understanding social media's impact is important. There is a gap in the literature regarding social media content that influences students and how it affects decisions at the program, career, and institutional levels. The purpose of this study is to understand social media's role in shaping students' decisions about enrolling at universities, majors, or academic programs.

Design: This qualitative study uses virtual focus groups with higher education students to explore experiences, opinions, and preferences related to university social media content and its influence on academic choices.

Methods: Participants were recruited via email, word of mouth, and social media. Eligible participants were at least 18 years old and currently enrolled in a higher education institution. Focus groups were conducted via Zoom, recorded, and transcribed for analysis. Data was analyzed using thematic analysis from participant statements.

Results: Results are currently under analysis and will be available for the presentation.

Presenters – Lieberman, Carissa; Martin, Hailea Jo
Authors – Carissa Lieberman, Hailea Jo Martin, Dr. Shurita Thomas Tate
Poster # A24

Department of Communication Sciences and Disorders

FROM TRAINING TO PRACTICE: GRADUATE PREPARATION, EARLY-CAREER SUPPORTS, AND SLP'S READINESS TO DELIVER AAC SERVICES

Augmentative and alternative communication (AAC) is a core speech-language pathology (SLP) competency yet training gaps in graduate programs leave many clinicians feeling underprepared to assess, implement, and train communication partners (Conlon et al., 2024; Sanders et al., 2021). Graduate programs vary in AAC coursework, practicum, and mentorship, risking inequitable client access to AAC services across pediatric and adult populations (Thistle et al., 2023), highlighting a need for targeted preservice preparation in assessment and intervention. The purpose of this study is to describe associations between SLPs' graduate-level AAC preparation and their perceived self-efficacy and readiness to implement. Participants (N=18) completed an online survey, and a subset completed 15-minute follow-up interviews. Clinicians reported frequent AAC service provision yet only modest perceived preparedness from graduate training, emphasizing that hands-on practicum, continuing education, and mentorship were most influential in building confidence for AAC implementation. Findings aim to inform best practices for graduate curriculum design and contribute to ongoing efforts to improve equitable AAC delivery across the continuum of care.

Presenters – Weir, Zoe
Authors – Dr. Michelle Jackson, OTD, MBA, OTR/L, Zoe E. Weir, OTDS
Poster # A48
School of Health Care Professions

GROWTH AND FIXED MINDSETS IN GRADUATE EDUCATION: A SCOPING REVIEW

Background: A growth mindset supports self-reflection, learning from mistakes, and adapting to future challenges. In graduate education, both faculty and students may adopt either a fixed or growth mindset. This scoping review examines whether a growth mindset is more effective than a fixed mindset in fostering resilience and lifelong learning in graduate students.

Methods: Four databases were searched via EBSCO. Search terms included “growth mindset,” “graduate students,” “growth mindset” and “fixed mindset,” “growth mindset” and “fixed mindset” and “students,” “growth mindset” and “fixed mindset” and “resilience,” “growth mindset” and “grit.” Inclusion criteria were peer-reviewed, English-language studies published in the last 10 years, related to growth and/or fixed mindsets in college students. Key themes were identified through thematic analysis.

Results: The initial database search retrieved 8,632 articles. Fifteen articles met the inclusion criteria and underwent thematic analysis. Four main themes were revealed: 1. Messages relating to success, 2. Learning opportunities, 3. Response to struggle, and 4. Value placement.

Implications: This scoping review found that an academic environment that promotes a growth mindset fosters lifelong learning, resilience, and student success, while supporting ongoing professional development for both faculty and students.

Presenters – Sultana, Kanij; Novik, Melinda

Authors – Kanij Sultana, Dr Melinda G. Novik
Oral Presentation – 1-PSU 315A
School of Health Sciences
PROCESS EVALUATION OF A UNIVERSITY FOOD RECOVERY PROGRAM
Objective: This study examines the process evaluation of a university food recovery program to identify logistical and personal barriers and explore students' perceptions.
Participants: All students enrolled at a large, Midwestern public institution who were registered members of the campus food pantry were recruited.
Methods: An online survey was administered in November 2025 and included both qualitative and quantitative questions assessing program participation, perceived effectiveness, and students feedback. Descriptive statistics and thematic analysis were utilized.
Results: Sixty-eight students completed the survey; 31 reported picking up food from the program at least once. Students provided positive experiences, particularly with food quality and amount of food received. The most common reasons for non-participation were off-campus location, inconvenient timing, and not seeing the email notification in time.
Conclusions: The findings suggest that universities should adopt food recovery programs. An emphasis on effective marketing with tailored communication, intentional alerts and ongoing evaluation is crucial.

Presenters – Blair, Morgan
Authors – Morgan Blair, Connor Eyre, Sara Wilson, and Kristen Thompson
Poster # A5
Department of Psychology, School of Mental Health & Behavioral Sciences
RELIGION, SPIRITUALITY, & CANCER OUTCOMES: IMPLICATIONS FOR RURAL-URBAN DISPARITIES
A. Problem/Purpose: Cancer and stress have shown to be linked when examining patient outcomes. The stress cancer diagnoses and subsequent treatments place on the mental and physical health of patients has been widely studied, as high stress and poor coping are associated with higher rates of negative outcomes (Jakovljevic et al., 2021). Consistent findings also show that religion and spirituality (R/S) function as protective factors for health outcomes (VanderWeele & Ouyang, 2025; Dempsey et al., 2025). Many studies show healthcare disparities between rural and urban cancer patients (Lewis-Thames et al., 2022). Despite consistent findings in each of these areas, there is a lack of literature examining the impact of R/S on rural vs. urban cancer outcomes. The purpose of this review is to synthesize findings on the impact of R/S on cancer outcomes and discuss the implications of this research for reducing disparities between rural and urban cancer outcomes
B. Procedure: Peer-reviewed studies from 2015 to 2025 were identified through systematic searches of PubMed, PsycINFO, and Atla Religion Database. Articles were located using keywords, such as oncology, mental health, rural, and religion. Articles were included if they reported quantitative or qualitative measures of the impacts of R/S on cancer outcomes and examined the differences between rural and urban cancer outcomes.
C. Results: Across multiple studies, R/S have shown to be integral to health outcomes of

cancer patients, as positive connections to religion or spirituality are associated with more positive outcomes (Baumann et al., 2024; Palmer et al., 2022). When examining rural communities in the United States, most demonstrate high levels of R/S. However, many report that their physicians do not mention R/S during treatment, despite most patients expressing desire for providers to address R/S in relation to mental health and treatment (Merath et al., 2020). Additionally, disparities continue existing between urban and rural healthcare accessibility and cancer outcomes, with evidence suggesting the gap is widening (Bhatia et al., 2022).

D. Conclusions and Implications: After examining the impact of R/S on health outcomes, as well as the disparities between rural and urban cancer outcomes, there is ample evidence that the inclusion of R/S within cancer treatment may contribute to more positive outcomes for cancer patients overall. Moreover, integrating R/S within healthcare settings during treatment of rural cancer patients shows potential to lessen the gap compared to urban patients. Future research should empirically evaluate the integration of R/S support in cancer treatment for rural patients to determine the impacts on cancer outcomes.

