Research and Creative Activities Day
Abstract Book

Access to Care and Social Service Support Using Community Development Warehouse

Daniel Adepoju

Department of Health Informatics, Luddy School of Informatics, Computing, and Engineering

Access to quality healthcare and social services is often hindered by social determinants of health (SDOH) such as food insecurity, housing instability, and unemployment. This capstone project leveraged informatics tools to address these barriers using the open-source District Health Information Software 2 (DHIS2) and advanced data visualization. In collaboration with the Randolph County Caring Community Partnership (RCCCP), a Self-Sufficiency Survey was integrated into DHIS2 to analyze SDOH data and generate actionable insights. The methodology involved data preprocessing, integration, and visualization using Docker, Power BI, and R. Despite challenges in fully implementing DHIS2 for visualization, a Support Need Index was developed to categorize survey data and create dynamic dashboards, enabling RCCCP to identify high-need populations and allocate resources effectively. This project demonstrates the scalability of informatics tools in addressing health disparities, offering a model for expanding DHIS2 integration to Indiana and beyond, ultimately advancing equitable, data-driven social service delivery.

Advisor: Zeyana Hamid, Department of Health Informatics, Luddy School of Informatics, Computing, and Engineering

Suicide Prevention Using Community Health Informatics (C.H.I): Leveraging DHIS2 for Early Detection and Intervention

Adekola Adepoju

Department of Health Informatics, Luddy School of Informatics, Computing, and Engineering

Suicide is a global public health crisis influenced by multifaceted factors, including drug abuse and mental health disorders. This project approaches suicide prevention through Community Health Informatics (C.H.I.), utilizing validated tools like the Drug Abuse Screening Test (DAST) and Columbia-Suicide Severity Rating Scale (C-SSRS) to assess and monitor risk. Leveraging DHIS2, an open-source health information system, the project integrates these tools into a decision-support framework for early detection and intervention. Despite ongoing challenges in achieving complete DHIS2 visualization, significant progress has been made in configuring the platform and demonstrating its capabilities. Supplementary tools such as Power BI and R Studio have been utilized to create visualizations and perform data analyses. This work underscores the critical role of informatics solutions in suicide prevention and provides a foundation for expanding

DHIS2-based efforts in Indiana and beyond.

Advisor: Zeyana Hamid, Department of Health Informatics, Luddy School of Informatics, Computing, and Engineering

Leukocyte Adhesion in a Mouse Model of Type 2 diabetes

Sanjana Adig, School of Science, Biology, Life and Health Sciences

Diabetic retinopathy, a leading cause of blindness among individuals with diabetes, develops when chronic hyperglycemia causes damage to the retinal components of the blood-retinal barrier (BRB). Our objective was to observe immune cell infiltration and structural changes in retinal vasculature in diabetic eyes compared to wild-type controls. Increased infiltration of CD45+ cells serves as evidence of BRB breakdown and inflammation, while abnormal collagen IV, a marker for the basement membrane, reflects vascular remodeling. Wild type mice were used to collect 3-week retinas and leprdb/db mice were used to collect 3- and 12-week retinas. Immunohistochemistry was performed to label retinas with CD45 (a pan-leukocyte marker) and collagen IV (a major component of the vascular basement membrane). Stained samples were imaged using a Nikon AXR confocal, and the images were analyzed with NIS Elements software to quantify the label. Preliminary results show an increase in CD45+ cell infiltration in diabetic retinas compared to wild-type controls. CD45+ cells are more concentrated in regions <1000 μm from the optic disc than in regions <3000 μm. CD45+ infiltration is also more pronounced in the twelve-week-old diabetic retina than in the three-week-old diabetic retinas, indicating a progressive increase in immune cell presence with disease duration. Collagen IV staining shows irregular and thickened vascular basement membranes in diabetic samples, in contrast to the vasculature seen in wild-type retinas. This study supports the hypothesis that chronic hyperglycemia in diabetes leads to blood-retinal barrier (BRB) dysfunction, resulting in both immune cell infiltration and vascular changes in the retina.

