

# Missouri State

GRADUATE  
COLLEGE

## 31<sup>st</sup> Annual Einhellig Graduate Interdisciplinary Forum Saturday, April 27, 2024

### *Abstracts*

#### Table of Contents

*Abstracts are listed by college and then alphabetically by the last name of the first presenter/author.  
Click the headings below to move to that page in the document.*

Darr College of Agriculture (COA) .....	2
Reynolds College of Arts, Social Sciences, and Humanities (RCASH) .....	5
College of Business (COB) .....	8
College of Education (COE) .....	9
McQueary College of Health and Human Services (MCHHS) .....	10
College of Natural and Applied Sciences (CNAS) .....	32

## Darr College of Agriculture (COA)

**Presenter: Mattie Cobban**

**Authors: Mattie Cobban and Lacy Sukovaty**

**Poster #: A11**

Agriculture

*COMPARISON OF GASTROINTESTINAL PARASITE PREVALENCE IN DOG POPULATIONS OF SOUTHWEST MISSOURI WITHIN VARIOUS LIFESTYLES*

Gastrointestinal parasites infect several mammalian species including the domestic canine and can cause clinical symptoms such as diarrhea, lethargy, anemia, to possible death. Some gastrointestinal parasites have zoonotic potential. Dog owners, shelter workers, trainers, veterinary staff, and groomers are not the only individuals at risk of contracting a zoonotic parasitic infection since dogs have access to public areas such as parks and stores. The focus of this study was to determine gastrointestinal parasite prevalence of dogs in southwest Missouri from different environmental conditions. Each responsible authority completed a questionnaire over the dog's environment. Fecal samples were collected from a local humane society, local dog trials, and dog owners. Samples were examined with the Mini-FLOTAC device (Jorgensen Labs, Loveland, CO) to quantitate and determine presence of parasitic ova species. Comparisons between parasitic prevalence and lifestyles were analyzed using Minitab (Penn State, State College, PA) to improve canine management decisions in the future.

**Presenter: Achyut Duwadi**

**Authors: Achyut Duwadi, Surya Sapkota, Cheng Zou, Li-Ling Chen, Lance Cadle-Davidson, and Chin-Feng Hwang**

**Poster #: A17**

Plant Science

*GENETIC STUDY OF POWDERY MILDEW RESISTANCE IN A VITIS INTERSPECIFIC HYBRID "CHAMBOURCIN"-BASED POPULATION*

In the midwestern United States, the *Vitis* interspecific hybrid 'Chambourcin' is a very popular winegrape. Powdery mildew, caused by the fungus *Erysiphe necator*, is one of the primary causes of grape yield loss across the globe. Presently, specific genetic determinants for resistance to *E. necator* remain undiscovered in 'Chambourcin'. To identify these factors, a controlled leaf disc assay was conducted for two years using the Automated Phenotypic System (APS) with 273 F<sub>1</sub> genotypes from a cross of 'Chambourcin' and *V. vinifera* 'Cabernet Sauvignon'. Additionally, a pioneer linkage map using the same number of 'Chambourcin'-derived hybrids was constructed with 355 simple sequence repeats (SSR) and 1,394 RNaseH2-dependent amplicon sequencing (rhAmpSeq)-derived haplotype markers that clustered into 19 linkage groups. A quantitative trait locus (QTL) analysis indicated a resistance locus (here named *Ren16*) was discovered on linkage group (LG) 7 explaining 8.90 % – 12.57 % of the total phenotypic variance. The markers used in the study can be directly used for future marker-assisted selection (MAS). Furthermore, the localization of powdery mildew resistance regions is crucial for gene identification and pyramiding, ensuring sustainable protection against pathogens.

**Presenter: Sarah McCord**

**Authors: Sarah McCord, Christi Sudbrock, Benjamin Onyango, and Kara Wolfe**

**Poster #: B32**

Agriculture

*TRACING GLOBAL EXPERIENCES TO EMPLOYER FAVORABILITY*

The research study's purpose was to gauge the perception of study away on favorability in the workplace, asking: Is there a significant difference in those who previously studied away valuing study away experience in potential new employees? and Is there a difference in how those who previously studied away view skills developed through study away programs? A survey was distributed to a non-profit focused on international development. Researchers used a mixed methods convergent design for collecting research. Data were analyzed using ordinal regression, factor analysis, descriptive statistics, and open/focused coding. Study away gives develops cultural competencies. These skills, and thematic codes are ready to communicate, ready to travel, building the foundation, prepared for work, and ready for missions. Individuals who did not study away were perceived to have an idealistic view of global experiences and have a more favorable view of skills developed through study away experiences. Study away experiences give students and employees assets to use in the workplace and throughout life. These skills are likely to be valued and recognized at an organization with an international focus.

**Presenter: Tabinda Shahid**

**Authors: Tabinda Shahid, Li-Ling Chen, and Chin-Feng Hwang**

**Poster #: B47**

Plant Science

*COLD HARDINESS IN VITIS INTERSPECIFIC HYBRID "CHAMBOURCIN"-BASED POPULATION*

The susceptibility of grapevines to low-temperature injury presents a significant challenge, particularly in the Midwest. Traditional European grape cultivar, *Vitis vinifera* 'Cabernet sauvignon', faces bud damage at temperatures below freezing. On the other hand, *Vitis* interspecific hybrid 'Chambourcin', exhibits greater tolerance to sub-zero temperatures. The objective of this research was to conduct Differential Thermal Analysis (DTA) on 287 F1 hybrid genotypes generated from a cross of 'Chambourcin' X 'Cabernet Sauvignon' to quantify bud cold hardiness by identifying the freezing exothermic reactions. Low-temperature exotherm (LTE) profiles, over two dormant seasons (December to February 2022-2024), revealed approximately twenty interspecific hybrid cultivars with superior midwinter cold hardiness, where maximum levels of hardiness were observed at -25 °C to -28 °C. Additionally, DNA markers were used to identify the Quantitative Trait Loci (QTL) associated with cold hardiness to promote hybrid cultivar selection via marker-assisted selection (MAS) that can thrive under wider climatic conditions, benefiting the wine and grape industry.

**Author: Misty Webster**

**Poster #: B55**

Plant Science

*GAINING BEE CAMPUS USA CERTIFICATION AND THE EFFECT ON MISSOURI STATE UNIVERSITY'S LANDSCAPES*

Pollinators are declining at alarming rates due to habitat loss, pesticide use, introduction of exotic species, and climate change. More species are listed as Threatened or Endangered each year. Pollinators are essential to produce many food crops including most fruits and vegetables, nuts, seeds, and oil crops. The importance of pollinators is well documented in the scientific community and many organizations have united in preservation activities supporting pollinators. Bee Campus USA, sponsored by the Xerces Society for Invertebrate Conservation, promotes pollinator conservation and works with universities across the USA. By joining Bee Campus USA, Missouri State University (MSU) can aid in nationwide efforts supporting pollinators while contributing to their Public Affairs mission. MSU obtained Bee Campus USA certification in December 2022, and has since added pollinator gardens at Plaster Stadium, the shuttlebus transit way, the Grand Street border of campus, and in many parking lot islands. MSU's role in Bee Campus USA supports urban pollinators by reducing pesticide use, adding native plants, and promoting insect biodiversity. Future plans include new pollinator beds at the Bond Center, Kemper Hall, and Blunt Hall.

**Presenter: Qiuni Yang**

**Authors: Qiuni Yang, Li-Ling Chen, and Chin-Feng Hwang**

**Poster #: A53**

Plant Science

*OPTIMIZATION OF PCR CONDITIONS FOR THE LINKAGE MAP CONSTRUCTION FROM A 'JAEGER 70' GRAPE-BASED POPULATION*

Vitis interspecific hybrid 'Jaeger 70', a renowned hybrid cultivar of *V. lincecumii* and *V. rupestris*, exhibits robust disease resistance, including resistance to several fungal pathogens and phylloxera. In contrast, 'Vignoles', a popular white wine grape cultivar, exhibits vigorous growth and cold hardiness but is highly susceptible to Botrytis bunch rot and powdery mildew. By leveraging interspecific hybridization, there is an opportunity to concatenate desirable traits from both cultivars. Crosses were made between 'Jaeger 70' and 'Vignoles' which resulted in 213 F1 genotypes. The primary objective of this study is to construct a genetic linkage map using this mapping population for future marker-assisted selection. Simple sequence repeats (SSR) markers, known for their high transferability between populations, play a key role in subsequent genotyping analysis. The basic strategy is to identify polymorphic SSR markers that can apply to both 'Jaeger 70' and 'Vignoles'. To achieve this, the ongoing experiment focuses on optimizing the annealing temperature of respective SSR markers, ranging from 50 °C to 62 °C, for polymerase chain reactions (PCR) reactions. Through extensive testing of 729 markers, 330 primer sets have been identified as promising candidates for further genotyping analysis. These results will facilitate accurate genotyping, which is essential for constructing a comprehensive genetic linkage map, thus advancing the understanding of grape genetics and supporting breeding efforts for the wine industry.

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

**Author: Mara Cressey**

**Art Exhibition**

Art and Design

*INVITES ONLY: EXPLORING SOCIAL DYNAMICS AND SELF-IMAGE THROUGH OIL PAINT*

My thesis work depicts the events of a fictional party. Using oil paint, I create multi-figure works that feature recurring characters, various narratives, complex relationships, and emotions associated with this fictitious evening. Within this painted realm, I portray a more confident, powerful version of myself; an alter ego, who exists alongside these various characters. Drawing inspiration from compositional strategies from Renaissance art history and Christian altarpieces, I paint on large-scale, shaped canvas and paper to suggest doors, windows, and other domestic, interior spaces. Additionally, these shapes allow me to juxtapose suggestions of prominence and divinity with satire, irreverence, and profanity. The narratives, characters, and text that I incorporate are often influenced by real life situations in which I wanted to come across as more self-assured. Ultimately, my work promotes keen social analysis, personal reflection, and confidence; I build a world in which the characters I create, including this second self, exist permanently.

**Author: Alyssa Malloy**

**Poster #: B31**

Dramatic Writing

*LITERARY LAMENTATIONS: A FULL-LENGTH PLAY*

The Living are offered a glimpse into a liminal afterlife realm where “long-forgotten” characters from medieval literature are forced to confront the echoes of their past in an immersive stage play about redemption, identity, and the enduring power of choices. Each of the residents of this liminal afterlife must eventually come to terms with the consequences of their own actions in life. Whether they’re able to move on is up to them... unless the Living choose to intervene.

**Author: Samara Mizutani Cesar**

**Poster #: A36**

Criminology and Criminal Justice

*NAVIGATING SEXUAL CONSENT IN JAPAN*

Employing an exploratory sequential research design, including focus groups and an online survey, this thesis explores the factors influencing how Japanese people navigate the gray zones of sexual consent. This study not only addresses gaps in the literature on sexual consent but also provides a preliminary understanding of Japanese individuals’ perceptions, beliefs, behaviors, and experiences in ambiguous sexual interactions, which is particularly meaningful given Japan’s recent legal revisions and changing sociocultural landscape. Findings indicated the impact of traditional sexual scripts on consent perceptions, with gender and relationship norms contributing to the dismissal of sexual assaults within specific relationships. It was also found that the presence of nonconsent communication was crucial in determining sexual coerciveness. Moreover, the results suggested that token resistance beliefs might serve as a

risk factor against sexual offending but a protective factor for sexual victimization. While it is too soon to draw any conclusions to inform sexual violence prevention and intervention policies given the study's limitations, this thesis provides insights for future research, emphasizing the importance of understanding consent in diverse cultural contexts for fostering healthy sexual relationships in a manner that is respectful and effective within that culture.

**Author: Farhang Mohammed Salih**

**Poster #: B34**

International Affairs

*HOW ISRAEL'S BACKING FOR THE KURDS IN THE 1960S CHANGED THE NATURE OF PROXIES IN THE MIDDLE EAST?*

Assisting non-state actors in the Middle East has typically involved arms deliveries and financial support. It was not until the 1970s and 1980s that Iran began providing military training to these groups. However, Israeli assistance to the Kurds stands out as a unique example in Middle Eastern history, where a state actively helped a non-state actor to enhance organization and adaptability. Israeli support for the Kurds went beyond supplying weapons and cash. It was similar to the model that Iran has in the Middle East now and Israel and its allies call a regional empire.

**Author: H M Murtuza**

**Poster #: B37**

Communication

*IMPORTANCE OF CONTEXT IN RHETORICAL CRITICISM: AN ANALYSIS OF THE BIDEN-HASINA SELFIE AT THE 2023 NEW DELHI G20 SUMMIT*

This essay undertakes a rhetorical analysis of a selfie that US President Joe Biden snapped of himself with Sheikh Hasina, the longest-serving Prime Minister of Bangladesh and the world's longest-serving female head of government, and her daughter Saima Wazed Putul. The selfie, which Biden took at the 2023 G20 New Delhi on September 9, 2023, outwardly conveys a friendly, empowering, and supportive relationship with Hasina. But a careful reading of the image in a broader context suggests the photo misrepresents US policy toward the Hasina-led government. Nevertheless, Hasina capitalized on the selfie to tout her political party and its objectives. In this essay, I consider the implications of the selfie's appropriation and use in a manner that runs counter to US policy and reflects on the importance of context in interpreting visual rhetoric.

**Author: Erin Sedra**

**Art Exhibition**

Art and Design

*BODY. FREEDOM. CHOICE: CREATING ART IN POST-ROE AMERICA*

I knew from a young age that I never wanted children. Whenever I expressed my disinterest in motherhood, I was often met with bewilderment, disapproval, and hostility. The church I was raised in taught me that my value and worth as a woman directly correlated with the power of my birthing hips. This fundamentalist upbringing has significantly shaped my relationship with my femininity, my body, and my artwork. In situations where I feel powerless, turning to my art

gives me a sense of control and self-expression. This body of work began as a reaction to the overturning of Roe v. Wade and has evolved to encompass a broader theme about abortion and related topics that impact women. Within my art practice, I explore how the use of a single symbol can be abstracted to create patterns and motifs to express different narratives surrounding abortion and femininity. I create 2D mixed media work using graphic design, digital fabrication, and other supporting processes and materials. My work reflects my relationship with the reproductive abilities of my body as well as my political beliefs. Abortion is a difficult and heart-wrenching decision that should be made privately between a woman, her doctor, and possibly her loved ones. This is especially important as every situation surrounding a woman's reason for abortion is unique and personal. Through my work, I advocate for open-mindedness, free speech, understanding, respect, and choice.

**Author: Emma Sullivan**

**Poster #: A46**

English

*INSIDE AND OUTSIDE: POEMS*

This creative thesis includes thirty-seven poems and fifteen illustrations that investigate the topic of self-exploration, creative freedom, and liberatory pleasure. My poems are souvenirs from a failed ethical standard, a trove of misogynic micro-aggressions, a spotlight on the backward-ness of gender norms, and a surprisingly strong thread that links women to the planet and to shared language, a thread humankind continuously tries to cut. The methods of research were largely a self-study and one that required consistent reflection. The results were a collection of writings that had to be revised and edited with the guidance of my thesis committee. The more intangible result is visible within the writing; I, the writer, underwent a change in approach. Not only am I now committed to the process of revision, but I also see its utility as a life skill. Readers will also clearly see a reckoning with loss of control, acceptance that control is not a pillar of the human experience, a reclaiming of the body via acknowledging the body's temporality, advocacy against newness and speed, and a devotion and loyalty to family and friendships. I draw inspiration from Adrienne Rich's call for writers to 'wake from the dead' and Richard Hugo's *Triggering Town*, an uncomfortable place for the writer to inhabit, but one that produces honest work. My writing is a reckoning, an I-don't-know-how-I-really-feel made visible through openness and vulnerability. My creative lens has been inspired by the works of Ada Limón, Maggie Nelson, Sharon Olds, Naomi Shahib Nye, Louise Glück, and other writers at play.

**Author: Shelby Theis-Lukenbill**

**Art Exhibition**

Art and Design

*RECOLLECTION*

My work is inspired by life's transient nature and objects' enduring capacity to house memories. The delicate sculptures I create combine second-hand objects with paper to capture the essence of moments and possessions that define personal histories. The objects I use represent more than their form or chemistry; they are imbued with fragments of history and memory that I am driven to preserve. In this work, the sentimental nature and purpose of my

belongings hold an equal or greater value than the physical nature and purpose of those belongings. I illuminate an object's sentimentality by combining its form with painted and drawn images, textures, photographs, and patterns to explore the appreciation of memory as it exists in the past and the present. By retelling stories of everyday experiences I am sharing the gift of hindsight as a tool for appreciating the parts of life we don't think to miss until they are lost.

## College of Business (COB)

**Presenter: Ahmed Amjad**

**Authors: Ahmed Amjad, Ismet Anitsal, and M. Meral Anitsal**

**Poster #: B1**

Project Management

*INFLUENCER MARKETING UNVEILED: NAVIGATING CHALLENGES, MEASURING IMPACT, AND UNVEILING REALITIES*

This research paper delves into the realm of influencer marketing, scrutinizing its inherent challenges, measurement metrics, and practical realities. Through an extensive analysis of industry dynamics and scholarly literature, the study aims to unravel the complex landscape of influencer-brand relationships. Focusing on transparency, authenticity, and regulatory compliance, we examined the critical aspects influencing consumer trust and brand engagement within the context of influencer collaborations. Additionally, the research investigates the diverse measurement methodologies and key performance indicators (KPIs) used to quantify influencer marketing initiatives' effectiveness and return on investment (ROI). By exploring these challenges and metrics, the study provides a comprehensive overview of the complexities surrounding influencer marketing. Ultimately, it seeks to offer invaluable insights to marketers, brands, and influencers navigating the dynamic terrain of contemporary digital marketing.

**Presenter: Bolormaa Chimed-Ochir**

**Authors: Bolormaa Chimed-Ochir, Ismet Anitsal, and M. Meral Anitsal**

**Poster #: A8**

Business Administration

*A REVIEW OF SUSTAINABLE CHALLENGES AND CUSTOMER VALUE HIERARCHY*

Sustainability has become more than just a buzzword and is now a critical consideration across industries. Businesses today understand that integrating sustainable practices into their strategies is not only a moral obligation but also a source of innovation and competitive advantage. Sustainability includes economic prosperity, social equity, and environmental stewardship, creating a balanced approach to decision-making. This holistic view recognizes how various business operations are interconnected and how they impact the broader ecosystem. In this context, understanding and meeting customer expectations are crucial. Consumers are more informed and influential than ever, shaping the values businesses should align with. Environmental and social consciousness have influenced consumer behavior, making



sustainability a significant factor in purchasing decisions. Businesses that align with customers' environmental and ethical values gain a competitive edge and enhance their brand reputation. Therefore, sustainability has become a key driver of customer preference, significantly impacting a business's success in the market.

**Presenter: Jessica Holden**

**Authors: Jessica Holden, Ismet Anitsal, and M. Meral Anitsal**

**Poster #: B20**

Business Administration

*CLARIFICATION AND IMPLICATIONS OF SOCIETAL, SOCIAL, AND SOCIAL MEDIA MARKETING CONCEPTS*

The concepts of societal, social, and social media marketing are still in their infancy. The concepts are still being developed, generating a lack of understanding, with no distinct differentiation. Lack of differentiation is causing confusion and misuse of terms. This study compares the concepts and techniques they use, to discuss each concept in practice implications. Classification of societal, social, and social media marketing through the introduction of a model identifying the tactics the concepts entail, will allow for improved understanding and implementation of the concepts. The study will also include propositions based on the impact of each concept and conclude with implications for managers and future research that may be done for further concept development and understanding.