Presenters – Rutledge, Cadee
Authors – Cadee Rutledge, Alana Mantie-Kozlowski (Supervisor)
Poster # A38
NAN
DEVELOPING GRADUATE STUDENT SELF-EFFICACY IN BEHAVIOR MANAGEMENT AND COLLABORATION THROUGH SCHOOL-BASED EXPERIENCE

Graduate speech-language pathology (SLP) programs must prepare students for clinical work requiring behavior management and interdisciplinary collaboration. In response to program feedback, a structured applied off-site practicum experience was developed in a school serving children with significant behavioral and developmental challenges. Using a quasi-experimental, repeated-measures design, this study examined changes in graduate students' perceived clinical self-efficacy across a semester of practicum. Participants were 16 graduate SLP students who voluntarily completed pre- and post-semester surveys. Seven students participated in the applied experience (five with complete pre/post data); remaining students completed the standard practicum sequence. Self-efficacy was measured using an adapted Graduate Student Clinical Self-Efficacy Survey (McBride, 2022). Both groups improved, with applied-experience students showing larger gains in behavior management confidence and reflections indicating increased strategic awareness and professional self-assessment.

Presenters – White, Aspen
Authors – Bonnie K. Slavych, Ph.D., CCC-SLP, ACUE, Aspen S. White, B.S.
Poster # A49
Communication Sciences & Disorders
PATIENT PERCEPTIONS OF HEALTHCARE PRACTICES: AN EXPLORATORY SURVEY OF INDIVIDUALS WITH CHRONIC CONDITIONS

Individuals with chronic health conditions often interact with multiple healthcare providers and service systems, which may create perceptions of pressure to use services they did not actively seek. Reports from patients suggest experiences such as unsolicited appointment scheduling, persistent automated reminders, and feeling treated as a "commodity" rather than as a person. The purpose of this exploratory study is to examine whether patients with chronic conditions perceive certain healthcare practices as predatory, and to identify which behaviors are most frequently perceived as such.
This study will use a cross-sectional survey design. Adults with one or more chronic health conditions will be invited to complete an anonymous survey, available in both online and paper-and-pencil formats to increase accessibility for older participants. The survey will include questions on demographic and health characteristics, experiences with healthcare scheduling and messaging practices, perceptions of pressure or commoditization, and the impact of these experiences on trust and engagement with healthcare. Data will be analyzed descriptively to identify patterns and inform future research on healthcare practices and patient trust.

Presenters – Eschman, Sydney; Ramsey, Morgan; Verslues, Cecilia
Authors – Ashlea D. Cardin, Sydney Q. Eschman, Morgan R. Ramsey
Cecilia L. Verslues
Poster # A12
Occupational Therapy Department
USE OF AN ADAPTED PEOP PROCESS TO INFLUENCE CO-OCCUPATIONAL MEALTIME PERFORMANCE: AN EXPLORATORY CASE SERIES
The Person-Environment-Occupation-Performance (PEOP) Model can be used to maximize occupational outcomes at person, organization, or population levels. A dyad-focused version has yet to be developed. To address this evidentiary gap, researchers developed a novel adaptation of the model (d-PEOP) to explore how dyadic characteristics influence the co-occupational performance of mealtime.
Researchers used an exploratory pilot case-series design to track the experiences of two caregiver-child dyads over a 10-week period for children aged 0-3 years and their caregivers. The d-PEOP was used to inform standard occupational therapy intervention. Data were collected via a pre-posttest survey. Data revealed improvements in the dyadic mealtime experience for both caregiver-child pairs (Dyad 1=27% increase; Dyad 2=51% increase).
The d-PEOP may be an effective way to understand dyadic needs and inform therapeutic interventions that address mealtime co-occupation. Further research is needed to examine co-occupation and dyadic feeding experiences.

Presenters – Sizemore, Lacey
Authors – Lacey Sizemore, Alana Kozlowski
Poster # A42
Communication Sciences and Disorders

FACILITATING TEACHER ENGAGEMENT IN INTERDISCIPLINARY SCHOOL-BASED IMPLEMENTATION

Interdisciplinary collaboration among general education teachers, special educators, and related service providers (e.g., speech-language pathologists and occupational therapists) is widely recognized as best practice in K–12 schools; however, implementation remains inconsistent. Teacher engagement is frequently identified as a critical determinant of whether interdisciplinary initiatives are adopted and sustained. This study used a scoping review design to synthesize peer-reviewed research examining teacher engagement, resistance, and implementation factors associated with interdisciplinary educational approaches in school settings. Using the Arksey and O'Malley (2005) framework and Joanna Briggs Institute guidance, a systematic search was conducted across multiple academic databases (e.g., PsycINFO, PubMed, SAGE Journals) using keywords related to teacher engagement, implementation, and interdisciplinary collaboration. Findings across studies indicated three primary categories of barriers: structural constraints (e.g., time and workload), professional factors (e.g., insufficient training and role ambiguity), and relational influences (e.g., beliefs about responsibility and shared ownership). Bronstein's (2003) Model of Interdisciplinary Collaboration was used as a conceptual framework to interpret barriers and identify evidence-informed supports for sustainable implementation. Results highlight the importance of institutional structures, role clarity, and reflective team practices in strengthening teacher engagement and interdisciplinary collaboration in K–12 schools.

Presenters – Allen, Natalya; Bentley, Caroline; Curtis, Rebecca; Daharsh, Jennifer
Authors – Lindsey Brandt, SPT; Emma Farris, SPT; Shelby Hubbard, SPT; Halie Rackers, SPT; Elizabeth Williamson, PT, PhD?

Poster # B3

Physical Therapy

THE EFFECTS OF AQUATIC THERAPY ON INDIVIDUALS WITH MUSCULAR DYSTROPHY

Introduction: Muscular Dystrophies are commonly inherited neuromuscular disorders that result in muscle weakness due to the degeneration of skeletal muscle. This systematic review examined the effectiveness of aquatic therapy as an intervention to delay the progression of the functional loss due to muscular dystrophy. Methods: This review looks at males and females ages 5-35 that had a form of muscular dystrophy and participated in rehabilitative aquatic therapy. Our initial search identified 38 articles from multiple electronic databases, all but nine articles were excluded. Our search excluded any single-subject studies, studies which examined other diagnoses, and studies that did include aquatic therapy intervention. Results: Findings from the remaining nine articles found that aquatic therapy significantly improved range of motion, muscle strength, functional movements, respiratory measures, and quality of life among participants. Conclusion: These findings suggest that aquatic therapy is an effective intervention for improving motor function and quality of life for those with muscular dystrophy. Future research should include a control group to further determine efficacy and reliability of aquatic therapy interventions.

Presenters – Wright, Madisonann
Authors – Madisonann Wright
Poster # A50
School of Health Care Professions
EFFECTS OF BOOK GENRE ON TODDLER LANGUAGE AND ENGAGEMENT DURING SHARED STORYBOOK READING
This study examined how book genre influences toddler language and engagement during shared storybook reading. One mother-child dyad (~24 months) participated in 5-minute reading sessions across four genres: labeling, wordless, informational, and rhyme. A consistent dialogic reading approach was used. Each intervention book was read four times for a total of 16 sessions. Quantitative measures included verbal output and engagement ratings coded from video recordings. Qualitative data included caregiver reflections and critical incident notes analyzed using reflexive thematic analysis. Results indicated that labeling and wordless picture books were associated with higher verbal output and engagement, while rhyme and informational texts supported sustained attention but elicited fewer verbalizations. Qualitative findings highlighted themes of familiarity, predictability, and caregiver responsiveness as key factors influencing participation. Overall, findings suggest that book genre differentially supports early language and engagement, with implications for caregivers and clinicians selecting developmentally appropriate materials.