**Author: Conner Wilkinson**

**Poster #: A52**

Cybersecurity

*OPEN-SOURCE INTELLIGENCE INVESTIGATION METROLOGY AND MATURITY MODELING*

Open-Source Intelligence Investigations currently do not have universal, industry, or publicly-accepted, well-regulated and practiced standards. These investigations are conducted by collecting, evaluating, and analyzing publicly available information for the purposes of Risk Analysis and Mitigation, Law Enforcement, or for Malicious Intent. OSINT IMMM is a framework which structures and formalizes the results of disparate investigation circumstances based on the Capability Maturity Modeling (CMM) system integrated with the Federal Investigative Standards (FIS) and Common Vulnerabilities and Exposures (CVE) systems. This framework intends to provide an Open Standard to enable deeper inspection at all levels of investigations and their outputs for better analysis and application of results.

## **College of Education (COE)**

**Presenter: Jeffrey Pettibone**

**Authors: Jeffrey Pettibone and Richelle Gipson**

***Virtual Presentation***

Teacher Leadership

*THE EFFECTS OF ASSESSMENT ON EDUCATION*

The overarching question of this study was whether assessments positively or negatively impact students and teachers? The method used for this study was qualitative which looked for similar themes after reading literature on the effects of assessment on education. We continually reflected on journal articles, literature, and collaborative dialogue with other education professionals. Through an exploration of literature, the findings reveal that assessments often fail to capture the complexity of student learning and emotional engagement. It also narrows the curriculum, diminishes instructional quality, and fosters a culture overly reliant on data and statistics. These factors contribute to stress and anxiety among teachers, retention challenges, and diminish the profession's appeal. The study highlights the need for a reevaluation of assessment practices, emphasizing alternative methods for understanding student progress and fostering a love of learning. By incorporating alternative or diverse assessment strategies, educators can gain a more authentic understanding of student learning while preserving instructional quality through student-centered approaches that empower educators and nurture student growth and development.

**Author: Clayton Taff**

**Poster #: B53**

Teacher Leadership

*STRATEGIES TO SWAY RELUCTANT LEARNERS TO JOIN THE CLUB*

The purpose of this sustained reflection was to uncover specific strategies that work to engage reluctant learners. The researcher utilized qualitative data to connect findings from influential educational texts to modern academic research. Five key discoveries emerged out of this study. The first was the importance of student engagement, what it means for students, teachers, and institutions as a whole. The second was the different types of student engagement: thought, feeling, and action. Next came the three factors that interact to bring about engagement: the student, the teacher, and the content. Fourth was the two primary theories of how learning happens, what are known as the classic view and the official theory. Finally came specific strategies to get students 'in the learning club.' Research was found that indicated a renewed emphasis on engagement would deliver results all stakeholders seek in schools; therefore, the study concluded with a rallying cry to teachers and policymakers to return to a focus on engagement.

## **McQueary College of Health and Human Services (MCHHS)**

**Authors: Katherine Anderson and Emilia Elmer Intriago**

**Poster #: A1**

Speech-Language Pathology

*READY, SET, READ: EARLY LITERACY PRACTICES OF YOUNG CHILDREN WITH AND WITHOUT DISABILITIES ACROSS DIVERSE BACKGROUNDS*

Home literacy experiences are a critical aspect of the emergent literacy stage of development. Research on early literacy typically focuses on practices common in racial majority households and rarely accounts for the experiences of children from culturally and linguistically diverse

backgrounds, including children with and without disabilities. This project aims to explore and examine culturally and linguistically diverse home literacy experiences and practices within multiple demographics to understand the effectiveness of generally applied practices versus those that may not be commonly considered targeting 'early literacy'. A survey was distributed to families that fit the study criteria to evaluate their home literacy practices and experiences, and examine how these vary by demographics. The results obtained demonstrated a variety of literacy experiences both naturalistic and intentional encountered across diverse households. This finding extends the current literature on early literacy experiences by expanding what is considered a literacy experience. Furthermore, it has important implications pertaining to knowledge regarding the enrichment of home literacy environments as it relates to cultural identity and practices.

**Authors: Kyle Asbury, Daisy Brown, Carter Erickson, and Meagan Engelbrecht**

***Virtual Presentation***

Athletic Training

*PROFESSIONAL ATHLETIC TRAINING STUDENTS' PERSPECTIVE ON FULL-TIME EMPLOYMENT VS. INTERNSHIP FOLLOWING GRADUATION.*

This study aims to investigate the perspectives of professional-level students regarding internships versus full-time employment following graduation and board of certification. Previous research explored the perspectives of certified master's students on full-time employment versus internships before the change in degree requirements. However, no research was found related to professional level athletic training students and their perspective on internships vs full-time employment. Results from the study are under review and are currently pending.

**Authors: Alicen Beckley, Paige Esry, and Hannah Spriggs**

**Poster #: B5**

Speech-Language Pathology

*A STUDY ANALYZING THE INFLUENCE OF EARLY STORYBOOK READING ON PARENT-CHILD INTERACTIONS WITH MINIMALLY VERBAL CHILDREN.*

This study explores if shared storybook reading is an effective tool for increasing turn-taking or vocalizations in minimally verbal children. Children who are minimally verbal communicate with those around them through eye gaze, gestures, or vocalizations that are atypical when compared to typical forms of expressive communication (Donnelly and Kidd, 2021). This often leads to a breakdown in communication through the devaluation of their communicative attempts as individuals might not consider them as meaningful. The asymmetry in turn-taking can be observed not only in conversation but also during shared storybook reading between a parent and child. Turn-taking is how most communication is carried out and forms a foundational framework for language acquisition (Levinson and Torreira, 2015). We know and acknowledge that early storybook reading is a crucial facilitator of later language development. Children with complex communication needs do not present with parallel interaction patterns thus warranting parent training to enhance shared storybook reading to optimize the quality of interactions. The information gained in this study will describe the children's vocalizations while providing insight into strategies parents can use.

**Authors: Riley Brady, Jordan Allen, Kathryn Plautz, Cardyss Williams, and Ashley Payne**

**Poster #: A4**

Experimental Psychology

*ADVERSE CHILDHOOD EXPERIENCES AND SCHOOL DISCIPLINARY PRACTICES IMPACT ON GENDERED-RACIAL BODY IMAGE*

Previous research defines adverse childhood experiences (ACEs) as “childhood events, varying in severity and often chronic, occurring in a child’s family or social environment that cause harm or distress, thereby disrupting the child’s physical or psychological health and development” (Kalmakis, 2014, p.1490). ACEs have been shown to impact exclusionary discipline, with “youth who had experienced two and four or more ACEs by age 5 were significantly more likely to report being suspended/ expelled in high school than youth who had no ACEs” (Pierce, 2022, p.10). Adverse childhood experiences encompass various experiences such as childhood abuse, neglect, maltreatment, racism, and sexism, which can have detrimental impacts to those experiencing them (Kalmakis, 2014). This study aims to explore how adverse childhood experiences of racism, sexism, and school disciplinary practices impacts how Black college women’s sense of self and gendered-racial body image. This study is part of a larger qualitative, youth participatory action research approach (YPAR). Researchers recruited Black college women mentors (N = 15) from a local mid-size public university and Black high school mentees (N = 22) from a local high school through snowball sampling to participate in an 8-week mentoring program. Pre- and post-program semi-structured interviews were conducted reflecting on mentors’ lived experiences along with their attitudes and beliefs surrounding Hip Hop, social media use and representation, and gendered racial identity development. The data is currently being analyzed, but utilizing thematic analysis, we expect to find themes related to the impacts of bullying, misogyny, and stereotyped messaging on Black women’s bodies to contribute to low self-confidence, rebellious forms of self-expression, and great experience with disciplinary action. Previous research has demonstrated that adverse childhood experiences are related to increased disciplinary action (Pierce, 2022). The results of this study will highlight how negative comments as adverse childhood experiences are related to how Black college women navigate body image in relation to how they were disciplined in school. Further research on this topic should investigate what techniques are most effective at aiding Black college women to navigate their body image after encountering adverse childhood experiences.

**Authors: Riley Brady, Ashleen Girn, Cristaliz Soto, and Ashley Payne**

**Poster #: B6**

Experimental Psychology

*IDENTITY DEVELOPMENT: BLACK WOMEN AND SELF IMAGE*

Previous research shows that Black women’s body image is influenced by a number of intersectional factors (Watson et al, 2019). Within group standards and conformity, colorism alongside misogyny and dominating cultural media stereotypes all informs body awareness/self-concept of black women. However, evidence shows that the impact on Black women’s mental health is conflicting. There is evidence about impacts of these social factors on body image, yet psychological stress of deciding to conform to oftentimes conflicting images is lacking in research. The purpose of this study is to further explore the connection between

gendered-racial self-image, mental health, and outside influential factors. The following research questions will be explored: 1. How does societal views of Black women's bodies influence how Black women construct their identity and self-image? a. How does Black culture and Black media influence Black women's body image and identity? 2. How do these psychosocial impacts influence the psychosocial well-being of Black women? This study is part of a larger qualitative, youth participatory action research approach (YPAR). Researchers recruited Black college women mentors (N = 15) from a local mid-size public university and Black high school mentees (N = 22) from a local high school through snowball sampling to participate in an 8-week mentoring program. Pre-and-post-program semi-structured interviews were conducted reflecting on mentors' lived experiences along with their attitudes and beliefs surrounding Hip Hop, social media use and representation, and gendered racial identity development. Data is being analyzed; yet we can preliminarily assess a correlation between outside influences and self-image. Stereotypes about Black women's identity can influence how said Black women feel about their racial/gendered identity. In primarily white cultures, it's shown that Black women assimilate to white standards of beauty and strive to assimilate to standards. Alongside that, white ideals shape the knowledge and standards of Black women. (Bayoli, 2020; Watson et al, 2020). In hip hop/black media, the subculture of hip hop feminism allows young women to develop their self-image by empowerment. Discussing ideals in these spaces can help young black women in developing their own self-image in a positive manner. Psychosocial impacts on Black women develop from environmental expectations in the form of maladaptive coping (Liao, Wei, Lin, 2020). Research showing young Black women can benefit in terms of self-image from having their own spaces to develop self-image shows that it's worthwhile to develop those kinds of spaces. (Richardson, 2013).

**Presenter: Lindsey Brandt, Emma Farris, Shelby Hubbard, and Halie Rackers**

**Authors: Lindsey Brandt, Kylee Dillon, Emma Farris, Shelby Hubbard, Cortney LaHue, Lauren Shipley, Halie Rackers, Katherine Worley, Beth Williamson, and Jessica Willis**

**Poster #: A5**

Physical Therapy

*THE EFFECT OF TIME OF DAY AND COGNITIVE DEMAND ON REACTIVE BALANCE IN YOUNG ADULTS*

This study examined the effect of balance related to time of day, the direction of instability, and the degree of intensity. Subject: While completing a cognitive task, 56 participants, ages 21-30, were tested in the morning (6:00-7:30) and evenings (6:00-7:30). Participants walked on a treadmill with randomized perturbations in the direction of left, right, forward, and backward. The participants walked at randomized intensity levels of low (15cm), moderate (20cm), and high (25cm) and were graded on a 4-point scale. A 2 (time of day) x3 (direction) x3 (perturbation of degree) repeated measure ANOVA was conducted (forward direction was not analyzed). Significant main effects included time of day, (participants were more stable in the evening compared to the morning), direction (balance was least stable in the backward direction compared to left and right) and intensity (highest intensity of 25cm was more unstable than 15cm and 20cm). The combination of time of day, direction of instability, and degree of intensity also impacted participants' balance. Conclusion: Our findings defined useful parameters to study fall risk among older adults.

**Presenter: Samantha Campbell**

**Authors: Samantha Campbell and Dana Paliliunas**

**Poster #: B7**

Clinical Psychology

*EXPLORING THE RELATIONSHIP BETWEEN PSYCHOLOGICAL FLEXIBILITY & TRAUMA SYMPTOM SEVERITY*

This study examines the relationships that trauma symptom severity has with psychological flexibility and inflexibility using the MPFI, whether flexibility and/or inflexibility mediates the relationship between type of trauma and trauma symptom severity, convergent validity of the AAQ-II with the MPFI, and whether flexibility and inflexibility are distinct constructs.

Participants were recruited from undergraduate psychology courses at MSU via SONA, and from across the U.S. using Prolific during the spring of 2024. They completed a questionnaire including the PCL-5 with LEC, the MPFI, and the AAQ-II. Trauma symptom severity weakly correlates with flexibility and strongly correlates with inflexibility. Inflexibility, but not flexibility, mediates the relationship between type of trauma and trauma symptom severity. There is a strong correlation between the AAQ-II and the MPFI's measure of inflexibility, but only a moderate correlation with the AAQ-II and the MPFI's measure of flexibility. Lastly, flexibility and inflexibility were moderately correlated. Trauma symptom severity is strongly related to inflexibility and weakly related to flexibility, and inflexibility mediates the relationship between type of trauma and symptom severity. There is evidence of convergent validity of the AAQ-II with the MPFI, but only evidence of weak convergent validity between flexibility and inflexibility.

**Presenters: Hardy Cleveland, Josh Condren, and Erik Glassl**

**Authors: Josh Condren, Erik Glassl, Hardy Cleveland, Jill Layman, and Tommy Nance**

**Poster #: A9**

Nurse Anesthesia Practice

*DOSING OF ONDANSETRON PRE-SPINAL ANESTHETIC TO REDUCE HYPOTENSION IN ELECTIVE CESARIAN SECTION*

Spinal anesthesia blockade (SAB) with local anesthetics (LA) is the most common anesthesia technique for cesarean sections (CS) for a multitude of reasons, including maternal safety. However, hypotension is a common, unpleasant side effect that frequently elicits nausea and vomiting. Anesthesia professionals are continually seeking ways to eliminate all causes of a patient's nausea and vomiting (NV). The Bezold-Jarisch reflex (BJR) is one proposed mechanism contributing to hypotension and bradycardia. With SAB onset, venous blood return to the heart is reduced, activating the BJR, resulting in bradycardia and hypotension.<sup>2</sup> Serotonin is a circulating neurotransmitter known to influence and activate BJR. Ondansetron is a 5HT-3 receptor antagonist used to block serotonin and reduce NV.<sup>2</sup> Typically, Ondansetron is administered at the end of a surgical case to minimize postoperative NV associated with a general anesthetic (GA). This project aimed to evaluate the effectiveness of Ondansetron administration pre-SAB on post-spinal hypotension, bradycardia, and NV and educate student registered nurse anesthetists (SRNAs) on the current literature, potentially causing change in practice. Based on the literature review, data suggests that administration of Ondansetron pre-spinal reduced hypotension and NV in the parturient. A protocol, educational video, and survey

were developed based on the data from the literature review with the aid of MSU RStats. These were distributed to SRNAs, utilizing Qualtrics software, as an educational tool and to assess knowledge gained and willingness to implement changes in their practice. The pre-video survey results showed that most SRNAs did not have a strong educational foundation of Ondansetron and the mechanism for administration prior to SAB in the obstetric population. However, following education, those surveyed felt strongly about the information presented and were more likely to implement the use of Ondansetron in clinical practice as derived from the protocol. The shortcomings included a small sample size and a lack of geographical variability in the sourced participants. Future studies should assess CRNA with a more diverse geography and evaluate different timings of administration and the impact on hypotension and NV. Finally, the national anesthesia practice board and individual hospitals would adopt a standard Best Practice protocol to mitigate post-SAB hypotension and NV in the obstetric population.

**Presenter: Callie Cochran**

**Authors: Callie Cochran and Leslie Echols**

**Poster #: B9**

Clinical Mental Health Counseling

*ADOLESCENT PEER VICTIMIZATION CHARACTERISTICS AND HELP-SEEKING BEHAVIORS*

A common strategy for ameliorating peer victimization in schools is emphasizing help-seeking strategies. Although previous literature has identified a number of factors that contribute to students' willingness to seek help (Matuschka et al., 2021), it is unknown whether the type of peer victimization (i.e., verbal, relational, physical, cyber) is associated with help-seeking behaviors among youth. Thus, this study's main purpose was to examine the role of type of victimization in the number and kind of help-seeking behaviors students report. Additionally, since previous research suggests there are gender differences in the type of victimization youth experience (Scheithauer et al., 2006) and females may be more likely to seek help for victimization than males (Hunter et al., 2004), the next purpose of this study was to explore gender differences in help-seeking behaviors. Participants were 515 middle-school students from Southwest Missouri participating in a school-based intervention program to reduce bullying and victimization. Data were collected before the intervention began. Results indicated that among males, the association between peer victimization and help-seeking was strongest for avoidant behaviors across all four types of victimization. Among females, the association between peer victimization and help-seeking was strongest for retaliatory behaviors across all types of victimization except physical victimization.

**Presenter: Jianna Cox**

**Authors: Jianna Cox and J.J. Smith**

**Poster #: A13**

Cell and Molecular Biology

*CHARACTERIZATION OF THE OVEREXPRESSION OF THE RECA HOMOLOGS DMC1 AND RAD51 IN TETRAHYMENA THERMOPHILA*

Two RecA homologs, Dmc1 and Rad51, work to repair DNA double-strand breaks (DSBs) within the cell through the recombination of homologous sections of DNA. Dmc1 works to repair programmed DSBs through meiotic recombination, while Rad51 functions to repair DSBs

caused by DNA damaging agents. Many chemotherapeutics work to form DSBs in cancer cells, attempting to inhibit the cell's growth. A hyper-recombinant phenotype is often seen in cancer cells due to the overexpression of RAD51, leading to drug resistance, the persistence of cancers, and an overall poor patient outcome. In the model organism *Tetrahymena thermophila*, an amacronuclear phenotype is observed at elevated growth temperatures (35 Â°C), when RAD51 is overexpressed. Further evidence shows that this phenotype is more affected from the change in temperature rather than only the temperature itself. A complication in the elongation of the macronucleus occurs but DNA synthesis is not halted, resulting in a macronucleus containing up to 5 times the normal genetic content. When DMC1 is overexpressed, no notable phenotype was observed. Further study between the two RecA homologs will help elucidate how RAD51 overexpression leads to genomic instability in the cell.

**Presenter: Erin Daily**

**Authors: Erin Daily, Thomas C. Franklin, Sarah Barber, and Sarah Jones**

**Poster #: A14**

Audiology

*I THINK I HAVE A HEARING LOSS BUT I DON'T WANT TO SEE AN AUDIOLOGIST: NOW WHAT DO I DO?*

The purpose of this study was to compare phone apps for testing hearing to actual audiometric testing via an audiometer due to over-the-counter hearing aids going into effect October 17, 2022. Audiogram-hearing test by Pidgey, Hearing Test by examobile, and Hearing Test by Marcin Masalski at e-audiologia.pl were compared to each other and to a calibrated GSI AudioStarPro clinical audiometer. A Larson-Davis Laboratories Model 800B Precision Integrating Sound Level Meter (SLM) was utilized in measuring the dB SPL of two different earphones (transducers); TDH39 headphones (for a clinical Audiometer) and JBL TUNE510BT headphones; and a Samsung Galaxy A53 5G Android phone. It was found that in accordance with the ANSI S3.6-2010 (American National Standards Institute), while using the JBL TUNE510BT headphones on a Samsung Galaxy A53 5G Android phone, it cannot be said for certain if there are accurate hearing test apps available for public consumer use.

**Author: Megan Davidian**

***Virtual Presentation***

Audiology

*COMPARING AUDITORY BRAINSTEM RESPONSES TO CLICK, TONEBURST, AND CHIRP STIMULI USING INTEGRITY AND ECLIPSE SYSTEMS*

Auditory Brainstem Response (ABR) testing is a key objective measure widely across audiology settings. Commonly utilized commercial equipment includes the Eclipse by Interacoustics and Integrity by Vivosonic. The present study aims to scrutinize the robustness of ABR wave V amplitudes using both Click and CE-Chirp stimuli at 70dB, while also comparing hearing threshold disparities using tone-bursts across these devices. Eleven normal-hearing adults aged between 20 to 30 years were recruited for participation. Each participant underwent comprehensive audiological and electrophysiological evaluations to obtain hearing thresholds through non-invasive, frequency-specific ABR measures. This evaluation encompassed a case history, visual inspection of the ear canal, standard Tympanometry, and behavioral hearing



threshold testing at conventional frequencies. ABR suprathreshold responses were elicited using both Click and CE-Chirp stimuli, and ABR thresholds were tracked at four distinct frequencies (500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz) in the right ear using the Eclipse and Integrity systems. Results revealed mean wave V amplitudes of 0.628  $\mu\text{V}$  (SD= 0.242  $\mu\text{V}$ ) for the Integrity system and 2.076  $\mu\text{V}$  (SD= 2.716  $\mu\text{V}$ ) for the Eclipse system regarding ABR suprathreshold responses. ABR suprathreshold responses obtained from both pieces of equipment were compared amongst each other and with the results from the behavioral audiological evaluation.

**Presenters: Alec Deveney and Dilon Jones**

**Authors: Alec Deveney, Dilon Jones, Waffa Kaf, Paul Durham, and Sophia Antonopoulos**

**Poster #: B12**

Audiology

*ASSESSMENT OF AUDITORY BRAINSTEM RESPONSES AND HEARING THRESHOLD IN A RAT MODEL OF MIGRAINE INDUCTION AND TEMPOROMANDIBULAR JOINT DISORDER*

This study aims to evaluate changes in tone burst Auditory Brainstem Responses (tb-ABR) and hearing thresholds at both suprathreshold and threshold levels before and after inducing chronic migraines, followed by its induction of temporomandibular joint disorder (TMD). Neural hearing sensitivity will be assessed pre and post these conditions. Four adult female Sprague Dawley rats underwent tb-ABR recordings to measure brainstem neural activity and hearing thresholds before and after inducing migraines and TMD. On day 1, rats were exposed to California Bay Leaf (CBL) to trigger migraines. Suprathreshold and threshold tb-ABRs were recorded using the Duet Intelligence Hearing System at baseline and on days one and fourteen post-migraine induction at frequencies of 4 kHz, 12 kHz, 22 kHz, and 32 kHz. TMD was provoked by 20 minutes of maximal jaw opening. To assess the combined TMD and migraines effect, additional tb-ABRs were recorded on days one and seven post-TMD induction. Suprathreshold tb-ABRs were recorded at 80 dB SPL, while threshold tb-ABRs were recorded at 50- and 30-dB SPL with adjustments of  $\pm 10$  dB. Threshold responses were determined by the lowest intensity level eliciting a repeatable tb-ABR wave II response. Results revealed both lower mean thresholds for each increase in frequency in addition to higher mean thresholds post-migraine and TMD conditions compared to baseline.

**Presenter: Kylee Dillon, Lindsey Brandt, Emma Farris, Shelby Hubbard, and Halie Rackers**

**Authors: Kylee Dillon, Beth Williamson, Courtney Lahue, Katie Worley, and Lauren Shipley**

**Poster #: B13**

Physical Therapy

*THE EFFECT OF TIME OF DAY AND COGNITIVE DEMAND ON REACTIVE BALANCE IN YOUNG ADULTS*

This study examined the effect of balance related to time of day, the direction of instability, and the degree of intensity. Subject: While completing a cognitive task, 56 participants, ages 21-30, were tested in the morning (6:00-7:30) and evenings (6:00-7:30). Participants walked on a treadmill with randomized perturbations in the direction of left, right, forward, and backward. The participants walked at randomized intensity levels of low (15cm), moderate (20cm), and high (25cm) and were graded on a 4-point scale. A 2 (time of day) x3 (direction) x3

(perturbation of degree) repeated measure ANOVA was conducted (forward direction was not analyzed). Significant main effects included time of day, (participants were more stable in the evening compared to the morning), direction (balance was least stable in the backward direction compared to left and right) and intensity (highest intensity of 25cm was more unstable than 15cm and 20cm). The combination of time of day, direction of instability, and degree of intensity also impacted participants' balance. Our findings defined useful parameters to study fall risk among older adults.

**Presenter: Jeanette Drecker**

**Authors: Jeanette Drecker and Amy Hulme**

**Poster #: A15**

Cell and Molecular Biology

*SPTBN1 INVOLVEMENT IN REVERSE TRANSCRIPTION OF HIV-1 IN CHME3 CELLS*

Human Immunodeficiency Virus 1 (HIV-1) is a lentivirus that infects CD4+ cells causing Acquired Immunodeficiency Syndrome (AIDS). HIV utilizes host proteins to replicate. A genome wide screen by Brass has shown that the molecular scaffolding protein, SPTBN1, is essential for HIV-1 infection. However, the viral replication steps that SPTBN1 impacts are not known. In previous work, SPTBN1 knockdown delayed HIV capsid uncoating but did not impact viral fusion kinetics. HIV-1 uncoating and reverse transcription occur simultaneously. Therefore, our goal was to analyze the impact SPTBN1 has on reverse transcription of HIV-1 in microglial cells. Knockdown SPTBN1 cells were infected with pseudotyped HIV-GFP cells and exposed to a reverse transcriptase inhibitor at different time intervals to test for completion of reverse transcription. The knockdown cells showed delayed infection but similar completion of reverse transcription as controls. Next, the process of reverse transcription will be examined by performing qPCR on early, intermediate, and late cDNA products. This study will better describe how SPTBN1 influences HIV replication and could be helpful in developing therapeutic targets for HIV-1 patients.

**Presenter: Mae Foster**

**Authors: Mae Foster and Clay Franklin**

**Poster #: A20**

Audiology

*DECIBELS OR DILEMMAS: ARE OVER-THE-COUNTER HEARING AIDS A SOUND SOLUTION FOR HEARING LOSS?*

Over-the-counter hearing aids were introduced to the United States market in October 2022, the introduction of over-the-counter hearing aids was meant to 'promote the wide availability of low cost hearing aids' and 'Help improve access to and foster innovation in hearing technology for Americans, thereby promoting public health'. Over-the-counter hearing aids are a lower cost option to address hearing loss in adults, but limited peer reviewed studies are available on the effectiveness of these devices or the affordability of the products. We analyzed the cost and features of the most popular over-the-counter hearing devices and the affordability of the devices for Americans with hearing loss. Contrary to the mission of the FDA reauthorization act of 2017, it was found that many of these over-the-counter devices are still

not affordable for many U.S. citizens. It was also found that there is a discernible lack of research on the effectiveness of these devices compared to prescriptive devices.

**Presenter: Paige Hemming**

**Authors: Paige Hemming, Mikayla Campbell, Matthew Coyle, Autumn McKeel, Dana Paliliunas, and Jordan Belisle**

**Poster #: A22**

Clinical Psychology

*EXAMINATION OF NONVERBAL IQ AND THE PEAK RELATIONAL TRAINING SYSTEM IN CHILDREN WITH AUTISM*

Studies have documented floor effects and low intelligence quotient scores for autistic individuals (ASD; Baio et al., 2018; Dixon et al., 2014). Utilizing nonverbal intelligence tests may reduce these recurrent findings. This study examines the relationship between measures of cognitive ability in autistic children. The Primary Test of Nonverbal Intelligence (PTONI; Ehrler & McGhee, 2008) was used as a measure of participants' cognitive ability, nonverbally, and the Promoting the Emergence of Advanced Knowledge (PEAK) Comprehensive Assessment (PCA; Dixon, 2019) was used as a standardized measure of cognitive and language ability as linked to the participants' curriculum. Participants were 3-16 years old, diagnosed with ASD, and receiving services at participating agencies. Participants were administered the PTONI, and PCA data were obtained from agency records. The results will discuss the future use of nonverbal intelligence assessments as representing cognitive ability with this population. The investigators are unaware of studies examining the use of nonverbal intelligence to measure cognitive ability as relating to PEAK. This study will contribute to literature investigating how psychometrics relate to cognitive ability for individuals with autism.

**Presenter: Hannah Hill**

**Authors: Hannah Hill and Clay Franklin**

**Poster #: A23**

Audiology

*TELEHEALTH FOR YOUR EARS: A COMPARISON OF THE TOP 10 FREE ONLINE HEARING TESTS*

Since the outbreak of COVID-19, many healthcare services were forced into switching to an online model. Telehealth has enabled people to stay safe while receiving healthcare around the world and especially in the US. In October of 2022, the Food and Drug Administration (FDA) passed legislation to provide Over the Counter (OTC) Hearing Aids (HAs) for anyone over the age of 18 with a mild to moderate hearing loss. With the prevalence of both telehealth and OTCs, hearing healthcare is more accessible than ever before. In this literature review, ten of the best free online hearing tests are compared and analyzed based on duration, content, set-up, results, and follow-up procedures. Tests were taken four times each, with differing conditions, and duration and content were documented. Each test varies in how they evaluate a person's hearing and/or their perception of hearing. The tests are under 15 minutes in duration and usually provide a simple screening by means of listening to pure tones, speech, or speech in noise. These tests are a quick and easy way to identify if a hearing loss is present but should not be compared to an in-person audiological evaluation.

**Presenters: Brandon J. Hill, Sunyang Lee, and Sydney S. Melugin**

**Authors: Brandon J. Hill, Sunyang Lee, Sydney S. Melugin, James Keaton, and Charles Wilson**

**Poster #: B19**

Nurse Anesthesia Practice

*THE IMPACT OF TIVA VS. INHALATIONAL ANESTHESIA ON POST-OPERATIVE COGNITIVE DYSFUNCTION IN THE ELDERLY POPULATION*

Postoperative Cognitive Dysfunction (POCD) is a state in which a patient's memory and learning decline after surgery. The condition is associated with delayed recovery, poor outcomes, and a higher incidence of new disability after surgery. The development of POCD can significantly affect social activities, including activities of daily living (ADL). POCD is differentiated from Postoperative Delirium (POD) by the onset of symptoms, which is in the early postoperative period for POD and weeks to months after surgery for POCD. POCD has the potential to become a prevalent problem because of the increasing elderly population. There are no current definitive guidelines for anesthesia providers to care for this population.

Conductors performed a literature review and summarized the most up-to-date research on clinical practice guidelines to lower the incidence of POCD in older adults. Once best practice guidelines were established, the authors conducted an education session for Junior SRNAs in the Missouri State University Doctor of Nurse Anesthesia Practice program. The educational information was also distributed to practicing CRNAs through the MSU alumni email list that includes Master of Science in Nursing (MSN) to Doctorate of Nurse Anesthesia Practice (DNAP) students. Surveys assessing current anesthesia providers' knowledge of POCD and practices to reduce POCD were distributed and analyzed.

**Presenter: Dana James**

**Authors: Dana James and J. Wang**

**Poster #: A25**

Cell and Molecular Biology

*MICROVASCULAR ENDOTHELIAL PERMEABILITY COEFFICIENT REGULATED BY PURINERGIC P2Y2 RECEPTOR.*

As a semi-permeable membrane, the endothelium mediates vascular exchange between the blood and target tissue. Prolonged inflammation is involved in processes of broad disorders and diseases such as diabetes, cancer, and vasculitis. Inflammatory mediators have a profound effect on increasing endothelial permeability. However, the direct mechanism of change in permeability to solutes is not fully understood. It has been shown in vivo that the activation of the P2Y2 receptor (P2Y2R) in microvascular endothelial cells (MEC) increases permeability. The goal of this research was to determine the molecular mechanism of P2Y2R-induced increase in permeability in MEC. Wild type (WT) and P2Y2R knock out (KO) primary murine MEC were used to measure permeability response to P2Y2R agonist, uridine triphosphate. Transwell supports and fluorescence labeled-dextran (70 kD) were used in permeability experiments, followed by spectrophotometry. Preliminary data has been collected and is currently undergoing statistical analysis. Identifying the mechanistic involvement of MEC P2Y2R in permeability change will further the understanding of vascular permeability response during inflammation and will aid in the treatment of a broad group of disorders.

**Presenters: Dilon Jones and Alec Deveney**

**Authors: Dilon Jones, Alec Deveney, Waffa Kaf, Paul Durham, and Sophia Antonopoulos**

**Poster #: A27**

Audiology

*ASSESSMENT OF AUDITORY BRAINSTEM RESPONSES AND HEARING THRESHOLD IN A RAT MODEL OF Temporomandibular Joint Disorder and Migraine Induction*

This study aims to evaluate changes in tone burst Auditory Brainstem Responses (tb-ABR) and hearing thresholds at both suprathreshold and threshold levels before and after inducing chronic temporomandibular joint disorder (TMD), followed by its induction alongside migraines. Neural hearing sensitivity will be assessed pre and post these conditions. Six adult female Sprague Dawley rats underwent tb-ABR recordings to measure brainstem neural activity and hearing thresholds before and after inducing TMD and migraines. TMD was provoked by 20 minutes of maximal jaw opening. Suprathreshold and threshold tb-ABRs were recorded using the Duet Intelligence Hearing System at baseline and on days one and fourteen post-TMD induction at frequencies of 4 kHz, 12 kHz, 22 kHz, and 32 kHz. On day fourteen, rats were exposed to California Bay Leaf (CBL) to trigger migraines. To assess the combined TMD and migraines effect, additional tb-ABRs were recorded on days one and seven post-CBL exposure. Suprathreshold tb-ABRs were recorded at 80 dB SPL, while threshold tb-ABRs were recorded at 50- and 30-dB SPL with adjustments of  $\pm 10$  dB. Threshold responses were determined by the lowest intensity level eliciting a repeatable tb-ABR wave II response.

**Presenter: Arshpreet S. Kandola**

**Authors: Arshpreet S. Kandola, D. Wayne Mitchell, and Melissa D. Fallone**

**Poster #: B22**

Experimental Psychology

*MEASURES OF HEART RATE VARIABILITY: RELIABILITY AND RELATION TO BIS AND BAS MOTIVATION SYSTEMS*

Heart rate variability (HRv) has been found to be positively correlated with cognitive functioning, emotional stability, and mental health resilience. The calculation of HRv varies across studies as well as the time period used to sample HRv (e.g., 60 minutes to 24 hours). The two primary measures of HRv used in research are SDNN (the standard deviation of the time between normal inter-beat-intervals in ms) and RMSSD (the root mean square of the difference between successive inter-beat-interval in ms). The purpose of this study was to examine the stability and reliability of the SDNN and RMSSD calculations assessed over two 60 second time periods; and to assess the relationship between these calculation methods with motivation using the BIS and BAS reinforcement sensitivity scales. Fifty adults served as participants. Both SDNN and RMSSD were found to be stable from time one to time two, however, RMSSD was found to be reliable ( $r = .76$ ) whereas SDNN was not ( $r = .28$ ). RMSSD was found to be correlated in the hypothesized direction with BIS ( $r = .36$ ) and BAS ( $r = -.39$ ). The theoretical impetus of HRv as an indicator of motivation and suggested time-based sampling periods to determine HRv will be discussed.

**Presenter: Corynn Knight**

**Authors: Corynn Knight and Jianjie Wang**

**Poster #: B23**

Cell and Molecular Biology

*EFFECT OF P2Y2 RECEPTORS ON LEUKOCYTE BEHAVIOR UNDER ACUTE INFLAMMATION IN TRANSGENIC MALE MICE IN VIVO*

P2Y2 receptors (P2Y2R), G-protein coupled receptors, play a role in various functions in the body including initiating inflammation and immune response. Previous research demonstrated P2Y2R prevention in leukocyte movement under non-inflamed conditions. This research aims to determine the importance of P2Y2R in leukocyte-endothelial interactions in vivo under acute inflammation. Intravital Microscopy (IVM) is used to observe hemodynamic activity in cremaster tissue venules of male mice. Images will be quantified to obtain baseline data measuring 'normal' interactions between leukocytes and endothelial cells in sham group of experiment. Cell-to-cell interactions were observed after inducing localized acute inflammation with lipopolysaccharide (LPS). We expected an increase in recruitment, rolling, and adhesion of leukocytes of wildtype mice treated with LPS compared to baseline and P2Y2R knockout mice with LPS treatment. If this is the case, it could suggest P2Y2R expression on endothelial cells and leukocytes regulates leukocyte response during inflammation. We anticipate that an increased grasp of P2Y2R role in inflammation will result in improved understanding of immune response initiation. Implications of these findings have the potential to be in clinical, therapeutic, and research applications.

**Presenters: Andrew Lacek, William Neba, and Jeff Podlaskowich**

**Authors: Andrew Lacek, William Neba, Jeff Podlaskowich, Jeanie Skibiski, and Joe Meyerott**

**Poster #: B26**

Nurse Anesthesia Practice

*POINT OF CARE ULTRASOUND FOR NEURAXIAL ANESTHESIA*

Neuraxial Anesthesia using landmark palpation methods, has been shown to result in a higher incidence of trauma and patient discomfort especially in the obese, parturient, geriatric populations, and in patients with spinal deformities. These studies also indicate that clinicians wrongly identify the spinal level for neuraxial anesthesia 88% of the time using landmark palpation. With the recent proliferation of ultrasound (US) technology in modern day practice, clinicians have mostly replaced the traditional dependence on landmarks in regional anesthesia and in the cannulation of major blood vessels. This shift in practice has resulted in a decline in the number of complications from central vein cannulations and a decline in Local Anesthetic Systemic Toxicity (LAST). Other studies have demonstrated that utilizing ultrasound for regional anesthesia for hip and knee surgeries significantly decreased hospitalization costs and was linked to a decrease in 30-day mortality. When used for neuraxial anesthesia, clinicians were 78% accurate in identifying the spinal level. Despite its advantages, and more than 60% of women receiving neuraxial anesthesia to manage labor pain every year, the use of ultrasound for neuraxial anesthesia has not been fully adopted.