Presenters – Reinwald-Johnson, Olivia
Authors – Olivia Reinwald-Johnson and Amy Hulme, PhD
Poster # A37
School of Health Sciences
THE EFFECT OF SPTBN1 KNOCKDOWN ON NUCLEAR IMPORT OF HIV-1 IN CHME3 CELLS
Human immunodeficiency virus (HIV-1) causes chronic illness, and as of 2024 there are roughly 40.8 million people living with HIV-1 worldwide. Many 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 upon the nuclear import step of HIV-1 replication. To better understand how SPTBN1 affects HIV-1 nuclear import in CHME3 cells, the formation of 2-LTR circles will be measured. The circular 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. 2-LTR circles can be accurately quantified by qPCR analysis with the primer efficiencies calculated for the beta-actin and 2-LTR primer sets. For this project, siRNA knockdown of SPTBN1 will be confirmed with qRT-PCR before infecting CHME3 cells with a 1/8 dilution of virus. DNA will be isolated from the infected cells, and qPCR will follow. In the future, an infectivity assay will be performed with N74D and E45A capsid mutants to better understand how cellular proteins interact with HIV-1 capsid. These experiments will allow us to further understand the role of cell factors like SPTBN1 in HIV-1 nuclear import.

Presenters – Jochens, Brooke
Authors – Brooke Jochens, Alana Mantie-Kozlowski, Ph.D., CCC-SLP

Poster # A20

DEPARTMENT: COMMUNICATION SCIENCES AND DISORDERS PREPARING SLP STUDENTS TO MANAGE BEHAVIORAL DYSREGULATION AND COLLABORATE IN SCHOOL-BASED INTERDISCIPLINARY TEAMS

The largest employment setting for speech language pathologists (SLPs) is within educational settings, with approximately 53% of SLPs working in public or private schools, according to ASHA. However, concerns regarding adequate preparation of graduate students to manage behavioral dysregulation and participate effectively in interdisciplinary teams are prominent among new and seasoned SLPs. The purpose of this scoping review was to map the literature examining preparation of SLP graduate students for managing behavioral dysregulation and engaging in interdisciplinary collaboration in school-based practice. This review was conducted in accordance with PRISMA-ScR guidelines and followed the Arksey & O'Malley scoping review methodological framework. A search for relevant literature was conducted across ASHAWire, SAGE Journals, Frontiers in Education, PubMed, ScienceDirect, and ERIC using the keywords: speech-language pathology, graduate student, behavior management, school-based practice, and interprofessional education. A total of 248 records were screened with duplicates removed, and 57 full-text articles remained. After screening the remaining articles, only six studies met all inclusion criteria. The included studies examined behavioral management preparation, interprofessional education opportunities, and interdisciplinary collaboration in school-based settings. Three themes emerged across included literature: limited formal preparation of maladaptive and dysregulated behavior management for SLP graduate students, the importance of structured interprofessional education opportunities, and the role of collaboration and role clarity in effective school-based practice. Findings suggest that graduate programs may benefit from emphasizing collaborative implementation of services and incorporating explicit behavioral management training within school-based preparation experiences. Improving these areas of training may enhance clinician readiness and support more effective communication intervention for students demonstrating behavioral dysregulation.

Presenters – Amstutz, Kamryn; Longhorn, Simoriah
Authors – Simoriah Longhorn, Kamryn Amstutz, Hillary Roberts, Sarah Murray

Poster # A3

Health Sciences

HOW ATTENDING A NATIONAL CONFERENCE FOSTERS A SENSE OF BELONGING IN DIETETIC STUDENTS

Leadership is a vital competency in dietetics. This mixed-methods study investigated how a structured framework, that included pre-, during, and post-conference tasks, impacted sense of belonging among nine dietetics students attending the Academy of Nutrition and Dietetics Food and Nutrition Conference and Expo. Prior to the study, 100% of participants had never attended the national event. Analysis using a Wilcoxon signed-rank test found a statistically significant increase in sense of belonging.

Qualitative analysis aligned with this, identifying networking, increased comfortability, and improved peer relationships as primary drivers of development. Guided activities, such as

group dinners and presenting to professional audiences, built self-efficacy. Following the intervention, 88.9% of students reported they were likely to attend future conferences. These findings suggest that structured activities and mentorship help mitigate barriers to inclusion and foster professional identity, helping to bridge the gap between student life and their sense of belonging to the profession.

Presenters – Kreikemeier, Callie; Schroeder, Megan
Authors – Callie Kreikemeierl, Megan Schroeder, Dr. Thomas C. Franklin
Poster # A22
Communication Sciences and Disorders
MISSOURI STATE UNIVERSITY BASKETBALL: IS THE NOISE TOO LOUD?
Noise-induced hearing loss (NIHL) has become an increasing concern across many occupations and industries, leading to the implementation of regulations designed to limit excessive noise exposure. While hearing conservation efforts typically focus on industrial environments, recreational noise exposure is another important area to consider. The purpose of this study was to measure noise levels at Missouri State University basketball games to evaluate the potential risk of NIHL among collegiate basketball players, coaches, and referees. Noise dosimetry measurements were used to examine noise levels in Great Southern Bank Arena during three Missouri State University men's basketball games and three Missouri State University women's basketball games. Results indicated that players, coaches, and referees were not exposed to noise levels exceeding the permissible exposure limits established by the Occupational Safety and Health Administration (OSHA). However, repeated exposure to these noise levels over time may contribute to cumulative noise exposure, which could increase the risk of NIHL in these populations across the course of a career. Further research is needed to better understand the extent of noise exposure in athletic environments and its potential long-term effects.

Presenters – Rattenborg, Jon
Authors – Jon Rattenborg, Charles K Hill, Adrien Martens, Shelby Houchlei, Stacy Goddard, Ryan A Gordon
Poster # B40
Kinesiology
ASSOCIATIONS BETWEEN ULTRASOUND-DERIVED MUSCLE MORPHOLOGY, ADIPOSITY, AND VO2PEAK IN YOUNG, TRAINED RUNNERS
We examined how body composition, as well as muscle thickness (MT), corrected echo intensity (cEI), and subcutaneous adipose tissue (ScAT) of quadriceps and calf musculature are associated with VO2peak in trained runners (150-300+ min. of moderate-to-vigorous intensity running per week). Participants (n = 25, 22 ± 3 yr) were recruited from the surrounding area. Ultrasonographic images of the rectus femoris (RF), vastus intermedius (VI), vastus lateralis (VL), and medial gastrocnemius (MG) were taken prior to a test to assess VO2peak. Associations between all variables and VO2peak were determined using Pearson's correlation coefficient. Multiple linear regression was also performed to determine if MT, EI, or ScAT of the assessed muscles were predictive of VO2peak. VO2peak

was negatively associated with BMI (r = -.670), fat mass (r = -.791), body fat percentage (r = -.707), and ScAT of the VL (r = -.436, all p < .05). VO2peak was positively associated with cEI of MG (p = .047). Additionally, cEI of the MG (p = .047) and cEI of the MG and VL (p = .019) were the strongest predictors of VO2peak. VO2peak was associated with more favorable whole-body composition, as well as ScAT and cEI, but not MT, of lower extremity musculature.

Presenters – Hall, Rachel
Authors – Rachel Hall (Dr. Alana Mante-Kozlowski as research advisor)
Poster # A16
Department of Communication Sciences and Disorders
IMPLEMENTING INTERDISCIPLINARY LANGUAGE THERAPY IN APE: A REFLECTIVE COMPARISON FOR TEACHER COLLABORATION
Interdisciplinary collaboration is both a legal requirement under the Individuals with Disabilities Education Act (IDEA) and an ethical responsibility outlined in professional standards for speech-language pathologists (SLPs); however, little research has examined collaboration between SLPs and educators in specialized areas such as adapted physical education (APE). This qualitative study was a thematic analysis that examined the barriers and facilitators of interdisciplinary collaboration during a 16-week clinical rotation at a state-operated school for children with severe, often comorbid disabilities and complex communication needs. Participants included seven graduate student clinicians from Missouri State University's Masters of Speech-Language Pathology program who implemented integrated language and physical education lessons in classroom and APE settings. Data from weekly written reflections were analyzed for recurring themes. Key barriers identified included communication challenges, role confusion, time constraints, power imbalance, and resistance to change. Facilitators included improved communication, direct guidance, mutual learning, respect, and a focus on shared IEP goals. The findings suggest that while systemic barriers persist, proactive communication and collaboration can enhance service delivery for students with complex needs. Continued research and education on interprofessional collaboration between SLPs and a variety of educational professionals is essential to identify factors that lead to the highest levels of success in functional contexts and create systemic change in educational settings.

Presenters – Dawson, Reece
Authors – Reece Dawson, Dr. Clay Franklin
Poster # B13
Communication Sciences and Disorders
ACTIVE NOISE-CANCELLING DEVICES VERSUS TRADITIONAL FOAM EARPLUG HEARING PROTECTION: COMPARATIVE ELECTROACOUSTIC ANALYSIS
Noise-induced hearing loss (NIHL) is a common and preventable cause of sensorineural hearing loss. This study evaluates whether consumer active noise-cancelling (ANC) devices provide meaningful sound attenuation compared to traditional foam earplugs. Three ANC devices and two disposable foam earplugs were evaluated using electroacoustic

measurements in a calibrated hearing-aid test box with a 2-cc coupler. Broadband pink noise at 85 dB SPL was presented, and attenuation was measured across octave bands from 125 to 8000 Hz. Three trials were obtained per device, and attenuation was calculated relative to baseline sound pressure levels. It is expected that foam earplugs will demonstrate greater attenuation at mid- and high frequencies, while ANC devices will show greater attenuation at lower frequencies. These findings will help clarify the frequency-specific performance of ANC devices and their potential role in hearing conservation.

Presenters – Stegeman, Danielle; Stegeman, Danielle; Schroeder, Kaitlyn
Authors – Danielle Stegeman, Kaitlyn Schroeder, Dr. Dee Telting
Poster # B48
Communication Sciences and Disorders
UNDERSTANDING CAREGIVER SUPPORT: TRAINING AND PERCEIVED IMPACT OF COMMUNICATION STRATEGIES IN APHASIA RECOVERY
Aphasia is a language disorder that impairs a person's ability to communicate but does not affect intelligence, and most often occurs after a stroke or brain injury. Over two million people in the United States are currently affected (National Aphasia Association, n.d.). Due to aphasia impacting not only the person but also those supporting them, caregivers often take on multiple roles and positions, including (but not limited to) providing daily support, advocating, motivating, and acting as "stand-in therapists" (Shafer et al., 2019). Evidence-based communication strategies for supporting people with aphasia (PWA) that are taught by speech-language pathologists (SLPs) have been shown to support recovery and improve progress (National Aphasia Association). However, it remains unclear how persistently caregivers receive training and/or how effective they perceive these communication strategies to be when supporting PWA.
This study aimed to investigate how caregivers were trained and what communication strategies they perceived as effective. The data was collected via a 12-question Qualtrics survey, which was offered to various clinics in surrounding areas. After analyzing the data from our 29 responses, the results revealed that most care partner training came directly from the SLP, either observing the therapy sessions or through direct coaching. Additionally, most participants reported that they would like to be directly coached by an SLP. Findings continued to highlight the need for SLPs to actively train caregivers to support effective communication for PWA.

Presenters – Sloan, Anna; Carter, Camryn; McHenry, Maci; Kozlowski, Tayte
Authors – Jennifer Marie Yates 1, Camryn E. Carter 2, Tayte Kozlowski 2, Maci E. McHenry 2, Anna C. Sloan 2, & Martin S. Rice 3.
Poster # A43
School of Health Professions
DEVELOPMENTAL OUTCOMES OF ADAPTED POWERED MOBILITY IN CHILDREN WITH LIMITED MOBILITY: A CASE SERIES
Purpose: This exploratory case series examined how a modified ride-on vehicle (MROV) intervention influenced motor development, cognitive processes (e.g., attention, cause-

effect understanding), sensory processing, and social participation in young children with limited mobility.
Methods: Two children (N = 2), aged 3 years with mobility-related diagnoses, participated in 1-hour, twice-weekly occupational therapy sessions for 6 weeks. Sessions included sensory-motor activities and MROV use targeting coordination, spatial awareness, and play. Caregivers were encouraged to use the MROV at home and document observations. Outcome measures included the Sensory Profile-2 (SP-2), Pediatric Evaluation of Disability Inventory (PEDI), and caregiver reports. Pre- and post-data were analyzed descriptively.
Results: Both participants showed stability or improvement across SP-2 and PEDI outcomes. Caregiver reports noted increased exploration, positive affect, and play participation, with variability in documentation.
Conclusion: Early adapted powered mobility may support sensory processing, engagement, and social participation in young children with limited mobility. Findings support emerging evidence for early MROV use and highlight the need for larger studies.

Presenters – Horn, Abigail; Lewis, Sarah
Authors – Dr. Shurita Thomas-Tate, Abigail Horn, Sarah Lewis
Poster # A19
Department of Communication Sciences and Disorders
ROLES IN LITERACY: COMPARING SPEECH-LANGUAGE PATHOLOGISTS' AND ELEMENTARY TEACHERS' PERCEPTIONS AND PRACTICES
This qualitative study examined school-based speech-language pathologists' (SLPs) and teachers' perceptions of their own and each other's roles in literacy intervention. Both professions support literacy development through phonological awareness, vocabulary, comprehension, and writing; however, collaboration often remains limited despite overlapping expertise. Thirty-eight participants (16 SLPs, 19 general education teachers, 2 special education teachers, 1 reading interventionist) completed a 10–15-minute online survey examining current literacy practices, perceived roles, and collaboration barriers. Results indicated that 42% of participants felt their school did not clearly define literacy roles. While 68% reported confidence defining their own role in literacy, only 43% felt confident defining their counterparts' roles. Collaboration most commonly occurred weekly (42%), primarily through informal check-ins and IEP meetings. The most frequently reported barriers were limited time, lack of shared planning time, and scheduling conflicts. Participants identified scheduled collaboration time, professional development, and greater role clarity as key strategies to improve interdisciplinary literacy support. These findings highlight the need for clearer role definition and structured collaboration opportunities to strengthen school-based literacy intervention.

Presenters – Hammitt, Ashley; Ruffini, Gabrielle
Authors – Ashley Hammitt, Gabrielle Ruffini, Dr. Dee Telting
Poster # B20
Department of Communication Sciences and Disorders

SLP GRADUATE STUDENTS' PERCEPTIONS AND KNOWLEDGE OF ADULT INPATIENT REHABILITATION FACILITIES AS A WORK SETTING.