**Presenter: Skyler Lee**

**Authors: Skyler Lee, Kelsey Kendrick, Claire Nichols, Christian Rivas, and Randi Ulbricht**

**Poster #: B28**

Cell and Molecular Biology

*TISSUE AND SEX-DEPENDENT EFFECTS OF A-TO-I EDITING AND INNATE IMMUNITY IN MICE*

Innate immunity is the body's first line of defense during a viral infection. Adenosine-to-Inosine (A-to-I) RNA editing of self RNA by ADAR (Adenosine Deaminase Acting on RNA) prevents the immune system from activating and doing harm. Females have more ADAR and more inflammatory factors than males under similar acute inflammatory conditions. Our purpose is to determine if editing by ADAR1 in heart, brain, and skeletal muscle is sex specific using Sanger Sequencing to measure editing in individual RNAs. Since there is more ADAR1p150 in females than males, we anticipate more editing and a more controlled immune response in females. We found that editing in the heart and brain was unaffected by ADAR1. However, in skeletal muscle RNA editing of FLNB was increased by LPS in males but had no significant effect in females. FLNA, another editing target, was unaffected by the treatment of LPS but showed a sex-dependent difference in editing. These results show that the effects of inflammation may selectively affect the function of FLNB in skeletal muscle. Expression of inflammatory factors such as ADAR1, TNF- $\alpha$ , and MDA5 was induced by LPS, with TNF- $\alpha$  and MDA5 having more induced expression in females. Our work suggests that the impact of sex on inflammatory factors may also indirectly affect the rate of RNA editing of select transcripts in select tissues. Thus, furthering our knowledge on A-to-I RNA editing and its impact on the innate immune system and related diseases.

**Presenter: Emma Liimatta**

**Authors: Emma Liimatta, Emily Schmoll, Archana Shrestha, Ariel Carpenter, and Joshua Smith**

**Poster #: B29**

Cell and Molecular Biology

*COLD HARDINESS IN VITIS INTERSPECIFIC HYBRID "CHAMBOURGIN"-BASED POPULATION CHARACTERIZING THE ROLE OF RAD23 IN UV RESISTANCE IN TETRAHYMENA THERMOPHILA*

When Nucleotide Excision Repair (NER) is nonfunctional, such as in the genetic disease Xeroderma Pigmentosum (XP), the risk of skin and eye cancer increases >1000 fold because DNA damage caused by UV radiation is unable to be repaired. The goal of this study is to determine the role of rad23 in UV resistance in Tetrahymena thermophila. This is the first time rad23 has been studied in T. thermophila and previous rad23 knockdowns in other organisms have shown UV sensitivity rather than resistance. In this study, rad23 knockdown was confirmed by qRT-PCR, and UV resistance was confirmed by UV survivability assays. Southern blot immunodetection techniques assessed levels of DNA damage in UV treated rad23 knockdown cells and showed decreased repair. Advancing knowledge of NER, XP and RAD23 will eventually lead to the development of treatments for Xeroderma Pigmentosum disease.

**Presenter: Marissa Luney, Ashlyn Towery, Micaela Piacentino, and Makenzie Maples**

**Authors: D. Carr, A. Liggett, M. Luney, M. Maples, M. Piacentino, and A. Towery**

**Poster #: A31**

Athletic Training

*THE EFFECTS OF THERAPEUTIC CUPPING ON THE AMOUNT OF SKIN DEFORMATION OF THE QUADRICEPS*

The amount of skin deformation that occurs during myofascial decompression inside a cup has yet to be studied. Therefore, the objective of our study was to examine how the amount of skin deformation changes from person to person with a standardized pressure during myofascial decompression. Our two questions are: (1) Is there a difference from person to person in how much skin deformation occurs in myofascial decompression under a standardized pressure? and (2) What factors affect skin deformation? Our methods include collecting data from live subjects. We examined if certain demographics change the amount of skin deformation under the cup in each individual (ie, height, weight, age, gender, BMI, body fat percentage, skin temperature, skinfold measurement). Measurements were taken through self reporting, bioelectrical impedance scale, infrared thermometer, and skin calipers. Then, we began our series of cupping for 6 minutes, with pictures taken every two minutes. The cups maintained a constant pressure of 260 millimeters mercury throughout. A measuring tape was attached to the cup to allow an accurate measurement of skin deformation within the cup. Results are currently pending and conclusions will be made based on results.

**Presenter: Jamila Makhoulfi**

**Authors: Jamila Makhoulfi, Randi Ulbricht, and Jianjie Wang**

**Poster #: A32**

Cell and Molecular Biology

*INVESTIGATING THE EFFECTS OF UTP-INDUCED P2Y2 RECEPTOR ACTIVATION AND INFLAMMATION ON INSULIN RESISTANCE IN MICE*

Insulin resistance is the impaired ability to use insulin to take up blood glucose and is associated with many clinical conditions including type 2 diabetes and obesity. While the cause of insulin resistance is unknown, it is linked to inflammation. Activation of the P2Y2 receptor potentiates an inflammatory response under obesity and obstructs glucose metabolism, resulting in insulin resistance. This research investigates the effects of P2Y2R on the signaling of the insulin receptor (INSR) and glucose uptake during acute inflammation. Inflammation was induced in male and female mice that were also treated with UTP to activate the P2Y2 receptor. We performed glucose tolerance testing (GTT) to measure response to glucose. We measured the expression of the insulin receptor and glucose transporter (GLUT4) in skeletal muscle and adipose tissue. Glucose tolerance of female mice is not affected by P2Y2R, while LPS-treated male WT mice have reduced glucose tolerance. We expect GLUT4 and INSR expression to increase in female mice tissues compared to male mice. This research investigates the mechanism of insulin resistance development and provides important insights into potential sex-specific targets of type 2 diabetes therapy.



**Presenter: Madison McClard**

**Authors: Madison McClard and Shurita Thomas-Tate**

**Poster #: A33**

Speech-Language Pathology

*QUALITATIVE STUDY OF THE USE OF CHATGPT IN GRADUATE TEACHING AND LEARNING*

This study investigated the growing use of AI tools like Chat GPT in graduate classes and clinical practice in the field of Speech-Language Pathology. As AI's influence grows in education, its effectiveness and ethical implications demand thorough investigation. Employing a first-person qualitative research approach, the researcher documented personal experiences, insights, challenges, and achievements in integrating Chat GPT into both graduate classes and clinical practice. This method facilitated a comprehensive examination of the researcher's perspective and firsthand encounters with Chat GPT, supplemented by the inclusion and analysis of journal entries from the research advisor, reflecting their collaborative journey. The findings of the study revealed three main insights into the effective utilization of ChatGPT in clinical practice and graduate coursework. This study contributes to the responsible utilization of AI in education and healthcare, potentially benefiting students and educators alike.

**Authors: Gabrielle McGrath, Sarah Murray, and Daniela Novotny**

**Poster #: A34**

Nutrition and Dietetics

*EXPLORING LEADERSHIP DEVELOPMENT OF ACADEMIC COURSE MENTORS IN NUTRITION & DIETETICS*

Literature suggests that leaders are trained rather than born. Leaders develop specific qualities and skills through several, smaller opportunities of influence, which allow them to effectively influence a larger population. Thus, it is important to provide undergraduate health professions students with leadership opportunities such as course mentorship, or peer-to-peer education. In this study, it was explored if and how providing nutrition and dietetics students mentorship opportunities developed leadership traits. Additionally, it was assessed if serving as course mentors prepared students for future leadership experiences in the profession of dietetics. This is a qualitative study, in which current and former course mentors of DTN 240 Introduction to Human Nutrition were interviewed via Zoom. Recordings were uploaded to Otter.AI for transcription and DelveTool for thematic analysis. Emerging themes suggested that a) course mentorship enhanced students' leadership skills such as adaptability, communication, and confidence, and b) students recognized that serving as course mentors provided them a position of influence to step into and develop as a leader.

**Presenter: Noelle C. Mennen**

**Authors: Noelle C. Mennen and Sarah Murray**

**Poster #: B33**

Nutrition and Dietetics

*RECRUITMENT INTO THE NUTRITION AND DIETETICS PROFESSION: THE IMPACTS OF CAREER DECISION.*

The demand for Registered Dietitian Nutritionists is increasing. With recent changes in education requirements to become a Registered Dietitian Nutritionist, recruitment is also

changing. Because of this, universities must reassess their recruitment strategy. Recruitment into the field of Nutrition and Dietetics is largely the responsibility of individual programs and instructors. It is suggested that mentorship may be beneficial in recruitment into Allied Health fields. This study explores factors leading to student's decisions to enter the field of dietetics. Specifically, it focused on how course mentorship programs may recruit students into dietetics programs. A survey was sent out to the undergraduate Nutrition and Dietetics students at a Midwestern University. Survey results were analyzed using the XM software and open-ended question responses were categorized and synthesized using qualitative coding to find key themes. Results showed that multiple factors determine a student's decision to be a Nutrition and Dietetics major, one primarily factor being an interest in how nutrition is integrated into the function of the human body. Data also suggests that students' interactions with mentors in the field of Nutrition and Dietetics increases interest and commitment to the field.

**Presenters: Morgan Mulford and Claire Kippenbrock**

**Authors: Thomas Franklin, Morgan Mulford, and Claire Kippenbrock**

**Poster #: B36**

Audiology

*ACCURACY OF INTERNET-BASED HEARING TESTING COMPARED TO STANDARDIZED PURE-TONE AIR CONDUCTION HEARING EVALUATION*

The FDA has approved the sale of over-the-counter hearing aids for a mild to moderate degree of hearing loss, which can be purchased online by uploading self-administered hearing thresholds determined through online hearing testing sites. With the medical and technological advances in telehealth, patients have access to participate in online hearing testing. The need to travel to a clinic for in-person testing is no longer necessary, but at what cost? This study investigates the accuracy of self-administered internet-based hearing testing compared to a standardized pure tone air conduction hearing evaluation conducted by an audiologic professional. The standardized audiological hearing examination is a test of the peripheral auditory system that tests for degree, configuration, and type of hearing thresholds. This test was created to identify, diagnose, and provide rehabilitation for those with hearing loss (ASHA, 2023). Traditional pure tone audiometry tests the softest sound audible 50% of the time between 250 Hz and 8000 Hz. The results are then plotted on an audiogram which shows the intensity as a function of frequency (Davis, 2016). In this study, eighteen consenting adults, 18 years or older, with no background in the field of audiology and normal cognitive function were asked to sit in a sound booth and participate in two internet-based hearing tests and a standardized pure-tone air conduction hearing evaluation. The audiograms from the three hearing tests were then compared at each individual frequency to determine the accuracy. The results from this study indicate that online hearing testing may be erroneous in determining the accurate power output needed for over-the-counter or online-purchased hearing aids.

**Presenters: Emily Nelson, Andy Burns, Caleb Dodd, Tate Reed, and Kaden Wilson**

**Authors: Emily Nelson, Andy Burns, Caleb Dodd, Tate Reed, Kaden Wilson, Madison Gregory, Ryan Moon, Patrick Brooks, Joshua Smith, and Amanda Brodeur**

**Poster #: B38**

Cell and Molecular Biology

*EFFECT OF HYPOCHLOROUS ACID ON STAPHYLOCOCCUS AUREUS: IN THE CONTEXT OF TREATING COMPOUND FRACTURES*

Compound fractures are susceptible to bacterial infection due to environmental exposure. Irrigation of the fracture is a common method to prevent infection. There are not yet clinical practice guidelines in terms of the type of irrigation solution to be used. The goal of this work is to explore if hypochlorous acid irrigation solution is effective at killing bacteria, while being non-toxic to human osteoblasts and osteoclasts, and to determine the therapeutic window for use of hypochlorous acid in irrigation of compound fractures. Hypochlorous acid is commonly used in cleaning solutions, wound treatment, and is naturally produced by the human body as part of a natural immune response. Some sources in the literature suggest that hypochlorous acid may cause cellular damage and change the way in which the cell functions. This investigation seeks to determine the most effective concentration of hypochlorous acid at inhibiting growth of Staphylococcus Aureus, one of the most common bacterial infections following compound fracture repair.

**Presenters: Emily Nelson, Alyssa Fonseca, Katie Helm, Maya Horn, and Chris Wells**

**Authors: Emily Nelson, Cristina Flaquer Fuste, Alyssa Fonseca, Katie Helm, Maya Horn, Chris Wells, Madison Gregory, Ryan Moon, Patrick Brooks, Joshua Smith, and Amanda Brodeur**

**Poster #: A38**

Cell and Molecular Biology

*EFFECT OF HYPOCHLOROUS ACID ON ESCHERICHIA COLI: IN THE CONTEXT OF TREATING COMPOUND FRACTURES*

Bone infection, or osteomyelitis, is a devastating possible outcome of compound bone fractures. A new possible surgical antiseptic is starting to peak surgeon's interest: hypochlorous acid. The goal of this work is to explore if hypochlorous acid irrigation solution is effective at killing bacteria, while being non-toxic to human osteoblasts and osteoclasts, and to determine the therapeutic window for use of hypochlorous acid in irrigation of compound fractures. Hypochlorous acid is naturally produced as part of a natural immune response and is an excellent antiseptic on surfaces and FDA approved for use in periorcular skin treatment and dental spray application. Some sources in the literature suggest that hypochlorous acid may cause cellular damage and change the way in which the cell functions. This investigation seeks to determine the most effective concentration of hypochlorous acid at inhibiting growth of Escherichia Coli, a model organism for pathogenic gram-negative bacteria.

**Presenter: Caleb Niccum**

**Authors: Caleb Niccum and Leslie Echols**

**Poster #: B40**

Experimental Psychology

*DEVELOPING A SHORT IPIP QUESTIONNAIRE FOR ADOLESCENTS*

This study aims to create an abridged version of the IPIP consisting of 15 items that are developmentally appropriate for adolescents. The original data came from the IPIP database where they openly post survey data from some of their questionnaires, one being the IPIP-50. The abridged questionnaire was designed by picking the items with the highest loadings via exploratory factor analysis and the highest factor correlations with scale reliability. The EFA yielded good factor loadings and fit indices (CFI = 0.99, NNFI = 0.99, RMSEA = 0.026, and RMSR = 0.012). The factor correlations were also good (average  $\hat{r} = 0.78$ ). The new 15-item scale was administered to 6th, 7th, and 8th grade students in a small, Midwestern middle school who were participating in a larger study on peer victimization (N = 207). Scale reliability first revealed poor alphas corresponding to catastrophic estimates and fit indices from the CFA. Both these analyses indicated that negatively worded items were the primary culprit. Thus, the next iteration of the 15-item scale will include only positively worded items. It will be administered to the same middle school students and scale reliability will be re-assessed.

**Presenter: Jordan Schler**

**Authors: Jordan Schler and Wafaa Kaf**

**Poster #: A42**

Audiology

*COMPARING AUDITORY BRAINSTEM RESPONSES BETWEEN CLICK AND WIDEBAND CHIRP STIMULI FROM TWO MANUFACTURERS*

Auditory Brainstem Response (ABR) testing is used to assess the auditory pathway from the auditory nerve to associated auditory neural pathways (Young et al., 2023). This test is often used with individuals that are not able to provide reliable behavioral audiological thresholds. Because of this, ABR testing is often used to conduct universal hearing screenings, interoperative monitoring, and aiding in the diagnosis of peripheral and central nervous system issues (Bargen, 2015). The purpose of this study is to compare how Vivosonic's 100 Hz click and VF chirp stimuli differ from Interacoustic's CE-Chirp and narrowband chirp in auditory brainstem response (ABR) threshold determination. The research will investigate the effect that decibel levels have on ABR threshold levels, the amplitude of Wave V when determining ABR thresholds, and the time that it takes to achieve a repeatable response. This study is aimed at providing normative data for ABR threshold determination to be used in the clinical setting.

**Authors: Catherine Scruggs, Grace Keltner, Maddie Broderick, and Zoe Mason**

**Poster #: A43**

Athletic Training

*EFFECTS OF MYOFASCIAL DECOMPRESSION ON THE EXTENSIBILITY OF THE SUPERFICIAL BACK LINE*

Recent research has highlighted the interconnectedness of muscles through myofascial lines, which can impact tissue extensibility. These extensibility issues within myofascial pathways may

disrupt the active range of motion for physically active individuals during daily activities. A common manual therapy technique used in rehabilitation is myofascial decompression, often referred to as cupping. Previous studies have demonstrated that myofascial decompression can alleviate pain and enhance tissue extensibility, leading to improved range of motion. However, our investigation identified a gap in the literature regarding the optimal placement of the cup in relation to areas of decreased range of motion within a fascial line. To address this, we conducted a study involving physically active participants with hip flexion restrictions. These individuals were randomly assigned to two groups, (1) myofascial decompression in the cervical spine and hamstrings and (2) myofascial decompression in the hamstrings. Pre and post treatment measurements were taken of passive hip flexion on all participants. Results are pending but further research is warranted to comprehend the relationship between tissue extensibility and myofascial decompression.

**Presenter: Lauren Smith**

**Authors: Lauren Smith and CaSandra Stanbrough**

**Poster #: B50**

Experimental Psychology

*“YOU FEEL ME?” SEX DIFFERENCES IN ANXIETY AND SOCIAL SIGNALS FOLLOWING SHAME*

The purpose of this study is to determine if the tend-and-befriend theory is applicable when someone experiences and witnesses shame. Participants were exposed to three in-person shaming scenarios and their heart rates and anxiety scores were collected. One scenario involved witnessing a stranger experience shame, another involved witnessing a loved one, and the final involved them experiencing it personally. Two 2x3 Mixed ANOVAs assessed sex differences in the participants' affective and physiological response after these scenarios. Results indicated that females reported more anxiety than men following the personal scenario compared to the stranger and loved one. However, the second analysis indicated that their heart rates were not affected. While women reported experiencing more anxiety after shame, their physiological reactions were inconsistent with an anxiety response. Reporting anxiety following personal shame may be an attempt to signal distress to the researcher, which is supported by the tend-and-befriend theory. This study supports and provides more detail regarding the tend-and-befriend theory, particularly when a female experiences shame. Females are more likely to seek social support by expressing anxious feelings after experiencing shame, even if they are not physiologically experiencing it.

**Presenters: Abby Stoy, Madi Bowles, Joel De Jong, and Rachel Milburn**

**Authors: Caleb Barron, Brett George, Elaina Peyton, Anh Tran, Jason Shaw, and Sean Newton**

**Poster #: B51**

Physical Therapy

*AGE-RELATED CHANGES IN MOTOR RECRUITMENT IN RESPONSE TO MULTIDIRECTIONAL PLATFORM-BASED BALANCE PERTURBATIONS*

The risk of falling increases with age. No studies to date have compared the effect of aging on motor responses to reactive balance perturbations in diagonal directions. The purpose of this study was to determine the age-related changes in motor recruitment in response to multidirectional platform-based balance perturbations. We hypothesized that older adults

would demonstrate increased latencies, increased agonist-antagonist contraction, and a greater reliance on hip strategies. Three participants, ages 23, 48, and 60 participated in this study. Electromyography (EMG) sensors were placed over tibialis anterior and semitendinosus muscles. Participants stood on a perturbation platform that moved unexpectedly. A single forward platform perturbation response was analyzed while standing 45° from forward. EMG data was analyzed for peak amplitude. Tukey's HSD Test for multiple comparisons found that the mean value of muscle contraction was not significantly different between younger, middle, and older adults ( $p = .510$ , 95% C.I.) Though between muscle comparisons were insignificant with aging, aging appears to cause preferential reliance on hip strategy muscles. Increased reliance on hip strategies with aging may be due to an increased fear of falling response and the ability to quickly shift greater mass compared to ankle strategies. Future studies should use larger sample sizes and test additional planes of motion and muscles.