Traditionally, speech-language pathology (SLP) practice has roots in both educational and medical settings; however, the field originated in educational contexts prior to expanding into medical settings (Cutter, 2025). Consistent with this history, education at the graduate level regarding adult Inpatient Rehabilitation Facilities (IRFs) as a work setting may be limited. The purpose of this study was to explore and describe SLP graduate students' perceptions and knowledge of adult IRFs as a potential work setting. Specifically, this study examined the relationship between students' IRF work preference rankings, perceived knowledge, and overall perceptions, as well as differences between first- and second-year graduate students. A survey design was utilized to identify knowledge gaps, inform educational preparation, and support graduate students' career decision-making. Results indicated that second-year students demonstrated slightly higher knowledge scores and preference for IRF practice than first-year students; however, these differences were not statistically significant. No significant relationships were found between students' IRF preference, perceived understanding, and objective knowledge of IRF practice.

Presenters – Nguyen, Crystal
Authors – Crystal Hoang Tran Nguyen, Ako Rostampour, Michael Healey, Erin McVey, Leah Kolb, Briggs Terwilleger, Scott D. Zimmerman
Poster # B37

School of Health Sciences

SEX DIFFERENCES IN HIPPOCAMPAL HEAT-SHOCK PROTEIN 70 PROTEIN EXPRESSION FOLLOWING A SINGLE BOUT OF EXERCISE

Heat-shock protein 70 (HSP70) is a molecular chaperone that is increased during physiological stress, e.g. exercise (Moore et al. 2016) and is involved in the clearance of amyloid-beta by interfering with the assembly of oligomers (Rivera et al. 2018). Little is known about the impact of a single bout of exercise and sex differences on the expression of HSP70. Twenty-nine male (n=14) and female (n=15) outbred mice (Swiss Webster (CFW), Charles River Laboratories) were acclimated to a treadmill for one week. Male (n=8) and female (n=8) mice were randomly selected and ran for one hour at 20 m•min-1. Hippocampal tissue was collected within one hour of the end of running. Outbred female mice had a greater HSP70 response to exercise (2.57-fold increase, p<.001) than males (1.94-fold increase, p<0.12). Exercise training promotes HSP70 production which may limit the progression of Alzheimer's disease (Moore et al, 2016). These data demonstrate that a single bout of exercise is sufficient to increase the production of HSP70, and the response of female outbred mice is greater than that of males.

Presenters – Bourner, Madelyn; Haacke, Kylie; McGonigal, Cassidy; Miles, Mallorie; Lawson, Matthew
Authors – Morgan Cervera, Jackson Dampier, Rachael Livingston, Gram Richardson, Patricia Cahoj, Sean Newton, Jason Shaw
Poster # B7

Physical Therapy
THE EFFECTS OF WII FIT FOR THE TREATMENT OF URINARY INCONTINENCE
Urinary incontinence (UI) is a common condition that can significantly affect quality of life, physical function, and psychosocial wellbeing. Virtual reality and game-based rehabilitation have emerged as engaging approaches to support therapeutic exercise. The purpose of this study was to investigate the effectiveness of a Wii Fit Balance Board intervention for the treatment of urinary incontinence. A 58-year-old female with a three year history of UI participated in a six week intervention using task oriented exercises through the Wii Fit system. The participant had a history of three childbirths including one vaginal delivery with episiotomy and two cesarean sections and reported UI with exertion and difficulty maintaining bladder control when the bladder was full. Outcome measures included the International Consultation on Incontinence Questionnaire Urinary Incontinence Short Form (ICIQ UI-SF), the ICIQ Overactive Bladder questionnaire (ICIQ-OAB), the Kings Health Questionnaire (KHQ), and bladder diaries. Post intervention results showed reductions in urinary frequency and incontinence episodes and improvements in several quality-of-life domains. These findings suggest Wii Fit based training may help improve urinary incontinence symptoms and quality of life.

Presenter – Russell, Claire
Author – Claire Russell
Poster # B42
School of Health Care Professions
COLLABORATION BETWEEN GRADUATE SLP STUDENTS AND ADAPTIVE PHYSICAL EDUCATION TEACHERS: AN INTERPRETIVE STUDY
Interprofessional collaboration is increasingly emphasized in school-based practice; however, limited research has examined how graduate speech-language pathology (SLP) students experience collaboration within adaptive physical education (APE) settings. This study explored how graduate SLP students, APE teachers, and a supervising clinician experienced push-in language intervention embedded within an APE program serving students with severe-profound disabilities. Using an interpretive description framework (Thorne, 2016), qualitative data were collected over nine weeks through graduate student reflections, teacher feedback, and supervisory analytic memos.
Inductive thematic analysis revealed that collaboration functioned largely as parallel participation rather than fully integrated co-teaching. Five interconnected patterns emerged: (1) friendly assistance rather than reciprocal partnership, (2) role ambiguity and misaligned expectations, (3) professional learning through misalignment, (4) moments of genuine instructional integration, and (5) reflexive recognition of structural constraints. While participants valued teamwork and demonstrated increased awareness of language integration within movement-based activities, sustained collaborative change was limited by established routines, unclear role definitions, and contextual barriers. Importantly, graduate clinicians demonstrated growth in professional identity, advocacy, and interprofessional communication skills through navigating these tensions.
Findings suggest that early interprofessional experiences may initially operate in parallel

rather than collaborative modes, particularly when shared goals and authority structures are not explicitly negotiated. Structured planning, clarified expectations, and deliberate attention to power dynamics may enhance authentic collaboration. Even when integration remains partial, such experiences contribute meaningfully to professional readiness and collaborative judgment among graduate clinicians. This study offers practice-based insight into preparing SLP students for inclusive, interdisciplinary service delivery in complex educational environments.

Presenters – Hill, Charles
Authors – Charles K. Hill, Jon Rattenborg, Shelby Houchlei, Adrien C. Martens, Brooklyn Vleisides, Samantha Buehler, Anabella Verkler, Aiden McLean, Taylor Dinyer-McNeely, Keith McShan, Cody Smith, Stacy Goddard, Ryan A. Gordon.
Poster # B24
School of Health Sciences
BODY COMPOSITION, MUSCULAR QUALITY AND SIZE, AND STRENGTH IN GLP-1 RA USERS WITHOUT AND WITH RESISTANCE TRAINING
Semaglutide induces large reductions in body mass that includes both fat mass and fat free mass. Limited evidence has assessed changes in body composition and muscular health while combining semaglutide use with exercise. We investigated changes in these outcomes in middle-aged (30-55 years) adults. Participants visited the Exercise Physiology Lab three times. During each visit (V1, V2, V3), body composition (BodPod), size and quality of the quadriceps and biceps brachii (B-mode ultrasound), and strength were assessed. Following V1, participants performed no resistance training (RT) for four weeks before returning for V2. Following V2, participants performed an eight-week RT protocol. Final assessments (V3) took place after the final RT session. Fat mass (kg) and body fat (%) changed from V2 to V3 ($p = .004$ and .008, respectively). No differences in fat free mass (FFM) appeared, indicating participants retained lean mass across the RT protocol. Indices of muscle health remained unchanged. From V2 to V3, leg press (MD = 43.4 kg, p < .001) and chest press strength (MD = 5.8 kg, $p = .005$) increased. These findings provide support that lean mass and muscular function can be preserved when RT is included while using semaglutide.