**Presenters: Laci Sutton and Ashlyn Lindberg**

**Authors: Laci Sutton, Ashlyn Lindberg, and Shurita Thomas-Tate**

**Poster #: A49**

Speech-Language Pathology

*AN EXPLORATION OF INCLUSIVE PRACTICES OF PUBLIC LIBRARIES FOR PATRONS WITH DISABILITIES*

This research project aimed to explore services libraries provide to patrons with disabilities. Research was conducted on this topic by first looking online at each local library's website to see if these services are easily located. A survey was also sent to these libraries asking about specific programs for a variety of populations that might be served (visually impaired, autism spectrum disorder, deaf/hard of hearing, etc.). Surveys were sent to major libraries in Kansas, Missouri, Oklahoma, and Arkansas. Of the surveys sent out, 45% of libraries responded. Results revealed that libraries across these 4 states are providing minimal accommodations for patrons with disabilities, and the majority of library staff do not feel equipped to assist these individuals. In conclusion, further research should be conducted on the services that should be provided to patrons with disabilities and help spread awareness of inclusive services that should be provided in public libraries.

**Authors: Emily J. Van Gundy and CaSandra Stanbrough**

**Poster #: B54**

Experimental Psychology

*AROMATHERAPIES AND STRESS: AN EXAMINATION OF SALVIA SCLAREA IN ACUTE STRESS CONDITIONS*

The use of essential oils as an alternative medicine in the United States is becoming increasingly popular as more accreditation is given to its therapeutic values. With this increase in use, it is important that we continue to examine the uses of essential oils, including associated risks. One unavoidable aspect of life is stress, both acute and chronic. This study aims to better our understanding of the stress reducing properties of the essential oil clary sage (*salvia sclarea*) after an experimentally induced acute stress experience. Gross and colleagues (2013) investigated chronic administration of clary sage essential oil in mice. Authors found that dominant mice had a reduction in dominant and anxiety-like behaviors when given the clary

sage essential oil in their food. Submissive mice also displayed a decrease in anxiety-like behaviors and reduced corticosterone (Gross et al., 2013). One study by Seol and colleagues (2013) examined a group of female participants undergoing urodynamic examinations, an acute stress experience. Within the experimental group participants either inhaled the scent of lavender or clary sage. This study concluded that participants who inhaled the scent of clary sage had a significant decrease in systolic and diastolic blood pressure compared to the control group. A significant reduction in respiratory rate was also observed in the clary sage group (Seol et al., 2013). The results of this study suggested that the scent of clary sage may promote feelings of relaxation and stress reduction in those undergoing stressful medical examinations. Clary sage has also been examined for potential hypertension reducing properties outside of acute stress conditions. Research has suggested that clary sage inhalation may reduce heart rate (Mitic et al., 2020). Due to clary sage's reported ability to have central nervous system calming properties and anxiolytic effects, this study examines the effects of clary sage essential oil scent under acute stress conditions, utilizing the Trier Social Stress Test (TSST) (Kirschbaum et al., 1993). Paired samples independent t-tests (sweet almond oil control group; clary sage experimental group) conducted through IBM SPSS Statistics for Windows, version 28 (IBM Corp., 2020) were used to examine differences in salivary cortisol, blood pressure, and responses to the State Trait Anxiety Inventory. Preliminary analysis reveals no significant differences between the clary sage and almond oil groups pre and post-test  $t(49) = -1.05$ ,  $p = .30$ , but measures are trending towards a decrease in blood pressure. Given enough power and statistically significant results, this study will give validation to use of clary sage aromatherapy as a secondary treatment for anxiogenic disorders. This study would lay the groundwork for future, more rigorous testing regarding the therapeutic effects of clary sage.

**Presenters: Nakaja Weaver and Freedom Austell**

**Authors: Nakaja Weaver, Freedom Austell, Mykah Doolin, and Ashley Payne**

**Poster #: A51**

Psychology

*UNFORGETTABLE ERAS: 90S AND 00S HIP HOP INFLUENCE ON COLLEGE-AGED BLACK WOMEN'S IDENTITY DEVELOPMENT*

Historically, Black women are core presences in the cultivation and evolution of music, style, and language in Hip Hop culture (Payne 2020; Phillips et al., 2005). Despite this role, Black girls and women report growing feelings of discomfort in Hip Hop spaces as it reinforces misogynist, sexualizing, and dehumanizing images of Black women (Payne 2020; McNally 2016; Hunter and Soto 2009). This study explores how young Black women engage with prominent Black women artists in the 1990s-2000s while they disengage with contemporary Hip Hop spaces. The research questions are: (1) How does 90-00s Hip Hop influence the gendered racial identity development of Black college women's (18-30yr)? (2) How does 90-00s Hip Hop culture influence Black college women's (18-30yr) (dis)engagement of modern-day Hip Hop, particularly of Black women in hip hop? This study is part of a larger qualitative, youth participatory action research approach (YPAR). Researchers recruited Black college women mentors (N = 16) from a local mid-size public university and Black high school mentees (N = 12) from a local high school through snowball sampling to participate in an 8-week mentoring program. Utilizing thematic analysis on (32) pre- and post-program mentor interviews,

preliminary results revealed 2 themes: (1) fictive kinship bonds with Black Hip Hop women artists of the 90s guide identity (re)construction for Black college women (2) a participant's individual kinship with Black Hip Hop artists of the 90s/00s influences the level of engagement with contemporary Hip Hop. Preliminary results align with previous explorations of the reflective way Black women interact with sexism and fetishization in Hip Hop spaces (Jennings 2020; Pough 2004; Payne 2020). Educators and practitioners who work with Black women, specifically Black college women may benefit from assessing their engagement with Black feminine images and tropes, specifically in Hip Hop culture.

## **College of Natural and Applied Sciences (CNAS)**

**Authors: Samuel Aogo, Jacob Lacki, and Robert Pavlowsky**

**Poster #: B2**

Geography

*DOWNSTREAM VARIATION IN FLOODPLAIN METAL-CONTAMINATION, ELM CREEK, PICHER FIELD, OKLAHOMA*

Situated within the Tri-State Mining District of Oklahoma, the Picher Field emerged as a leading producer of zinc (Zn) and, to a lesser extent, lead (Pb) globally, spanning from the early 1900s century to the 1970s. Presently, this area forms part of the Tar Creek Superfund site, recognized for its environmental degradation due to the accumulation of mining residues. This research examines the levels and spatial distribution of metal pollution from mining activities in the floodplain soils of Elm Creek, which drains the Picher Field's and merges with the Neosho River near Miami, Oklahoma. Prior to this study, a detailed investigation into the distribution and accumulation of Zn concentration in the sediments of Elm Creek's floodplain and channel had not been conducted. Employing methods such as coring and surface soil sampling, the study gathered 247 samples from 13 locations within the Elm Creek watershed impacted by historical mining operations. Analytical results from X-ray fluorescence (XRF) demonstrated markedly high Zn concentrations in the floodplain sediments, peaking at 33,154 ppm – surpassing the probable effect concentration (PEC) tenfold and the threshold effect concentration (TEC) by seventy-two times. The research reveals an average contamination depth of approximately 60 cm throughout the watershed with a range of 30 – 90 cm. Furthermore, a discernible decline in Zn levels was noted moving downstream and away from the channel's central path, with concentrations diminishing from 33,154 ppm at a point 1.47 km upstream from the pollution sources (Bird Dog) to 1,449 ppm at a distance of 14.04 km downstream, indicating the varying impact of historical mining activities along Elm Creek.



**Presenter: Afrida Aranya**

**Authors: Afrida Aranya and Tasnuba Jerin**

**Poster #: B3**

Geography

*HYDROGEOMORPHIC RESPONSE OF FLUVIAL SYSTEMS IN RESPONSE TO CLIMATE CHANGE IN THE OZARK HIGHLANDS*

The relationship between climate change and its impact on fluvial systems has gained significant scientific attention in recent years. However, limited research has explored this relationship in karst-dominated landscapes, particularly in the US Midwest. This research investigates the effect of climate change on the hydrology of James River draining the karst-dominated landscape of the Ozarks. The research looks at: how the channel responds to different flow regimes before (pre-1990) and after (post-1990) climate change and how these responses vary based on channel stability. This study examines two 1.5 km channel reaches – one active and one stable. Peak streamflow data of over 60 years are analyzed to evaluate flood frequency distributions. A comparative analysis of streamflow recurrence intervals before and after 1990 shows a shift in the flow regime. Flood events of specific recurrence intervals are simulated using HEC-RAS to assess flow depth, velocity, and flooding extent. Results show increased streamflow magnitudes across all return intervals from pre- to post-climate change periods, with pronounced effects on longer-recurrence-interval floods. Channel behaviors show more variation for smaller-magnitude floods between the two periods. The study aims to aid in improving flood prediction and contribute to flood preparedness and management plans in the region by enhancing our understanding of how climate change shapes flow patterns.

**Presenter: Grace Atkins**

**Authors: Grace Atkins and Fei Wang**

**Poster #: B4**

Chemistry

*INTRODUCING SI VACANCIES INTO  $\text{MOSi}_2$  AND  $\text{WSi}_2$*

The purpose of this project is to find a ternary silicide with thermoelectric properties similar to  $\text{ReSi}_{1.75} \text{O}_{0.25}$  by using binary pnictides and chalcogenides with molybdenum and tungsten. Mo and W binary pnictides and chalcogenides were used as precursors to introduce elements which have high vapor pressure and low boiling points. Powder x-ray diffraction (XRD) was used to evaluate the final phase of each binary after melting in the box furnace and afterwards, in the arc melting furnace. The binaries that were determined to be pure phase in their composition were able to be used as precursors for preparing ternary silicides. The pure phase binaries that were successfully made were MoP,  $\text{MoP}_2$ ,  $\text{Mo}_3\text{Sb}_7$ ,  $\text{MoSe}_2$ ,  $\text{MoS}_2$ , WP,  $\text{WP}_2$ ,  $\text{WS}_2$ , and  $\text{WSe}_2$ , all of which were evaluated using their XRD powder pattern. Ternary silicides, produced using various compositions of W and Mo with Si and one of P, S, Se, Bi, or Sb binaries, were evaluated using single crystal XRD. One ternary silicide,  $\text{WSi}_{1.875}\text{P}_{0.1} \text{O}_{0.025}$ , was prepared using WP as the source of P. The powder XRD pattern showed additional peaks not shown in the theoretical  $\text{WSi}_2$  powder pattern. This indicates the possible presence of vacancies in the ternary crystal structure.

**Presenter: Kristos Baffour**

**Authors: Kristos Baffour, Neelima Koti, Carissa Sutton, David Johnson, Rishi Patel, Santimukul Santra, and Tuhina Banerjee**

**Poster #: A2**

Chemistry

*KINETIC MODULATION OF  $\hat{\pm}$ -SYNUCLEIN FIBRILLATION AND TOXICITY BY 4-PHENYLBUTYRIC ACID*

Protein misfolding and aggregation of alpha-synuclein ( $\hat{\pm}$ -syn) into toxic amyloids underlies the pathogenesis of neurodegenerative diseases such as Parkinson's disease (PD). Although most therapeutic attention is focused on the use of pro-dopamine analogs to alleviate the symptoms of PD, inhibiting the formation of toxic  $\hat{\pm}$ -syn amyloids present a viable approach to attenuate the pathology of PD. 4-Phenylbutyrate (PBA) is an oral derivative of butyrate that is approved for treating urea cycle disorders. PBA has garnered significant attention as a potential chemical chaperone for targeting alpha-synuclein ( $\hat{\pm}$ -syn) due to its potential to stabilize the native conformation of the protein and prevent aberrant interactions. In this study, we investigated the potential of PBA in modulating the aggregation propensity of  $\hat{\pm}$ -syn and its implications for PD pathogenesis. Using in vitro assays, we demonstrated that PBA treatment significantly alters the pattern of  $\hat{\pm}$ -syn aggregation, as evidenced by reduced formation of oligomeric species and its increased susceptibility to proteolytic cleavage under the influence of PBA. Proteinase K assay, surface plasmon resonance, and Nile red studies indicate that PBA interacts with the extensive hydrophobic contacts of  $\hat{\pm}$ -syn oligomers and significantly reduces  $\hat{\pm}$ -syn-amyloid induced toxicity, suggesting that oligomerization may be a requirement for  $\hat{\pm}$ -syn to exert its neurotoxic effect. Furthermore, using ThT based assays, we elucidated the kinetics of PBA-mediated inhibition of  $\hat{\pm}$ -syn aggregation, highlighting its role in accelerating the maturation of  $\hat{\pm}$ -syn fibrils. Current evidence both in vivo and in vitro suggests that  $\hat{\pm}$ -syn oligomers exert the most neurotoxic effects. PBA preferential interaction with  $\hat{\pm}$ -syn oligomers explains its ability to mitigate  $\hat{\pm}$ -syn-induced cytotoxicity as observed in this study. Collectively, our findings provide compelling evidence for the neuroprotective potential of PBA in targeting protein misfolding and aggregation in PD and suggests an avenue for disease-modifying interventions in neurodegenerative disorders.

**Presenter: Rakshya Bhatta**

**Authors: Rakshya Bhatta, Nhi Le, and Kyoungtae Kim**

**Poster #: A3**

Biology

*EFFECTS OF CDSE/ZNS QUANTUM DOTS ON THE EXPRESSION OF EXOSOMAL PROTEINS SECRETED BY HELA CERVICAL CANCER CELLS*

Quantum dots (QDs) are zero-dimensional nanoscale semiconductor particles with unique electrical and optical properties. QDs are used across various fields, including biological imaging, medical diagnostics, therapeutics, quantum computing, and energy devices. Recently, there have been serious concerns about the cytotoxicity assessment of QDs because of their small size and low biodegradability. In this research, we looked at the effect of cadmium-based QDs on the expression of exosomal proteins. Exosomes are a type of small, membrane-bound extracellular vesicles (EVs) that are secreted by cells into the extracellular environment and play

crucial roles in intercellular communication. We extracted the exosomes from HeLa cells and purified them using ultracentrifugation method. We lysed these exosomes to precipitate the proteins and used mass spectrometry to conduct global quantitative proteomics on these proteins. We found 10 proteins significantly differently expressed, where five were over-expressed, and five were under-expressed. Through this study, we found that quantum dots alter the expression of exosomal proteins, which can interfere with cell-to-cell communication.

**Presenter: Matthew Bruenning**

**Authors: Matthew Bruenning and Ridwan Sakidja**

**Poster #: A6**

Materials Science

*DEVELOPMENT OF MACHINE LEARNING INTERATOMIC POTENTIALS TO MODEL CORROSION BEHAVIOR INSIDE MOLTEN SALT REACTORS*

In this study, we developed and evaluated the efficacy of Machine Learning Interatomic Potentials (MLIP) designed for a molten salt/alloy system to contribute to the development of next generation Molten Salt Reactors (MSR). Corrosion inside these reactors is an extreme concern and accurate computational methods are necessary for efficient development and maintenance of these reactors. We present an interatomic potential trained on a neural network over thousands of trajectories containing different compounds found in our 9-element corrosion system. We optimized the hyperparameters to account for the initial corrosion mechanisms and the cluster dynamics within the molten salts. Here we show our potential has achieved chemical reaction accuracy and the molecular dynamics simulations show dissolution of Chromium atoms.

**Presenter: Moth T. Castagna**

**Authors: Moth T. Castagna, Jenny K. Burrow, Ciara G. Stewart, and Avery L. Russell**

**Poster #: A7**

Biology

*TAKE IT OR LEAF IT: CAN BEES LEARN TO USE LEAF SHAPE TO FIND FLOWER REWARDS?*

A century of research demonstrates that pollinators use diverse floral cues to find food rewards. However, floral cues are not always reliable, as often occurs when unrewarding plant species mimic the floral cues of co-occurring rewarding plant species. In these cases, pollinators should learn to use other non-floral cues instead. Here we examined whether and when generalist bees would learn to associate differences in leaf shape with a pollen reward. We expected bees would rely more on leaf shape when learning petal color was more difficult, and vice versa. We therefore assigned bees to either of two treatments, differing in terms of how much artificial flowers differed in petal color; each treatment differed in leaf shape in the same way. As expected, bees learned much faster when petal color differed greatly. Yet when petal colors differed little, bees had a harder time learning petal color and did not show evidence of having learned leaf shape. However, bees learned and recalled the petal color and leaf shape in combination, but only when the petal colors were dissimilar. Our results suggest that non-floral cues may be learned secondary to or only in combination with floral cues (such as petal color).

**Presenter: Abhishu Chand**

**Authors: Abhishu Chand, Nhi Le, and Kyoungtae Kim**

**Poster #: B8**

Biology

*INVESTIGATING THE EFFECTS OF CDSE/ZNS QUANTUM DOTS ON ACTIN DYNAMICS*

Quantum dots (QDs) are biocompatible nanoparticles that are highly sought after for their potential in biomedical applications such as drug delivery due to their unique optical and electronic properties. Even with such immense potential, the use of QDs in biological settings has been limited due to concerns regarding their toxicity in the cell. Our previous studies revealed that QDs interact with G-actin and impair its function. Therefore, we further investigated the effects of QDs on the actin dynamics using several biomolecular techniques. Our results revealed that QDs behave in a biphasic manner in the actin assembly process, where high concentrations of QDs inhibit actin polymerization while the lower concentrations of QDs stimulate actin polymerization. We also found that the QDs bind to F-actin and cause enhanced depolymerization of the actin filament and can also cause the bundling of the filaments. These effects of QDs highlight the importance for safer QDs in order to minimize their toxicity and optimize their potential usage in the biomedical fields.

**Presenter: Preston Clubb**

**Authors: Preston Clubb, Jessica Linson, Maximo Reyes, Elim Horn, Illya A. Medina-Velo, Jorge L. Gardea-Torresdey, and Cyren M. Rico**

**Poster #: A10**

Chemistry

*SUBTLE ALTERATIONS OF METABOLOMICS REVEALS STRESS MEMORY OF DAUGHTER PLANTS WHEN PREVIOUSLY EXPOSED TO NANOCERIA*

The effects of parental stress on the performance of next generation exposed to another contaminant were investigated. Wheat was exposed to cerium oxide nanoparticles (CeO<sub>2</sub>-NPs) in first and second generations and exposed to perfluorooctanesulfonic acid (PFOS) in the third generation. Phenotypic or metabolic responses were assessed at 21-day (short-term exposure) or 90-day (long-term exposure) exposure periods. Biomass production, chlorophyll content, enzyme activity, and membrane damage were measured at short-term exposure, while elemental and PFOS concentrations, and grain metabolites were analyzed in long-term exposure. Results showed that previous exposure to CeO<sub>2</sub>-NPs improved chlorophyll content but reduced concentrations of important macro- and micro-elements in the grains, shoots and roots of daughter plants exposed to PFOS. When compared to shoots and roots, wheat grains had the lowest quantities of PFOS. However, metabolomic research showed that parental exposure had a major impact on the metabolite composition of daughter plants. For instance, quantities of adenine, sucrose-6-phosphate, and other organic acid metabolites had gradually dropped following repeated and constant exposure to CeO<sub>2</sub>-NPs. The results imply that subtle alterations in the metabolite and elemental compositions of grains may serve as a means of passing on stress memory from exposure in previous generations to subsequent descendent generations.

**Presenter: Claudia Patricia Colmenero**

**Authors: Claudia Patricia Colmenero and Melida Gutierrez**

**Poster #: A12**

Natural and Applied Sciences

*WATER QUALITY OF A KARSTIC SHALLOW AQUIFER IN LAWRENCE AND GREENE COUNTIES, MISSOURI*

Water quality is important to be monitored to guarantee that it is not being contaminated. In karstic areas, fractures provide zones where contamination could filtrate to the deeper ground and contaminate aquifers. The purpose of the study was to analyze water quality of springs in proximity to faults to determine the variation in chemistry with time as well as its potential to contaminate to the deeper aquifer. For this, eleven springs were sampled monthly within Lawrence and Greene counties for 12 months. Basic water quality from the springs was analyzed. Nitrate was also analyzed due to this contaminant being potentially present and coming from anthropogenic sources. Using the monthly values obtained for a whole year, Cl, Na, SO<sub>4</sub>, and NO<sub>3</sub>-N concentrations were separated into small, intermediate, and large concentrations. For nitrate, most of the springs had 2-4 mg/L NO<sub>3</sub>-N. Urban springs of Greene County showed more contamination (Na, Cl, SO<sub>4</sub>), while most springs from Lawrence County had excellent water quality, except for two springs (Big Spring, Verona) that consistently had more nitrate than the others, and therefore monitoring these wells is recommended.

As future work, water and sediment samples will be analyzed to determine the presence of PFAS in the zone and groundwater sampled from wells adjacent to the springs will be included in the study. Both PFAS and well samples analyses are in progress.

**Author: Debaleen Das Spandan**

**Poster #: B10**

Computer Science

*NON-VERBAL COMMUNICATION IN SMART HOMES USING PROXEMICS-ENHANCED SCENE GRAPHS*

Voice-controlled smart assistants have become widely popular, offering a natural and convenient way to interact with smart home devices. However, these assistants cannot serve individuals with speech impairments. Therefore, non-verbal communication methods, such as gesture recognition, eye tracking, context awareness can complement and overcome some of these limitations to enhance user experience in smart homes. To address this issue, I am investigating non-verbal communication methods to make smart home technology more accessible and intuitive. In this research, I focus on proxemics, i.e., study of distance between smart home users and surrounding objects, enabling spatial awareness and intuitive automation in smart homes. I apply scene graph, which is a graphical representation of objects and relationships in an image to provide a structured representation, such as positions, spatial relationships, and properties of the objects in indoor home environments. This approach's novelty lies in applying proxemics in scene graph generation for extracting spatial information and scene understanding to automate smart home actions.

**Presenter: Dorian DeHart**

**Authors: Dorian DeHart, James McDaniel, Jeremiah Carlson, and Toby Dogwiler**

**Poster #: B11**

Geology

*ASSESSMENT OF HISTORICAL AND CURRENT REGIONAL GEOMORPHIC PARAMETERS IN OZARK STREAMS TO SUPPORT BANK STABILIZATION*

Using historical imagery analysis and current stream survey data we document the range and magnitude of change in stream channel morphology in representative streams within the Ozarks over the past 80 years. These results will be used by the US Army Corps of Engineers to develop broadly applicable guidance for bank stabilization that will streamline the permitting process for landowner bank stabilization projects. Aerial imagery from the 1940s to present was used to digitize plan view channel features. In-channel surveys are used to collect additional data about bedform composition, flow parameters, and bed material. Drone-based aerial surveys are used to generate high resolution orthophotography and digital elevation models of the current channel conditions. Our current data from all of our studied Ozark streams shows that our average lateral migration ranges from 3.8m to 31.8m from the 1940s to today. The average migration rate per year ranges from 0.1 to 0.5 m/year. The data are compiled into a Geographic Information System that will streamline sharing, collaboration, and future analysis of channel morphology. US Army Corps of Engineers SOI: W81EWF-22-SOI-0035

**Presenter: Courtney Duncan**

**Authors: Courtney Duncan, Danielle Evilsizor, Katelin Meek, Michael Bigelow, Cody Pham, Hunter Bartelt, Alex Weldon, Katelyn Sedgwick, Joshua Howard, Laszlo Kovacs, Courtney Coleman, Jason Londo, and lab**

**Poster #: A16**

Biology

*CARBARYL-INDUCED LEAF NECROSIS IN VITIS RUPESTRIS B-38*

Interveinal leaf necrosis was observed in the field on many members of our F1 hybrid population (*Vitis rupestris* B38 x *Vitis riparia* HP1) following spray application of carbaryl insecticide. Subsequent carbaryl applications revealed similar results in two different growing seasons at two separate locations. Consistent results demonstrated that carbaryl-induced necrosis segregates in this F1 population, with its origin being from the female parent plant (*V. rupestris*). Using GBS marker-based linkage maps of the two parents, this insecticide-sensitivity trait was mapped to a single major QTL on chromosome 16 of the female parent. An in vitro leaf disk assay enabled us to confirm the segregation pattern of carbaryl-triggered necrosis under controlled environmental conditions and to map this trait to the same locus of chromosome 16 in *V. rupestris*. The *Vitis vinifera* reference genome sequence within the QTL peak is a gene-rich region encoding several receptor-like kinases and intracellular immune receptors. We performed an RNA-seq analysis to investigate the carbaryl-induced gene expression pattern in SE and IN progeny plants. We found that several defense-related genes had increased expression levels in accordance with carbaryl sensitivity. Analysis of the RNA-seq data and subsequent validation using RT-qPCR showed that several carbaryl-responsive genes were differentially regulated in carbaryl-sensitive plants compared to carbaryl-insensitive plants. DEGs, which include several mediators of plant pathogen defense, suggest that carbaryl

is erroneously perceived by a receptor within the plant's immune system, prompting the activation of the defense mechanism known as hypersensitive reaction (HR). This hypothesis suggests that leaf necrosis occurs as a result of this misdirected HR.

**Presenter: William Durstock**

**Authors: William Durstock, Saki Urushidani, Babur S Mirza, Bob Pavlowsky, and Marc Owen**

**Poster #: B14**

Biology

*A MICROBIAL SOURCE TRACKING STUDY TO IDENTIFY FECAL CONTAMINATION AND POTENTIAL PATHOGENS IN SEQUIOTA SPRING*

Waterborne pathogens originating from human fecal material of infected individuals are one of the major areas of health concern in karst environments where water can easily flow from old leaky septic tanks and broken sanitary sewer lines into rivers and streams. The current study was focused on temporal monitoring of fecal indicator bacteria (FIB) in Sequiota Spring. Based on an initial Microbial Source Tracking (MST) study, we observed a high abundance of human fecal indicator bacteria (HFIB) (up to 110,000 cells/L water) in July 2020. The City of Springfield initiated a detailed assessment and repair plan for the upstream sanitary sewer lines as a remediation solution. Through this remediation effort, the HFIB significantly decreased (55 times reduction) in June 2022. We also assessed the waterfowl fecal indicator bacteria which were low ~300 cells/L and remained unchanged from the year 2020 to 2022. This suggests that the sewer repairs completed in the recharge area of Sequiota Spring were a primary cause of the reduction in HFIB. This study demonstrated a successful remediation effort in reducing human fecal contamination to reduce potential health risks at this site.

**Presenter: John Echele**

**Authors: John Echele and Brian Greene**

**Poster #: A18**

Biology

*AN EXPERIMENTAL TEST OF CHEMICAL CUE RESPONSES IN COTTONMOUTH SNAKES*

As gape-limited predators, snakes change their diets to include larger prey species as they grow. This can result in an ontogenetic diet shift where small prey types are replaced by larger prey species. Diet ontogeny is particularly common in pit vipers where young individuals consume lizards and switch to mammals as snakes grow. A study of prairie rattlesnakes (*Crotalus viridis*) reported that subjects also responded to prey chemicals in laboratory trials in a pattern that matched the diet shift observed in wild specimens, suggesting that snakes are innately shifting their diet with increasing size. The authors predicted that this sensory pattern should be widespread in vipers. We replicated the rattlesnake experiment on cottonmouth snakes, which also exhibit an ontogenetic shift in diet but feed on a wider variety of prey than rattlesnakes. In contrast to the rattlesnake study, our results showed that cottonmouths responded most strongly to fish cues at all body sizes and did not show sensory responses that matched the diet pattern. Unlike rattlesnakes with relatively narrow diets and well-defined shifts in prey types, cottonmouths feed on a wide range of prey and seem to exploit whatever prey are most abundant in different locations. This dietary breadth and foraging flexibility may

promote similar sensory responses to all prey types consumed by cottonmouths, with stronger responses to fish, because they are important prey for snakes at all body sizes.

**Presenter: Mary Fakunle**

**Authors: Mary Fakunle, Riley Pope, Preston Clubb, and Cyren Rico**

**Poster #: A19**

Chemistry

*ASSESSMENT OF PISUM SATIVUM (PEA) GROWTH POTENTIAL IN MARTIAN SIMULANT*

This research aimed to assess the potential of martian soil to sustain the growth and yield of peas. Pea plants were cultivated to full maturity using two different soil compositions: pure earth soil enriched with rhizobium necessary for nitrogen fixation and a homogenous blend of Martian simulant and earth soil in a 50:50 (w:w) ratio. Various parameters including chlorophyll levels, plant height, biomass, and elemental composition were evaluated to compare the performance of peas on Earth vs Martian simulant soil. Results showed that Martian soil cannot support productivity of peas and improving Martian soil quality should be done first before using in plant propagation.

**Author: Sasha H Freeman**

**Poster #: A21**

Biology

*INVESTIGATING THE SCOPE OF VOCAL SIGNATURES IN FEMALE CAROLINA WREN (THRYOTHORUS LUDOVICIANUS) CHATTERS*

Carolina wrens (CARW) are small songbirds that form long-term social pair bonds and maintain territories year-round. Male and female CARW appear similar, but use sex-distinctive vocalizations. Female wrens exhibit a sex-specific vocalization known as the 'chatter,' often delivered during male-female duets. Some hypothesized functions of this vocalization involve the communication of identity to the male partner. However, it is not yet known if these vocalizations are individually distinctive. My research aims to investigate whether individual female CARWs perform acoustically distinct chatters. To answer this question, I am color band-marking birds for individual identification in the field, and subsequently recording multiple chatters for each female CARW across four sites in SW Missouri. Acoustic analyses will involve the measurement of spectrotemporal characteristics (how sounds change in frequency across time) of chatters. Statistical analyses will focus on whether spectrotemporal variation is shared among females within the local population, or is individually unique. Evidence for unique vocal signatures in females would show plausibility for chatter's hypothesized functions involving individual identity signaling.

**Presenter: Daniel Garten**

**Authors: Daniel Garten and Sean Maher**

**Poster #: B15**

Biology

*EASTERN FOX SQUIRREL (SCIURUS NIGER) OCCUPANCY IN A SOUTHERN MISSOURI WOODLAND*

Species occupancy, which relates the probability of presence of a species at a specific place and time, is an important component of conservation and wildlife management allowing for



estimation of species distribution as well as inter-species and environmental interactions. The purpose of this study was to analyze occupancy of Eastern Fox Squirrels across multiple seasons (2019–2024) at Bull Shoals Field Station, and to identify potential covariates associated with detection and colonization. Data were drawn from camera trap surveys from 26 sites during summer and fall seasons. Multi-season occupancy models were fit using R and the unmarked package. Detection and colonization covariates were selected based on hypotheses regarding the influence of habitat variables, with those included in the final model determined by lowest Akaike information criterion (AICc). Detection of Fox Squirrels was associated with weekly average maximum temperature ( $^{\circ}\text{C}$ ;  $\beta = 0.11$ ,  $\text{SE} \pm 0.039$ ,  $\text{CI} = 0.0336\text{--}0.1866$ ), and colonization was associated with average tree height (m;  $\beta = 0.449$ ,  $\text{SE} \pm 0.164$ ,  $\text{CI} = 0.1267\text{--}0.7709$ ). These results indicate that Fox Squirrels tend to be detected during warmer months with colonization occurring in areas with tall trees.

**Presenter: Ethan Grier**

**Authors: Ethan Grier, Shayd Gothard, Santimukul Santra, and Tuhina Banerjee**

**Poster #: B16**

Chemistry

*THE ROLE OF BRUSH CONFORMATION/GRAFTING DENSITY OF PEGylated GOLD NANOPARTICLES ON INSULIN FIBRILLATION*

Amyloid fibrillation has long posed a problem in the field of biochemistry. Aggregation of various proteins in the body, such as alpha synuclein and Tau have been linked to several neurological diseases, such as Parkinson's disease and Alzheimer's. As such, investigations into compounds that could inhibit or alter fibrillation of various biological proteins are of interest. Gold nanoparticles remain a good candidate for investigation due to their stability and dispersion at physiological conditions.

In this study, gold nanoparticles are synthesized via gold chloride reduction by polyethylene glycol (PEGn). The amount of polyethylene glycol varies between samples to change the grafting density of the PEGn present on the surface of the nanoparticle. The grafting density and brush conformation was then determined via proton nuclear magnetic resonance. The kinetic potency of the various gold nanoparticle samples was then investigated via Thioflavin T (ThT) fluorescence assays with insulin, which allow for the monitoring of amyloid fibrillation in real time. Fourier transform infrared spectroscopy was then used to confirm the structure of the fibrillated insulin to verify the results of the ThT assays. Insulin was chosen as a model protein due to its ability to fibrillate quickly under specific conditions, allowing for rapid collection of data.

**Presenter: Samantha Grove**

**Authors: Samantha Grove and Brian Greene**

**Poster #: B17**

Biology

*SCENT TRAILING IN NEONATE AGKISTRODON PISCIVORUS WHEN EXPOSED TO CONSPECIFIC AND HETEROSPECIFIC CHEMICAL CUES*

Chemosensation is central to snake ecology, playing an essential role in predator recognition, foraging success, and communication with conspecifics. In areas with cold winters, neonatal

snakes often trail chemical cues from older individuals to locate communal hibernacula essential for winter survival. Juvenile cottonmouths (*Agkistrodon piscivorus*) form social bonds with littermates and have been shown to trail conspecific chemical cues in the fall. However, the effect of relatedness on trailing phenomena has not been tested. Using y-maze experiments I evaluated trailing behavior of 32 captive-born neonate cottonmouths (*Agkistrodon piscivorus*) to determine if (1) subjects prefer to trail siblings over non-relatives, and (2) whether cottonmouths would also trail cues of a closely related species, the copperhead (*A. contortrix*). In the conspecific trailing experiment, a non-significant majority of individuals trailed their siblings' cues over an unrelated neonate conspecific. The heterospecific trailing experiment showed that cottonmouth neonates did not respond to copperhead cues, with equal numbers of subjects selecting the copperhead and blank control cues. My results indicate that cottonmouths only exhibit trailing responses to conspecific chemical cues and that relatedness does not change their response. These results may be adaptive in that copperheads and cottonmouths are rarely observed hibernating together. Thus, trailing copperhead cues could lead a naïve cottonmouth to an inappropriate hibernaculum. Furthermore, trailing any cottonmouth may be equally beneficial because they would likely all be converging on the same den sites.

**Presenter: Seth Harris**

**Authors: Seth Harris, Curtis Witt, and Kyoungtae Kim**

**Poster #: B18**

Natural and Applied Sciences

*INVESTIGATING THE NANOTOXICOLOGY OF CDSE/ZNS QUANTUM DOT ALTERNATIVES IN HUMAN LIVER CELLS*

Fluorescent nanoparticles known as quantum dots (QDs) have many unique properties that make them useful in biomedicine. One of which, is fluorescence, a property good for diagnosis. Specifically, CdSe/ZnS QDs, while good at fluorescing, show toxicity. Due to this, safer alternatives have been developed. This study uses an XTT viability assay, ROS fluorescent imaging, apoptosis, and transcriptomics to investigate the effect of the following QD alternatives: InP/ZnS, CuInS<sub>2</sub>/ZnS, and carbon dots (NCD) in liver cells (HepG2 and THLE-2). The liver is a possible destination for accumulation of QDs making it an appropriate model for testing. At a nanomolar range of 10-150, CdSe/ZnS and CuInS<sub>2</sub>/ZnS QDs show reduced cell viability in THLE-2 cells while HepG2 cells remain resistant. Furthermore, CdSe/ZnS and CuInS<sub>2</sub>/ZnS treated THLE-2 cells generated ROS as early as 6 hrs after treatment and elevated apoptosis after 24 hrs. RNA transcriptomics reveal heavy downregulation of genes controlling cell adhesion pathways in all QDs except carbon dots. In conclusion, carbon dots show the least toxicity while the metallic QDs (InP/ZnS and CuInS<sub>2</sub>/ZnS) still demonstrate potential concerns to liver cells.

**Author: Fahim Ahmed Irfan**

**Poster #: B21**

Computer Science

*SENSOR ACTUATOR RELATIONSHIP INFERENCE IN SMART HOMES*

With the evolution of wireless technology and Internet of Things, smart homes are equipped with many sensors and actuators. These actuators respond to diverse sensor events, enabling automatic actuation. To automate the actuation, users need to set rules which require prior knowledge of sensors. To alleviate the issue pertaining to user intervention in setting up rules to automatic actuation based on sensor events, in this research, we propose a novel sensor actuator relationship inference that automatically groups related sensors and actuators using only time series data. The approach extracts features from time series data and applies the extracted features to Spectral Clustering, a clustering algorithm that clusters data points based on similarity and distance among sensor and actuator events. Experimental results show that the approach performs well without prior knowledge of deployment scenarios even if the sensor and actuator numbers are not equally distributed.

**Presenter: Tessa N Irvine**

**Authors: Tessa N Irvine, Derek Bateman, Kevin Babbitt, Alexander Edmond, and Day B Ligon**

**Poster #: A24**

Biology

*POPULATION SURVEYS OF ALLIGATOR SNAPPING TURTLES IN OKLAHOMA*

Alligator Snapping Turtles (*Macrochelys temminckii*) are of acute conservation concern following decades of declines, likely fueled by hunting and an increase in construction of dams that fragment most of the rivers within its range. In response, Oklahoma has conducted several population surveys to assess their status, including a state-wide survey in the late 1990s and a survey of rivers in the northeastern part of the state in 2018-19. Here, we report results from the first season of a survey chiefly focused in southeastern Oklahoma. From 27 May – 25 June 2023, we conducted surveys of the aquatic turtle communities at nine sites, including Lake Eufaula, Verdigris River, Neosho River, Arkansas River, Little River, and the Illinois River. Subsequently, Hugo Lake and the associated Kiamichi River were surveyed, and Lake Eufaula and Neosho River and Blue River were resurveyed between 25 August and 15 October. Using 0.9-m diameter hoop nets baited with fish or chicken, we captured a total of 2,327 turtles 2,391 times. Our surveys detected 0, 0, 0, 1, 3, 3, 5, 29, and 96 (total = 137 (117 unique) *M. temminckii*) across the nine sites we surveyed, indicating that the species is thriving in some water bodies but are rare or have been extirpated from others. Because *M. temminckii* were deemed to be rare in the Neosho River based on previous survey efforts, 100 captive-bred and head-started individuals were released in 2021; interestingly, of the 29 *M. temminckii* we captured at that site this year, only 20 were introduced head-starts and the remaining nine captures were of wild animals. Additionally, we scanned every turtle captured with a metal detector to identify fishhooks and other metal hardware that may have been ingested or otherwise been embedded in a turtle's body. Using this method, we detected metal hooks in seven turtles, including four *M. temminckii*. The locations of these detected hooks in *M. temminckii* were diverse, with one found on the upper surface of the head, another situated just beneath the skin in the neck, a third located at the back of the mouth, and the final one

discovered after being ingested and found lodged in the throat. If externally embedded, hooks were promptly removed on site whenever possible. Additionally, veterinary staff successfully extracted two swallowed hooks. Subsequent efforts will endeavor to continue expanding the range over which *M. temminckii* are known to occur in Oklahoma.