Presenters – Houchlei, Shelby
Authors – Shelby Houchlei, Charles K. Hill, Jon Rattenborg, Adrien C. Martens, Brooklyn Vleisides, Samantha Buehler, Anabella Verkler, Aiden McLean, Stacy Goddard, Keith McShan, Cody Smith, Taylor Dinyer-McNeely, Ryan A. Gordon.
Poster # B27
School of Health Sciences
CHANGES IN DIETARY INTAKE AND METABOLIC HEALTH IN SEMAGLUTIDE USERS WITHOUT AND WITH RESISTANCE TRAINING
Semaglutide induces significant weight loss through appetite suppression and caloric restriction. We investigated changes in dietary intake and metabolism in semaglutide users both without and with a resistance training (RT) protocol. Eleven adults (30-55 years) using semaglutide participated in this study. At three different lab visits (V1 – baseline; V2 – after

four weeks of continued medication use and no RT; V3 – after an eight-week RT protocol alongside medication use), measures of resting metabolic rate (RMR), glycated hemoglobin (HbA1c), and fasting blood glucose (FBG) were collected. Additionally, prior to each lab visit, three-day dietary logs were used to assess caloric and protein intake. At V1, participants were encouraged to consume adequate calories and protein (e.g., 1.2 g/kg of body weight). We observed no significant changes from V1 to V3 for RMR, HbA1c, or FBG. Food logs indicated caloric intake increased from 1097 kcals/day (V1) to 1258 kcals/day (V3), though these findings were not significant. Protein intake increased from V1 to V2 (53 g at V1 vs 63 g at V2, p = .036). Further research should examine how diet, physical activity and metabolism interact within users of semaglutide when combined with exercise.

Presenters – Schasteen, Caitlan
Authors – Caitlan Schasteen, OTR/L, CLT; Traci Garrison, DHSc, OTR/L; Megan McMahan, PT; Tara Boehne, OTD, OTR/L
Poster # B45
Department of Occupational Therapy
ADDRESSING CLINICAL EDUCATOR CONFIDENCE IN USING EVIDENCE-BASED STRATEGIES DURING CLINICAL EDUCATION
Clinical education is a vital component of the rehabilitation profession. Clinical educators are regularly in demand as students need clinical placements each year. Healthcare programs rely on quality educators to provide a supportive and comprehensive learning environment. This quality improvement project aimed to evaluate the effects of a series of videos and handouts in the areas of growth mindset, grit, resilience, soft skills, generational perspectives, and motivational interviewing developed to prepare rehabilitation professionals to grow as educators. Thirteen clinicians participated in a pre- and post-survey, post-test, and focus group to assess perceived effectiveness of these educational videos. Preliminary analyses suggest the post-test and survey demonstrate statistical significance. Common themes identified from the focus group following participation in this educational opportunity included: (1) developing a professional learning mindset, (2) individualizing learning, (3) impact of generational differences, (4) communication and reflective teaching practices. This information can be applied to future learning opportunities to support educator development to improve engagement and clinical student learning.

Presenters – Carr, Hannah
Authors – Hannah Carr
Poster # B8
Communication Sciences and Disorders
MILITARY NOISE EXPOSURE
It is well known that military personnel are exposed to high levels of noise throughout their service, placing them at an increased risk of noise-induced hearing loss (NIHL) and tinnitus from repeated exposure to loud noise levels. Federal agencies, including the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety

and Health (NIOSH), established noise exposure guidelines for both civilian and military occupations. Comparing the established guidelines to the noise encountered in the military shows that they underestimate the levels experienced by military service members. Findings show that small and large-caliber weapons produce sound levels exceeding the 140 dB SPL maximum limit set by both OSHA AND NIOSH. Findings indicated differences in risk across occupations, showing that not all military occupations are exposed to high levels of noise, but many are still exposed to moderate levels. A comparison of established guidelines underestimates the levels experienced by military personnel. Personnel in infantry or artillery experience higher levels of noise exposure than those in administrative or medical roles. Due to the complexity of noise in military environments, it is difficult to determine appropriate measures to ensure that the provided hearing protection effectively reduces the impact of hazardous noise.

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

Presenters – Malachowski, Makayla
Authors – Makayla Malachowski
Poster # A26
English
TECHNICAL COMMUNICATION AS COMMUNITY ENGAGEMENT: ADVOCATING FOR SERVICE-LEARNING COURSES IN TPC PROGRAMS
Technical and Professional Communication (TPC) programs often require internships or capstone experiences to help students develop professional skills, build networks, and assemble portfolios of their work. However, many traditional internships expect students to be proficient in their skills and provide limited space for them to grow into their roles. This study examines how service-learning course models may better support emerging TPC professionals by providing structured opportunities for skill development, reflection, and community engagement. Focusing on Missouri State University's The Springfield Way internship program—which is grounded in the university's public affairs mission of community engagement, ethical leadership, and cultural competence—this research explores how service-learning can benefit students in both academic preparation and workplace expectations. Using a qualitative interview methodology, the study will gather perspectives from a program administrator, a community partner, a student intern, and a representative from the Citizenship and Service-Learning Office. These interviews conceptualized the program's goals, its alignment with TPC learning outcomes, and the ways students apply and strengthen technical writing skills in community-based contexts. The study's findings suggest that service-learning experiences offer TPC students a safety net to continue building their technical writing skills, practice professional communication, and engage meaningfully with community organizations in Springfield. Ultimately, this research seeks to demonstrate the value of integrating service-learning more intentionally into TPC curriculum to foster both student growth and community impact.

Presenters – Gulledge, Camryn
Authors – Camryn Gulledge
Oral Presentation – 2-PSU 315A
Department Art & Design
HERP COUNT 2025
My thesis body of artwork, Herp Count 2025, is a process-based project in which I log and document every herp, or reptile and amphibian, I encounter in the wild while investigating the realities of human impact on ecosystems. During 2025, I observed 1,406 individual animals, most of which appeared not in remote wilderness but in the compromised margins of human spaces. When I observe herps in a littered area, I collect nearby trash and bring it back to my studio, where I create a collage combining it with a detailed drawing of that specific individual. I use a clean-touch printmaking process that involves a stretched plastic film inked on the underside and placed over paper. As the animal moves, its weight transfers ink to the paper below, creating a delicate drawing. Each piece is an act of slow attention and care; a deliberate act of resistance to the speed and indifference that endangers these animals. Herp Count 2025 is a project about the need for improvement: in conservation, in lawmaking, in perception, and in how we inhabit shared ecosystems. It is about a need to pay attention, to demonstrate dedication, care, and hope in what I personally can do to improve my niche in the world and that there will be an improved future.