**Presenter: Bryce F. Jarrett**

**Authors: Bryce F. Jarrett and Brian Greene**

**Poster #: A26**

Biology

*THE EFFECT OF PREY TYPE ON COTTONMOUTH (AGKISTRODON PISCIVORUS) FORAGING BEHAVIOR*

Pit vipers – such as rattlesnakes, copperheads, and cottonmouths – typically ambush their prey from a stationary position. Ambush foraging in these snakes is characterized by the delivery of an envenomating strike after which prey are released, trailed, and swallowed. This process is an adaptive behavior that minimizes the chances of struggling prey inflicting retaliatory injuries to the snake. However, strike-and-release behavior is not ubiquitous in viperid snakes, which hold prey types that may be difficult to trail if released. My study involved cottonmouths (*Agkistrodon piscivorus*) which are semi-aquatic pit vipers that forage on a variety of prey types. Cottonmouths in Southwest Missouri undergo an ontogenetic shift in diet, where juveniles consume mainly reptiles and amphibians while adults mostly eat small mammals. I conducted experimental foraging trials where three different prey types were fed to 10 juvenile cottonmouths to test the hypothesis that cottonmouths change foraging tactics when feeding on mammalian and non-mammalian prey. Foraging snakes always held frogs (*Acris blanchardii*), and fish (*Pimephales* spp.) whereas 9 of 10 snakes released mice (*Mus musculus*). My results are consistent with those on foraging rattlesnakes that feed on mammalian and non-mammalian prey, suggesting that prey-specific foraging tactics are an ancestral trait in pit vipers that is widespread within the subfamily Crotalinae.

**Presenter: Acacia Jurkowski**

**Authors: Acacia Jurkowski, Jessica Gilbert, Trey Norman, Anastasia Jones, Taryn Criblez, and Austin Brown**

**Poster #: A28**

Chemistry

*CRYSTAL OPTIMIZATION, PROTEIN CRYSTALLOGRAPHY, AND STRUCTURE DETERMINATION OF CYAN THERMOSTABLE FLUORESCENT PROTEINS*

Fluorescent proteins are commonly used as cell markers in living organisms. Modifications by mutation can be used to improve the qualities of these proteins including fluorescence, thermostability, pH stability, and chemical stability. The goal of this research project is to use degenerative mutagenesis to try to improve the fluorescence of currently thermostable cyan proteins and then determine their three-dimensional protein structure. Currently the most recently mutated proteins by the DeVore lab have improved thermostability but have low quantum yield. Using degenerative mutagenesis four residues of the CTP-T mutant were altered to attempt to improve the quantum yield by eliminating a kink in beta strand 7. The mutant

CTP-T 143-146 JG2 successfully improved the quantum yield from 0.07 to 0.37. Crystal trays were set-up to optimize the best conditions for protein crystals and x-ray diffraction was used to collect a data set with a resolution of 1.7 Å. Structural determination of both CTP-T and CTP-T 143-146 JG2 will be used to compare these mutations with the current best cyan fluorescent protein, m-Turquoise2 as well as protein characterization to compare thermostability, pH stability, and chemical stability.

**Presenter: Matthew Knoll**

**Authors: Matthew Knoll, Darwin Sorensen, Ryan Dupont, Joan McLean, and Babur Mirza**

**Poster #: B24**

Biology

*IDENTIFICATION OF ARSENATE REDUCING BACTERIA USING UNCULTURED BASED METHODS*

Arsenic (As) is one of the major water groundwater contaminants. It is a worldwide problem and detected at high levels in groundwater in many parts of Asia, South America, Europe, and United States. Most of the As contamination in the U.S. comes from the west, more specifically from basin-fill aquifers and private domestic wells in California, Nevada, New Mexico, Arizona, and Utah, where there are As concentrations in excess of the EPA drinking water limit.

Indigenous bacteria have the ability to directly reduce Arsenate (AsV) to Arsenite (AsIII) for energy production. The AsV is used as terminal electron acceptor and converted into AsIII using the arsenate reductase gene (arrA gene). The AsIII is water-soluble and contributes to groundwater arsenic contamination. So far, only a few known bacterial species such as Geobacter, Wolinella, Citrobacter, Clostridium, Sulfurospirillum, and Desulfomicrobium are suggested to reduce AsV. In this current study, we aimed to identify the natural bacterial population associated with AsV reduction using cultured independent methods. We used Illumina paired-end DNA sequencing of 16S rRNA gene amplicons to identify bacterial species associated with AsV reduction under controlled conditions. This study can be useful in identifying other potential bacterial species that contribute to arsenic contamination.

**Author: Clarissa Krimmel**

**Poster #: B25**

Chemistry

<sup>31</sup>P NMR INVESTIGATION OF ABASIC DNA

Base excision repair (BER) mechanisms fix single base lesions in DNA, such as T: G mismatches. During the base excision repair mechanism, an abasic site (AP site) is formed as an intermediate. AP sites are unstable and highly mutagenic, if they are not repaired the replication of DNA cannot proceed normally. This research involves investigating how the conformational properties of abasic sites in DNA affect the binding recognition of enzymes involved in DNA repair mechanisms including BER. There are two sequences being analyzed, one with an abasic site at the fifth position labeled as S5, and one with the abasic site at the sixteenth position labeled as S16. Using <sup>1</sup>H NOESY, <sup>31</sup>P HSQC, <sup>13</sup>C HSQC, and 1D <sup>31</sup>P NMR experiments, values can be obtained associated with the energy barriers and the energy of each phosphate conformational state such as BI and BII. The <sup>1</sup>H NOESY experiment gives information about the structural position of the hydrogen molecules in the DNA sequence. The <sup>31</sup>P HSQC

and  $^{13}\text{C}$  HSQC give information about the dynamics of the phosphate or base and the sugar of the nucleotides in the DNA sequences. This data will help us to better understand the BER mechanism and how the abasic site affects the DNA backbone.

**Presenter: Jacob Lacki**

**Authors: Jacob Lacki, Samuel Aogo, and Bob Pavlowsky**

**Poster #: B27**

Geography

*COMPARISON OF MINING-METAL STORAGE AMONG DIFFERENT CHANNEL DEPOSITS IN ELM CREEK, TAR CREEK SUPERFUND SITE, OKLAHOMA*

Elm Creek is a stream that lies at the western edge of the Tar Creek Superfund site in northeastern Oklahoma, which is part of the larger Tri-State Mining District of Missouri, Kansas, and Oklahoma. This was a prolific zinc and lead mining district from the mid-1800s up until the 1970s. The primary goal of this study is to determine where Zn and Pb contamination due to mining is occurring in the channel of Elm Creek, and if there is a difference between the various in-channel landforms (bars, benches, pools, glides, and riffles). Sediment samples were collected along the length of the stream from these various in-channel landforms and analyzed using x-ray fluorescence to determine metal concentrations. It was found that firstly, there are several sites that are well above acceptable levels of contamination (per EPA suggested standards), and secondly, that there is generally not a significant difference between the different channel landforms. The sites that were above acceptable levels of these metals will be of interest for land managers when considering future remediation efforts.

**Presenter: Nhi Le**

**Authors: Nhi Le, Abhishu Chand, Emma Braun, Chloe Keyes, Qia Wu, and Kyoungtae Kim**

**Poster #: A29**

Biology

*AN INVESTIGATION ON THE MECHANISM OF QDS-MEDIATED DISRUPTION OF THE ACTIN CYTOSKELETON.*

Quantum dots (QDs) are a type of fluorescent nanoparticles that are sought after for their potential to be used in many biomedical applications and commercial product development. As such, the safety of QDs has been intensively investigated. Recent studies have demonstrated the toxicity of QDs on a cellular level, yet the mechanism by which QDs exert toxicity is unclear. In this study, we examined the molecular mechanism of QDs' toxicity, focusing on QDs' impact on the actin cytoskeleton. We found that QDs can bind to a number of intracellular proteins, including the actin protein. Our result revealed that QDs and monomeric actin (G-actin) spontaneously interact, leading to the formation of the QDs-G-actin complex and causing a reduction in the intrinsic fluorescence of the G-actin. Furthermore, this interaction was also found to cause a change in the secondary structure of G-actin. In conclusion, our study revealed that QDs disrupt the actin cytoskeleton by directly binding to the monomeric actin, sequestering the supply of monomeric actin, and simultaneously altering the structure and function of the actin protein.

**Presenter: Hannah Lowery**

**Authors: Hannah Lowery, Josh Hess, and Bob Pavlowsky**

**Poster #: B30**

Natural and Applied Sciences

*LARGE WOOD DISTRIBUTION AND GEOMORPHIC IMPACTS IN HEADWATER FOREST STREAMS IN BIG BARREN WATERSHED, MARK TWAIN NATIONAL*

The role of large wood (LW) in fluvial systems is well documented with effects ranging from increased biodiversity to regulating channel morphology. However, few studies of LW and its geomorphic impacts have been completed within the Ozark Highlands. This study investigates LW loads in two small headwater tributaries (2.5 km<sup>2</sup>) draining Mark Twain National Forest, Ozark Highlands, Missouri. The objectives are to explore the distribution of LW across different valley floor landforms and compare wood loads between the two watersheds based on differences in channel network type, valley characteristics, and land management practices. LW loads were assessed at 21 reaches in August and an additional 10 reaches in December 2022. The distribution of large wood on channel, bench, floodplain, and terrace features was quantified and effects on channel morphology evaluated. Additionally, LW dimensions and standing tree basal areas were compared since one watershed has been subjected to prescribed burning. In general, wood volumes in channels and on floodplains are like those reported for other studies in the Ozarks and other similar regions. However, LW pieces <10 cm in diameter impact the channel morphology in these multi-channel systems since larger logs have limited mobility in the shallow and hydraulically rough channels.

**Presenter: Joshua Lowy**

**Authors: Joshua Lowy, Brian Greene, and Jay McEntee**

**Poster #: A30**

Biology

*PITVIPER "PERSONALITY": INVESTIGATING THE PRESENCE BEHAVIORAL SYNDROMES IN THE COTTONMOUTH (AGKISTRODON PISCIVORUS)*

Within the last 15 to 20 years animal personality research has seen a surge in prominence and popularity among behavioral ecologists. Animal personalities – often termed ‘behavioral syndromes’ – occur when behaviors of individuals are correlated across time and contexts, and have numerous ecological, evolutionary, and conservation implications. Initial work on behavioral syndromes concepts was derived from a few species, subsequent work has expanded the taxonomic scope of research subjects. However, squamate reptiles – especially snakes – remain underrepresented. My research investigated individuality and the presence of behavioral syndromes in the cottonmouth (*Agkistrodon piscivorus*) across 4 behavioral axes: exploration, aggression, reactivity, and boldness using open field, feeding, predator response and emergence experiments respectively. My results suggest that behaviors were repeatable within individuals but provides no evidence of correlated behaviors across contexts.

**Presenter: Daphne Miles**

**Authors: Daphne Miles, Hannah Whaley, Anna Faust, and La Toya Kissoon-Charles**

**Poster #: A35**

Biology

*IMPACTS OF LOW WATER DEPTH ON ANNUAL AND SEASONAL AQUATIC VEGETATION GROWTH IN AN OZARK SPRING-FED POND*

Spring-fed impoundments in the Ozarks experience fluctuations in water depth. These fluctuations might promote algae growth and cause shifts in dominant aquatic plant growth forms (i.e., submerged to emergent). It is not well understood how changes in water depth impact the plants in these spring-fed systems. William's Pond is a spring-fed impoundment that faced a dam malfunction, causing below-average water depth for nearly 2 years. Smaller water volumes can cause high nutrient concentrations and excessive algal growth. We measured aquatic plant cover and water depth seasonally before, during, and after the dam malfunction. Decreased water depth was expected to increase filamentous algae and decrease submerged plants (SAV). During the dam malfunction (2020-2021), water depth was lower (<1m) than after the dam was fixed (2022-2023). Algae cover was highest and SAV cover was lowest in winter 2021 compared to other years. Algae cover was also highest in spring 2021 compared to other years but SAV cover was constant. Shading from algae and decreased water depth might explain the decreased SAV cover. Our findings indicate that changes in water depth lead to annual and seasonal differences in the aquatic plant community.

**Presenter: Basem Motwaly**

**Authors: Basem Motwaly, Day B. Ligon, and Omar Attum**

**Poster #: B35**

Biology

*GUARDIANS OF THE DESERT: SAFEGUARDING THE EGYPTIAN TORTOISE AND ITS ECOSYSTEM*

The Egyptian tortoise is one of the smallest and most endangered tortoises in the world, with a restricted range in Egypt. Over 90% of their habitat has been destroyed due to overgrazing and development. The tortoises are also collected for the pet trade. However, a population was recently rediscovered in the Zaranik Protected Area in North Sinai. To protect and study the tortoises, a project has been initiated. Local hires are engaged to monitor and collect data on the tortoises, acting as a deterrent against collectors. They visually track the tortoises and collect information such as coordinates, temperature, behavior, and potential threats. The tortoises are also weighed, measured, and given a unique mark on their shells for identification. Using local community research technicians not only helps protect the tortoises but also acknowledges the value of indigenous knowledge and skills, which boosts local community pride. To determine the population structure, growth rings on the carapace shells are examined from field photos. This helps determine the tortoises' age distribution and guides targeted conservation strategies. Overall, the project aims to secure the long-term survival of the Egyptian tortoise and ensure its thriving for future generations.



**Author: S.M. Faiaz Mursalin**

**Poster #: A37**

Computer Science

*DIVERSE ROBOT PATH PLANNING IN DYNAMIC ENVIRONMENT: A TOPOLOGY BASED APPROACH*

Robot path planning is computationally challenging due to high dimensionality of the planning space. Inclusion of dynamic agents such as people in the planning environment increases the computational complexity requiring efficient reactive measures such as rerouting. To address this challenge, we propose utilizing topology-based approach to identify important junctions such as points of curvature in obstacle space, to facilitate finding diverse paths to be used in rerouting in presence of dynamic obstacles. Leveraging Discrete Morse Theory (DMT) which is a coordinate-free approach in mapping the planning space, we address the curse of the high dimensionality of the problem. Diverse path planning through DMT allows identification of distinct homotopy classes of the solution paths. We adopt lazy evaluation to address dynamic changes to the environments effectively to report near optimal path for the robot in the changing environment. We evaluate our algorithm using robot with degrees of freedom ranging from 3 to 5 in two dimensional office layouts. Evaluation of our algorithm demonstrates its capability to find diverse and near optimal amidst dynamic agents, in execution time comparable to existing algorithms.

**Presenter: Suman Shree Neupane**

**Authors: Suman Shree Neupane, Sean Maher, Rabin KC, Rajan Poudel, and Giorgi G. Auteri**

**Poster #: B39**

Biology

*HELP OR HINDRANCE? HUMANS AS A NICHE EXPANDING AND REDUCING FORCE FOR HIMALAYAN BLACK BEARS IN NEPAL*

In this study we aimed at exploring the relationship between Himalayan black bears (HBB) and humans in Nepal analyzing their distribution using MaxEnt. We focused on constructing niche model for HBB considering both natural and human influences. We aimed to determine the extent of HBB habitat unaffected by human interference and assess how this natural range compares to the actual observed range in habitats altered by human activity. The result indicated that HBB are negatively affected by human- altered development. Natural forested regions remain highly suitable habitats, while areas modified by human activity exhibit lower but still notable levels of suitability for HBB. The result indicated that majority of the suitable habitat lies outside protected areas of Nepal. They showed consistent decline in habitat suitability as human presence increases, emphasizing urgent need for conservation activities to address human-bear interactions and safeguard vital habitat areas for the species.

**Author: Trieu Nguyen**

**Poster #: A39**

Natural and Applied Sciences

*ENCAPSULATION OF ACTIVE PHARMACEUTICAL INGREDIENTS INTO SOLUPLUS<sup>®</sup> A GRAFT BLOCK COPOLYMER.*

Most active pharmaceutical ingredients (APIs) are poorly soluble in water, thereby creating challenges in drug delivery and absorption strategies. Soluplus<sup>®</sup>, a graft copolymer comprised

of polyvinyl caprolactam, polyvinyl acetate, and polyethylene glycol, is marketed by BASF as a solubility enhancer. The mechanism of solubility enhancement is believed to involve polymeric micelles of the Soluplus<sup>®</sup> that encapsulate the APIs for storage in and transport through aqueous media. The goal of the project is to characterize drug uptake into Soluplus<sup>®</sup> micelles by using dynamic light scattering (DLS) to measure the sizes of Soluplus<sup>®</sup> micelles and monitor increases resulting from the incorporation of drugs into the micellar structures. Soluplus<sup>®</sup> micelles typically exhibit the effective diameters in the range of 70-75 nm, as determined from aqueous suspensions having Soluplus<sup>®</sup> concentrations of 1% and 4% (w/w), well above the CMC which is found out to be 0.082wt %. APIs such as Ibuprofen and Diclofenac have been introduced into Soluplus<sup>®</sup> suspensions, and the Soluplus<sup>®</sup> micelles were re-evaluated for size increases due to drug uptake.

**Presenter: Onyinye Okafor**

**Authors: Onyinye Okafor and Kyoungtae Kim**

**Poster #: A40**

Biology

*INVESTIGATING QUANTUM DOT EFFECTS ON ENDOCYTOSIS AND EISOSOME ORGANIZATION*

Quantum Dots (QDs) hold significant promise for biomedical uses, yet their cellular impacts still need to be fully understood. This study examines the toxicological effects of CdSe/ZnS-COOH QDs on yeast cells, focusing on adverse effects in receptor-mediated endocytosis, pinocytosis, and eisosome organization. Our recent RNA sequencing analysis of yeast treated with QDs identified several differentially expressed genes, including APS2, SEG1, SEG2, COS10, and DID2. The research uncovers that QDs interfere with endocytic patch maturation at each stage of endocytosis, indicated by extended lifespans of the QD-treated cells. Additionally, QD exposure results in delayed movement of FM1-43 dye to the vacuole and accumulation of mRFP-Cps1 within the vacuole. Notably, QDs also promote increased Pil1-GFP recruitment to eisosomes. Ultimately, this research sheds light on the underlying cellular and molecular responses to quantum dot toxicity within yeast cells, offering a new understanding of this field.

**Author: Ophelia Pettington**

**Poster #: B41**

Biology

*COMPARING PLANT RHIZOSPHERE MICROBIOMES IN MINING-CONTAMINATED AND REMEDIATED WET ECOSYSTEMS*

Mining pollution impacts wet ecosystems in their watershed. The Tri-State mining district of SW Missouri, SE Kansas, and NE Oklahoma experienced over 100 years of metal mining. Remediation started in 1984, but contamination remains across the area. Plant microbial communities and their relationship to metal concentrations of remediated areas is poorly understood. Plants and their microbes are used for remediation. Plants manipulate their rhizosphere microbiome in response to stressors and recruit microbes to increase metal tolerance. Bacteria remediate metals through various mechanisms. Microbes in polluted and remediated areas vary depending on the metals and extent of pollution. Our study sites located in Webb City, MO are in varying stages of remediation. We will identify bacteria and measure abundance in plant rhizospheres in these zones. We will use DNA sequencing to assess

microbial composition and ICP-MS to measure metal concentrations at each site. I hypothesize that microbial diversity will be higher in remediated sites with lower metal concentrations compared to non-remediated sites. Our findings will inform future remediation projects and provide insight on the evolution of microbial communities in remediated zones.

**Presenter: Alexis Reifsteck**

**Authors: Alexis Reifsteck, Lillian Alspaugh, and Mackenzie Childers**

**Poster #: B42**

Biology

*GRAVEL BAR PLANT DIVERSITY IN DISTURBANCE-PRONE OZARK STREAMS WITH CONTRASTING NUTRIENT AND SEDIMENT COMPOSITION*

Gravel bars are ecotones between streams and the adjacent terrestrial environments. In Ozark streams, they are frequently disturbed and altered by floods, causing plant communities to undergo frequent secondary succession. Despite the constant resetting, Ozark gravel bars maintain high plant density and diversity during baseflow, although variable between streams. We measured percent cover of gravel bar plants over the baseflow season in two Ozark streams that differ in sediment size distribution, nutrients, and gravel bar elevations. We wanted to determine what environmental variables drive plant communities and what key functional traits are most common in dominant gravel bar plants. Preliminary results indicate gravel bars with lower elevations support higher species diversity and taxa richness. The stream with more fine sediments and higher nutrient content was dominated by nitrogen and sandy soil-loving species. The stream with less fine sediments and lower nutrient content was dominated by species that reseeded quickly and abundantly.

**Presenter: Gaige Riggs**

**Authors: Gaige Riggs and Ridwan Sakidja**

**Poster #: B43**

Materials Science

*CONVOLUTIONAL NEURAL NETWORK ANALYSIS FOR DRUG DISCOVERIES*

We compared convolutional neural networks (CNNs) such as GNINA and DiffDock for optimizing drug design targeting MDM2, an oncoprotein. MDM2 inhibitors are crucial in pharmacological research due to their role in regulating p53, which results in an impact on cell response to damage and thus cancer development. We focused on optimizing network hyperparameters to enhance MDM2 docking efficiency, improving binding affinity accuracy for potential ligand evaluation and novel drug discovery pathways.

**Presenter: Cole A. Roman**

**Authors: Cole A. Roman, Brianne Edwards, and Babur Mirza**

**Poster #: B44**

Biology

*ROLE OF PH AND PLANT AGE ON THE SELECTION OF RHIZOBIAL ENDOPHYTES IN SOYBEAN ROOT NODULES*

Soybeans can nodulate with different rhizobial genera. Previous field studies suggested that under acidic conditions, soybeans prefer *Bradyrhizobium* as a root nodule endophyte and under

alkaline conditions *Sinorhizobium* dominates. So far, the role of soil pH and the age of the host plant in selecting rhizobial strains for root nodule endophytes is unknown. In the current greenhouse study, we planted soybeans in acidic, alkaline, and neutral sterilized sand and plants were inoculated at different plant growth stages with various cell densities of *Bradyrhizobium japonicum* and the *Sinorhizobium* USDA 191 strains. Using Next-DNA sequencing we assessed the relative distribution of rhizobial endophytes with soybean root nodules. We observed a preferred selection of *Bradyrhizobium* over *Sinorhizobium* under different pH conditions regardless of their abundance in rhizosphere soil. Currently, we are assessing data from the root nodules and rhizospheres of plants that were inoculated at different plant growth stages to determine if the age of the host plant plays any role in the selection of rhizobial endophytes. This study can be useful in identifying potential rhizobial strains for developing superior bioinoculants under different soil pH conditions.

**Presenter: Tanner Rust**

**Authors: Tanner Rust and Matthew R. Siebert**

**Poster #: B45**

Chemistry

*ASSESSING INTERATOMIC POTENTIALS FOR MOLECULAR DYNAMICS SIMULATION OF SOYBEAN OIL PYROLYSIS*

The world today relies on hydrocarbon combustion for many reasons, including its high energy density that provides ease of transportation. However, hydrocarbons sourced from fossil fuels are not expected to last forever. Biodiesel, a renewable alternative, has many attractive benefits but comes with other downsides. Biodiesel can gel in cold environments and may leave residue in an engine. Pyrolysis of biodiesel has shown promise in addressing these common detriments. Inducing pyrolysis on biodiesel feedstock (commonly soybean oil in the USA) would be an attractive option presuming it continues to produce fossil fuel analogs similar to biodiesel pyrolysis. Herein, Langevin molecular dynamics were employed to simulate the pyrolysis of 6400 soybean oil-based triglycerides (SOBTs). One hundred runs containing 64 triglycerides each were performed at 2000K for 10 picoseconds with 1 femtosecond timesteps. ANI-2x, a machine-learned interatomic potential, was used as the energy calculator. Bond breaking and forming events in each run were observed and analyzed. The results matched expectations from bond dissociation energy (BDE) values for oleic and linoleic acids (those with BDE data available).

**Presenter: Larissa Saarel**

**Authors: Larissa Saarel, Thomas Zapletal, Donald T. McKnight, and Day Ligon**

**Poster #: B46**

Biology

*THE REPRODUCTIVE ECOLOGY AND MOVEMENT PATTERNS OF STAURITYPUS TRIPORCATUS IN BELIZE*

Turtles are struggling to persist in the world with more than 60% of known species recognized as threatened or having gone extinct in modern times. Factors contributing to turtle species' decline include habitat destruction, overexploitation for food, the commercial pet trade, and climate change. The Northern Giant Musk Turtle (*Stauritypus triporcatus*) is a large-bodied

freshwater species native to eastern drainages in Mesoamerica. Unlike some species that exhibit specializations for inhabiting either lotic or lentic systems, *S. triporcatus* occurs in diverse aquatic habitats ranging from fast-moving streams and riffles to static marshes and lagoons. We initiated a study of movement and reproductive patterns of female *S. triporcatus* in central Belize in 2023. Our study site is a small lagoon (<80 meters at its widest point and roughly 3 km in length) with limited seasonal connectivity with the Belize River. In May – June 2023, we captured 10 reproductively mature female *S. triporcatus* through a combination of active pursuit with dip nets, snorkeling, and baited hoop nets. To the carapace of each turtle, we affixed radio and acoustic transmitters and two data loggers that collectively measured movement, water depth, and temperature at the top and at the rear marginals of the carapace. Following release at their capture sites, these turtles were relocated nearly daily from August until early December. Additionally, turtles were periodically recaptured to obtain plasma samples for later analysis of reproductive hormones and were scanned with an ultrasound (and periodically X-rayed) to determine reproductive condition of the ovaries. Mid-study, we know that, following the onset of summer rains, shelled eggs are absent until at least mid-August, and appear to be retained through the fall wet season. Additionally, X-radiographs were used to assess the size and number of eggs in each clutch. Finally, movement patterns varied widely among individual females, with some individuals remaining within a small area within the lagoon, and others moving throughout the lagoon, and in some cases even moving to other water bodies.

**Presenter: Aleana Savage**

**Authors: Aleana Savage and Giorgia Auteri**

**Poster #: A41**

Biology

*SENSITIVITY TO ARTIFICIAL LIGHT AND SOUND IN BATS USING URBAN LANDSCAPES*

Anthropogenic activity has prompted range shifts, extirpations, and behavioral change of native wildlife. Although humans have long altered the landscape, recent increases in land use intensification has significantly impacted wildlife habitat and biodiversity. As anthropogenic developments compromise habitat, some species have begun to exploit urban areas. While there are some commonalities between synurbic species, not all urban wildlife exhibit these shared characteristics. As urban areas expand, it will be essential to distinguish what drives unique species to select for urban habitat. The gray bat, *Myotis grisescens*, is an endangered species that has increased in abundance following heightened conservation efforts of summer and winter use caves. The species has, anecdotally, become more common in highly disturbed areas despite previously recorded narrow habitat requirements. I seek to understand whether behavioral changes in the form of tolerance to anthropogenic disturbance such as light and sound can be observed between urban bats compared to their rural counterparts. I also tested if urban bats tended to be more exploratory of novel environments and bolder when approaching stimuli. I tested individuals for behavioral differences using a standard Y-maze test. In a preliminary analysis, I considered species-level differences in behavior. I found that the classic synurbic species, *Eptesicus fuscus*, was more tolerant to light stimuli and explored more of the Y-maze. Because *M. grisescens* was more tolerant to sound, I then considered characteristics such as roost location, age, and sex on species-specific behaviors. Juveniles in

non-urban sites were more exploratory than non-urban juveniles, and males were bolder than females. Although there was not a distinct difference between urban and non-urban *M. griseus* behavior, *M. griseus* were consistently more tolerant to sound than light. Future conservation decisions should be made in consideration of the ecological trajectories of species under selection pressure to adapt to urban areas.

**Presenter: Iqra Shakoor**

**Authors: Iqra Shakoor, R. Biagioni, F. Wang, and C. Rico**

**Poster #: A44**

Chemistry

*REMOVING PERFLUOROCTANESULFONIC ACID FROM WATER USING ENGINEERED NANOPARTICLES*

The contamination of perfluorooctanesulfonic acid (PFOS, C<sub>8</sub>F<sub>17</sub>SO<sub>3</sub>H) in water is considered a threat to humans and the environment. In this research, the removal of PFOS in water through cerium oxide and magnesium oxide nanoparticles was investigated. The experiment was performed by mixing PFOS with nanoparticles. The prepared suspensions were put on a shaker for 24 hours for mixing. The samples were allowed to settle down for half an hour before centrifugation. The filtrate was analyzed through Liquid Chromatography Mass Spectrometry (LCMS), and the solid samples (after washing with water) were analyzed through X-ray Diffraction (XRD). The results showed that the nanoparticles could adsorb PFOS. XRD data did not show any changes in the cerium oxide nanoparticles structure, but a minor change was observed in the structure of magnesium oxide nanoparticles.

**Presenter: Rubina Sherchan**

**Authors: Rubina Sherchan and Scott David McElveen**

**Poster #: B48**

Natural and Applied Sciences

*STUDYING THE DIVERSITY OF BACTERIAL ENDOPHYTES IN DIFFERENT SOIL TYPE OF LAB LAB PURPUREUS*

Lab Lab purpureus, commonly known as 'hyacinth bean,' is a perennial herb native to tropical Africa. This plant is a significant source of protein and possesses great agricultural and medicinal value. Lab lab establishes a symbiotic association with rhizobia and significantly improves soil fertility, reducing the need for chemical fertilizer applications. Relatively few studies have been conducted to assess the potential influence and interaction of root nodule endophytes in Lab Lab. Hence, the current greenhouse study focused on studying the potential influence of crop rotation and organic matter application on the selection of rhizobial endophytes under different soil conditions. Next-generation DNA sequencing of 16S rRNA gene amplicons and *nifH* genes was performed to assess the bacterial distribution within root nodules and rhizosphere soil. The 16S rRNA sequencing suggested that *Bradyrhizobium* is the most dominant endosymbiont, making up to 96% of the total identified sequences. The other two bacteria detected in relatively low abundance (1-3%) compared to *Bradyrhizobium* were *Nitrobacter* and *Tardiphaga*.

**Presenter: Nathan Sines**

**Authors: Nathan Sines, Tasnuba Jerin, Marc Owen, Afrida Aranya, and Robert Pavlowsky**

**Poster #: B49**

Geography

*DYNAMICS OF THE BANK EROSION PATTERN IN RESPONSE TO ANTHROPOGENIC DISTURBANCES IN THE CUIVRE RIVER WATERSHED OF MISSOURI*

Human activities are reshaping Earth's surface – triggering channel instability – leading to questions about their effects on bank erosion. The Cuivre River and its two tributaries located within the Cuivre River watershed, northwest of St. Louis, Missouri has a limited pool of knowledge on bank erosion with its most recent study carried out in the early 1990s. This research aims to explore the bank erosion dynamics/pattern over 1816 – 1994 and 1994 – 2015. It hypothesizes that, while channel process-form relationships dictate bank erosion, human activities, particularly channel modification/disturbances, have deteriorated this fluvial system. The specific research questions include (i) To determine the change in channel width between 1816 and 1994, and 1994 to 2015 to understand the effect of anthropogenic/climate effects on bank erosion; (ii) To calculate sediment deposition and removal from the stream bank caused by bank erosion in the period of 1994 to 2015; (iii) To investigate the effect of anthropogenic disturbances on bank erosion rate of this fluvial system. Aerial photo analysis was conducted to determine change in bank width, while geospatial analysis of LiDAR data was used to determine bank height and estimate water depth. The analysis and comparison of the aerial photograph and Lidar data shows that lateral bank erosion rate has significantly increased over the last 30 years compared to the previous 170 years, specifically in the 4th and 5th order streams of the watershed. Sediment erosion and deposition analysis indicated significantly higher sediment removal compared to sediment deposition across the watershed. Fieldwork on visual stream assessments shows significant degradation of the Cuivre river watershed across all stream orders due to human activities like livestock direct access and channel modifications. This research contributes to the understanding of how human activities influence bank erosion, which can benefit watershed management by showing the most critical areas of erosion.

**Presenter: Md Zoheb Ullah Sohel**

**Authors: Md Zoheb Ullah Sohel, Matthew Bruenning, Gaige Riggs, Anika Tabassum, and**

**Ridwan Sakidja**

**Poster #: A45**

Materials Science

*REVOLUTIONIZING MACHINE LEARNING: HARNESSING QUANTUM COMPUTING'S EDGE*

Quantum Machine Learning has an edge over classical Machine Learning (ML) due to its capability in 1) exploring parallel solutions using the quantum physics concepts of superpositions and entanglements, 2) extracting complex features to tackle high dimensional problems, and 3) conducting efficient quantum-based ML algorithms. In this work, we have applied quantum computing to solve examples of numerical and classification problems commonly used Machine Learning. One example is to solve image classifications, and another is to perform numerical analysis using quantum-based kernel algorithms e.g. Support Vector Machines (SVMs). We compared our results with the classical ML's. This is an initial part of the

Quantum Information System QIS@Perlmutter project where the large-scale simulations are to be done at the Berkeley Lab.

**Author: Jeniya Sultana**

**Poster #: A47**

Computer Science

*DYNAMIC CONTEXT DETECTION FROM SPOKEN TEXT AND VOICE COMMAND IN HOME AUTOMATION SYSTEM*

Voice-enabled interactions have become increasingly popular with the rise of smart homes. Moreover, to enhance automation, there is a growing need for efficient context detection that alleviates the need to memorize voice commands. To address this, we followed a two-step approach in this research. In the first step, we developed a novel context recognition model utilizing a transformer, an attention mechanism, and a fully connected neural network. It was trained on a day-to-day conversational dataset, demonstrating higher accuracy than some baseline models. In the second step, we developed a dynamic context detection framework that groups new conversational data to identify new contexts automatically. These newly identified contexts are then merged with the initial context recognition model to help it learn new contexts and adapt to a changing environment. Preliminary results show that this two-step approach boosts the adaptability of smart home systems, enabling dynamic context detection and improving the quality of human-computer interactions.

**Author: Carissa Sutton**

**Poster #: A48**

Chemistry

*DEVELOPMENT OF FUNCTIONAL PLASMONIC NANOCERIA FOR THE ULTRASENSITIVE DETECTION OF EBOLA HEMORRHAGIC FEVER*

Infectious diseases have been increasing in both severity and prevalence, leading to increasing economic burdens and health concerns. Ebola hemorrhagic fever is an infectious disease that is both highly communicable and highly fatal. Current detection methods for the virus have high specificity and sensitivity but have long and/or complicated procedures that do not allow for early virus detection in highly affected areas. Real-time RT-PCR is more time-efficient; however, specificity and sensitivity are reduced. Since early detection of the virus is the only way to increase survival rates, sensitive detection methods that are rapid, specific, cost-effective, and user-friendly are vital for hospitals and infected areas. This research integrates plasmonic properties from gold nanoparticles and stabilizing nanoceria properties to form plasmonic nanoceria (PNC). These nanosensors allow for rapid, sensitive, specific, and portable colorimetric detection of the ebola virus in multiple media types by integrating ELISA with a lateral flow assay.



**Presenters: Anika Tabassum and Matthew Bruenning**

**Authors: Anika Tabassum, Gaige Riggs, Md Zoheb Ullah, Matthew Bruenning, and Ridwan Sakidja**

**Poster #: B52**

Materials Science

*QUANTUM FUSION: BLENDING QUANTUM MECHANICS WITH CUTTING-EDGE QUANTUM INFORMATION SCIENCE*

Quantum computing offers a unique and potentially substantial advantage over classical computing due to its capability to explore many possible solutions at once. In this work, we are demonstrating quantum computing simulations to solve a range of quantum mechanics problems. Here, quantum computing can be used to generate the analogs of superpositions and entanglement operations from quantum mechanics. By mapping the Hamiltonian of a fermionic system through its second quantization format and with subsequent transformation operations directly into a quantum circuit, the ground state can be precisely computed by a quantum circuit through Variational Quantum Eigensolver (VQE) algorithm. We demonstrated the approaches for both molecular Hamiltonians as well as for periodic lattice system. The project is an initial part of the Quantum Information System QIS@Perlmutter where the large-scale simulations will be performed at the Perlmutter supercomputer at the Berkeley Lab.

**Author: Chris Watson**

**Poster #: A5-**

Biology

*SNAKE MUSK AS AN ALARM CUE*

Alarm cues are signals used by animals to warn others of potential threats. Although alarm cues have been documented in a range of taxa, it has been largely unexplored in non-avian reptiles. This may be due in part to the historical portrayal of reptiles as asocial. In recent decades however, the discovery of cryptic sociality and maternal attendance in vipers has challenged this perspective. All snakes carry scent glands from which they secrete aromatic chemicals (musk) when harassed by predators. In this study, I looked at behavioral and physiological responses of cottonmouths (*Agkistrodon piscivorus*) to musk from conspecifics and evaluated differences due to age. Because some animals respond to alarm cues from other species, I also examined reactions of cottonmouths to secretions from the closely related copperhead (*A. contortrix*). The heart rates of snakes exposed to musk do not seem to change drastically in the absence of additional stimuli. However, snakes exposed to musk are more prompt and exaggerated in displaying defensive behaviors. Further research into cryptic sociality in vipers and other non-avian reptiles may prove valuable in improving our understanding of the evolution of alarm signaling, altruism and sociality.

**Author: Serene Zan**

**Poster #: B56**

Computer Science

*AN INVESTIGATION ON THE MECHANISM OF QDS-MEDIATED DISRUPTION OF THE ACTIN CYTOSKELETON. TEACHERS PERSPECTIVES ON COMPUTER SCIENCE PROFESSIONAL DEVELOPMENT: SIX WEEKS OF SUMMER WITH ROSE*

The Internet of Things is one of the fastest-developing technologies today, enhancing efficiency and enabling data-driven decision-making in households and various industries. Consequently, educating the new generation of students to become IoT professionals is increasingly important. However, In Southwest Missouri, teacher development opportunities in STEM, particularly in computing, are limited. The Research Opportunity for Smart Environments (ROSE) program, a 3-year program launched in 2023 at Missouri State University and funded by the National Science Foundation, is aimed at addressing this gap. The ROSE grant offers professional development and educates teachers in innovative IoT practices, equipping them with computational thinking, research skills, and hands-on research experience. During the first six-week summer workshop, we collected and analyzed teachers' daily reflections using a twofold approach, involving qualitative and sentiment analysis. Our results showcase the outcomes of teachers' participation in ROSE - illustrating how their engagement influenced their perspectives and knowledge, empowering them to create innovative and research-driven curricula.