Presenters – Hayes, Liliana
Authors – Liliana Hayes
Poster # A18
Communication, Media, Journalism, and Film
THE LOUNGE
The Lounge, an original one-act stage-play written by Liliana Hayes, is a heartfelt comedic story set in a high school teachers' lounge — the one place students are never supposed to go. The play follows Petra Joy Pruitt, an eager and neurodivergent newbie English teacher, as she starts working at her alma mater, Grandin High School. Here, she steps into a world of quirky colleagues all fighting over how to spend a $40,000 funding surplus. The flighty, dramatic science teacher, Birdie Belrose, wants a sustainability garden for a place to house all her beloved plants. East Exley — the strict and dry-witted history buff who only teaches at Grandin so he can coach the basketball team — wants new bleachers in the gym. Then, the overzealous principal, Wes Warren, with his heart in the right place but head far from it, just likes to feel important while watching the fight from afar. All the while, their students continue to quietly fall through the cracks. Everything changes when a sharp-tongued teenaged troublemaker, Lavender LeClair, breaks into the lounge to steal test answer keys to sell to freshmen. Instead of turning Lavender in, Petra Joy sees what no one else has: a brilliant kid who's been secretly struggling for years, doing whatever it takes to get by. What starts as an unlikely tutoring session in the teachers' lounge slowly shifts the spotlight onto what really matters — the teachers who show up, the students who just need someone to notice them, and what a school could become if it actually tried. The Lounge was inspired by

the playwright's own experiences as a young student growing up while not realizing her brain worked different than her peers'. It is a piece that advocates for disability resources and student outreach while being easily digestible for general audiences. The script was first conceptualized in MED610: Playwriting with Cristina Pippa. It was further developed in MED766: Pre-Production Practicum for Stage and Screen and produced as a part of MED767: Staged Production, both classes instructed by Conci Nelson. Biweekly rehearsals began in late January 2026 and will run until mid-April when the play will premiere in Strong Hall as an experimental, immersive performance.

Presenters – Huffman, Mackenzie
Authors – Mackenzie Huffman
Oral Presentation – 2-PSU 308C
Department of Communication, Media, Journalism, and Film
THE UM...LIKE FISH: CREATING AWARENESS OF VOCAL PAUSES THROUGH STUDENT CALLOUTS
This teaching activity is intended for an introductory public speaking course to foster awareness of vocal pauses/filler words. The Um...Like Fish activity should be implemented after the instructor has already explained the importance of speech delivery. After introducing the activity, small prizes are brought to every class period. When the instructor uses a filler word, the students have the opportunity to raise their hand and bring the filler word to the instructor's attention. If they do so, then the student receives a prize. Over a total of 10 class periods, four class sections, two instructors, and 96 students, students recognized filler words by the instructor a total of 16 times. As such, this activity--and variations thereof--should instead be used during a single class period, not over the course of a semester. What this activity, instead, teaches students is the invisibility of filler words, and assists in de/prioritizing what aspects of delivery to focus on during speech practice. This begs the question, should public speaking instructors work to reduce the number of filler words in student speech?

Presenters – Lizarraga, Moira
Authors – Moira Lizarraga, Gift Akintoye
Oral Presentation – 2-PSU 317A
Department: Department of Communication, Media, Journalism, and Film
TRANSLATING DIGITAL TRUST: AUTONOMY, SECURITY, AND RELATIONAL BOUNDARIES ON SOCIAL MEDIA
This qualitative study advances an understanding of how Gen-Z individuals in romantic relationships translate social media behaviors into relational meaning, particularly in relation to trust and boundary negotiation. Drawing on 12 semi-structured interviews with U.S. college students between the ages 18-25, we conducted a thematic analysis guided by Expectancy Violations theory (EVT) and Communication Privacy Management theory (CPM). Findings identify two conflicting trust models: an autonomy-oriented model that prioritizes independence and assumes trust as inherent to the relationship, and a security-oriented model that prioritizes transparency and ongoing trust-building. These divergent

frameworks lead to systematic misinterpretations where behaviors intended to reinforce the relationship are perceived as violations. Our analysis shows that social media functions as a key space where relational expectations are enacted, contested, and negotiated. We introduce the concept of relational translation to describe the interpretive labor required to reconcile mismatched trust models in digitally mediated relationships. These findings extend existing theories of relational communication by highlighting how meaning-making processes – rather than behaviors themselves – drive conflict and connection in contemporary romantic relationships.

Presenters – Hinkson, Sarah
Authors – Sarah Kwong Hinkson
Poster # B25
Department of Communication, Media, Journalism, and Film
AGAPE: A MINI-EPISODIC SERIES FOCUSED ON THE DIFFERENT FORMS OF LOVE
Agape is a six-part, mini-episodic series written by Sarah Kwong Hinkson. A year after their mother's passing, Milo must come to terms with their guilt and strained relationship when an all-knowing being appears, bearing the face and likeness of their dead mother.
Agape is centered on the different forms of love within the Greek Mythos. In its first installation, Agape was part of a series of short plays conceived in Hinkson's THE 482 course. Hinkson focused her plays on love in an effort to challenge the stereotypes associated with the trope and highlight how love or relationships in general can be complex and everchanging. Love is not as simple as romantic love shown on screen. It can be heartbreaking, uplifting, terrifying, unplanned, imperfect, and at times even toxic when not nurtured.
The most recent product was created into a more concise series, highlighting the week leading up to the main protagonist's birthday and their ever-present anxiety and grief associated with their mother. Through MED 766 & MED 767, Hinkson has been able to actualize the shifting relationships between the main protagonist, their mother, their partner, and friends.
Our main protagonist, Milo (they/them), is introspective and deeply scarred after the loss of their mother. Not only did the two share the same quiet nature and observant tendencies, but they also shared the same birthday. Milo grieves their mother, but also their own sense of self.
This causes rifts in their present relationships with their partner, Noel, and their best friends, Grace and Lucy. A visit from an all-knowing being the week of their birthday, does damage, of course, to their psyche, but also opens them up to conversation with the people that care about them the most. Healing comes from recognizing that grief is a form of love, a quiet and tumultuous kind of love but love still the same.
The process of filming Agape has been also a form of love. It's been challenging but very rewarding process in finding venues, catering services, and also scheduling vastly different acting schedules. The actors and crew aboard have dedicated many weeks to making this project the best love story it can be. Without their dedication and the volunteered resources of the surrounding Springfield community, this project would not be possible. Special

thanks, as well, must be given to MSU Graduate Services, the amazing faculty/staff from the Communication, Media, Journalism, and Film Department, and the ever-supportive peers and classmates from the MFA Dramatic Writing program.
Filming is still ongoing but is set to wrap at the end of April 2026. Post-production will begin in May 2026 with coloring, scoring, sound-mixing and more detailed editing.

Presenters – Goodman, LaDonna
Authors – LaDonna Goodman - Writer, Director, Producer, DP; Sarah Hickson - Actor; Bob Farmer - Audio Engineer; Amina Swinson - Illustrator
Poster # A15
Department of Communication, Media, Journalism, and Film
THE SHOE
Purpose of research: For this project I wanted to explore two classic forms of storytelling: the fairytale and the radio play. Overtime each has declined in mainstream popularity, but both are having some what of a resurgence. this is exciting as both hold special meaning to me and so I was excited the leverage both in my project "The Shoe." By bringing these forms together along with speculative fiction, this apocalyptic fairytale takes a bite-sized look at morality and the nature of humanity. In it I also seek to highlight what makes radio plays distinct, their ability to engage the imagination of the listener through sounds and silence rather than visual saturation.
Methods: In the creation to this piece, I first had to adapt the short story I wrote into a radio play. The script of a radio play is unique in that the layers of sounds are established on the script. The music that is used to convey tone and sound effects had to be developed as they are not present in a medium like short stories. Like any works, several drafts were required, and techniques form dramatic writing were applied to shape dialogue, pacing and atmosphere. Next the actual recording process required both a cast and crew. After recording for each character, the audio engineer used the script and conversations to create a sound scape that expressed the story. Concurrently, an illustrator worked to create still images enhance the pivotal moments of the story.
Results: "The Shoe" is currently in post production. The final outcome will be the radio play paired with a curated set of still images.
Conclusion: This project explores and uplifts radio plays as a relevant medium for storytelling and fairytales as a story type that connects with audiences in a way that is both evergreen and emotionally satisfying. This project required several collaborators in several fields including illustration, acting and audio engineering in addition to writing. This collaboration mirrored the experiences of writers outside of the academic setting. Partnerships are the only way to complete projects and that was certainly my experience in producing "The Shoe."

Presenters – Lizarraga, Moira
Authors – Moira Lizarraga
Oral Presentation – 1-PSU 312C
Department of Communication, Media, Journalism, and Film

THE SWEETENING MEDIUM: PLEASURE AND SUFFERING INTERTWINED
This essay undertakes a media ecology of sugar and HFCS, a technology I refer to as the sweetening medium. More specifically, it suggests that the sweetening medium sustains an impactful duality of pleasure and suffering that is reflected in both its development and influence. From the refinement and crystallization of sugar to the enzymatic engineering of high-fructose corn syrup, sweetness has evolved from a mechanically produced sensory attraction into a chemically engineered necessity embedded in everyday diets and global food infrastructures. Approached through a media ecology lens rooted in medium theory, this paper examines sugar and HFCS not simply as ingredients but as media technologies with formal properties that introduce structural biases toward immediacy, durability, portability, and pleasure. These properties have embedded sweetness into cultural rituals, interpersonal communication, and emotional life while simultaneously reorganizing labor systems, imperial economies, and industrial food environments. In this paper, I argue that the historical development and material characteristics of the sweetening medium have structured social, cultural, political, and interpersonal environments in ways that both enable pleasure and conceal enduring forms of power, dependency, and inequality.

Presenter – Coonrod, Kara
Author – Kara Coonrod
Oral Presentation – 1-PSU 308C
Department of Art and Design
CORPUS MEUM, MEA ELECTIO
The interplay between religion, the body, politics, and self-actualization are innate to my existence and understanding of self. Using the material language of the Catholic church, and personally relevant folklore from its pagan roots, I invite the viewer to observe my personal inversion of religious-driven hierarchy, values, and norms, using my own surgically removed fallopian tubes as metaphor for the value given to my right to bodily autonomy. I offer a gentle rebuke to the past and present political and religious forces that view women as a vessel purely for furthering the species, rather than as equal human beings with their own ideas, dreams, and aspirations. The fallopian tube is where conception occurs, and my repetitive use of this form throughout my artworks represents not only my personal sovereign organ tissues in spiritual/physical form but also serves to elevate the tube itself: from a tiny but crucial component of the human female reproductive system to a sacred and deeply personal icon of freedom.

Presenters – Koehler, Mikaela
Authors – Mikaela Koehler
Poster # A21
English
UNDERSTANDING COMPOSITION STUDENTS' USAGE OF LEARNING MANAGEMENT SYSTEMS: A USABILITY STUDY OF D2L BRIGHTSPACE
This study investigates the usability of the D2L Brightspace learning management system (LMS) within composition classrooms at Missouri State University. Prompted by the recent

institutional transition to Brightspace and informed by firsthand teaching experience, the research aims to evaluate how effectively undergraduate students in ENG 110 courses interact with the platform. The study employed qualitative methods, including surveys, interviews, and heuristic evaluations, to gather student feedback on Brightspace's usefulness, satisfaction, ease of use, and accessibility. Survey data was collected using a modified version of Arnold Lund's USE Questionnaire, while interviews incorporated heuristic assessments based on established usability taxonomies. Participants included Missouri State undergraduate students aged 18–22 enrolled in composition courses during Fall 2025. The data collected revealed how Missouri State composition students struggle and interact with using Brightspace. Students often viewed Brightspace as difficult to use, not user friendly, and it impedes their ability to access and complete their course work. However, when shown how to use Brightspace and having the chance to ask questions about it, students become more comfortable and easily remember how to use it. With this perspective from students, it is clear there is a need for consistent course design to increase usability, accessibility, and inclusivity in order to increase student satisfaction, engagement, and outcomes inside and outside the classroom.

Presenters – Durr, Lillian
Authors – Lillian Durr
Oral Presentation – 1-PSU 317A
Department of English
NONBINARY GENDER PERFORMANCE AND SELF-IDENTIFICATION IN FRANKENSTEIN
Mary Shelley's 1818 novel Frankenstein, a text informed by a rich Romantic era philosophical tradition, has produced an expansive contemporary body of transgender studies scholarship. Advancing on transgender studies analyses of Frankenstein, my thesis analyzes the difference between the monster's internalized self-perceived identity and their externally performed and witnessed identity. I argue that the difference between the monster's internal and external identity can be interpreted as an analogy through which to understand contemporary nonbinary experiences. Specifically, I position the monster as an illustration of how the performance Judith Butler describes as gender in their 1988 essay "Performative Acts and Gender Constitution: An Essay in Phenomenology and Feminist Theory" is a limited expression of an internal, inescapable, ontological experience of self-identification. I suggest the monster's inability to articulate their difference, consequent exile, and desire for companionship are then analogous to nonbinary experiences of internalized invalidation, linguistic limitation, and social isolation.

Presenters – Shute, Olga
Authors – Olga Jocelyn Shute
Oral Presentation – 1-PSU 315A
Visual Studies - CMFJ
MEXICAN AMERICAN SPIRITUAL GUIDES- XOLOS AND CHIHUAHUAS
As a first-generation Mexican American, I look for alternative sources of information through spiritual practices and postcolonial artwork that predate American

modern/contemporary art. People of color in the US are categorized by words like Latin X, First, Second, or Third Generation, Mexican American, and so on. In searching for my own identity, I question the verbiage that places constrictions over my body, soul, and life experiences. Compared to its pre-declaration past, the United States' 250-year history is rather short. Working with chihuahuas and garland beads has deepened my understanding of my own cultural and artistic heritage. Jewelry and fabric shield part of my soul. Decolonizing my thoughts on my own existence, I turn to other spiritual frameworks that appear in Mexican Mythology. The Mexican artistic process known as Milagros is still in use today. Milagros, meaning small miracles, are objects adorned in protective charms. For my work, I am fascinated with bracelet making and jewelry. A common practice between young kids and crafty people. The current cultural engagement with bracelet making is a shared experience that bonds us together. Jewelry and adornment on the body is a form of soft armor. The Milagros offers the maker a wish for the same spiritual protection. Hearts and wooden crosses are fastened with little metal trinkets. The house charm is a wish for home repairs. The heart charm is for romantic interests and/or healing someone's heart physically. Bone charms are used to heal broken limbs and promote quick recovery. Like the celebrations from Day of the Dead, I honor the idea of my own death. I embrace life’s natural endpoint of departure. Large and small sculptures of Xolos and small hairless dogs were seen as guide dogs of the underworld. Spiritual dogs of the underworld protect our grave sites and guide our souls to eternal rest. In order to fully live my life, I embrace my death. Ceramic Colima dogs were brought into houses to provide people with protection and guidance for life. A tiny piece of ceramic corn was in each dog's mouth. Reminding us of the nourishment we offer to each other and provide for our families. Looking at a portion of my cultural heritage, I associate dogs, jewelry, and maize with tradition, power, and spiritual protection.