Mentor: Casandra Carrillo; Teri Belecky-Adams

The Effects of GPR162 on Metabolism

Sahira Allie, Biology, Life and Health Sciences

In our studies, we are trying to research the effect and function of GPCRs on metabolism and diabetes. It regulates metabolic processes that coincide with obesity, such as appetite, energy balance, glucose and lipid metabolism. In our own research, we used the Oral Glucose Tolerance Test, OGTT. This is a test used to assess how well the body processes sugar, or in other words, glucose. It is used to diagnose prediabetes, diabetes, and gestational diabetes. We are working to find the connection between G Protein-Coupled Receptor 162), GPR162, and its links to metabolism and diabetes.

Mentor: Hongxia Ren

Effect of binge-like alcohol drinking on presynaptic release mechanism proteins in the medial prefrontal cortex

Khaled Alysavy, School of Science, Biology and Neuroscience, Life and Health Sciences

The development of alcohol use disorder (AUD) can be initiated by binge drinking, which is a harmful form of alcohol consumption. Previous research has demonstrated that high alcohol consumption alters neuronal activity, including the release of glutamate, an important neurotransmitter in the brain. The mechanism for this change in glutamate release is unknown. Here, we seek to clarify changes in specific proteins involved in the release of neurotransmitters, offering insight into how excessive drinking may contribute to AUD. We examined how binge drinking affects the amounts of three proteins—Piccolo, Bassoon, and RAB3—that are involved in the release of glutamate by neurons. To test this, mice were exposed to drinking-in-the-dark (DID), a model that produces binge-like intake, for two weeks, with brains collected twenty-four hours following the final drinking session. Initial examination of Piccolo, Bassoon, and RAB3 levels in the medial prefrontal cortex by fluorescent immunohistochemistry yielded no significant group differences between male and female mice with and without a DID drinking history. Examination of other brain regions known to regulate alcohol drinking is ongoing. This research will offer a significant understanding of how molecular alterations after binge drinking might change glutamate release, a known consequence of heavy alcohol intake.

Mentor: Dr. Marian L. Logrip, Ph.D.

Exploring the Relationship between Ethylene and the Dehydrin Q9T022 in Arabidopsis Thaliana

Aibek Amankeldi, School of Science, Biology, Life and Health Sciences

Dehydrins are a family of intrinsically disordered proteins believed to be important for cold, drought, and osmotic tolerance. Dehydrins have been shown to significantly increase stress survival of Arabidopsis thaliana when overexpressed and are fairly ubiquitous through various stages of life and tissues. Q9T022, an acidic member of the dehydrin family, is known to be highly expressed within roots and developing siliques. Several studies have shown a significant increase of Q9T022 mRNA expression in response to ethylene treatment of dark-grown seedlings. Ethylene, a gaseous plant phytohormone often used in industry for fruit ripening, induces a well categorized phenotypic effect in A. thaliana known as the triple response, consisting of a reduced root and hypocotyl elongation, thickening of the hypocotyl, and an exaggerated apical hook. This work examines the differential phenotypic effects of ethylene treatment upon plants with and without a functional Q9T022 protein. This was carried out by first isolating a homozygous Q9T022 knockout mutant and comparing it, through measurement of the hypocotyl length, to wild type plants under equivalent dark-grown conditions. Preliminary findings indicate minimal difference in hypocotyl length due to the absence of a functional Q9T022 protein. To identify Q9T022 and its responsivity to ethylene, extracts of wild type and Q9T022 knockout protein under control and ethylene rich conditions will be compared through western blotting techniques utilizing dehydrin

specific antibodies. Our contributions aim to elucidate Q9T022's role in the canonical ethylene signaling pathway and relate Q9T022 protein's characteristics to others within the dehydrin family.

Mentor: Stephen Randall

Degenerate Art: The Nazi's Theft of Art and Culture

Maggie Barney, Art History, Arts and Humanities

This paper examines the mass seizure of artwork and cultural artifacts orchestrated by the Nazi regime leading up to and during World War II. It discusses the various outcomes of this effort, including sale and destruction, with an emphasis on the Nazi party's motivations for deeming artwork incompatible with their ideology and its labeling as Degenerate Art. Finally, efforts of recovery and repatriation are presented, with a focus on the Monuments Men Foundation for the Preservation of Art and a discussion of recent findings.

Mentor: Orna Tsultem

Development of a Cellphone-Based Detection System for Pb2+ in Water

Steven Benson, School of Science, Department of Chemical and Chemical Biology, Physical Sciences

Lead (Pb2+) is a toxic metal and neurotoxin. It was widely used as an additive for paint, gasoline, and batteries up until the banning of lead-based paint in homes in 1978. Lead is still used today in some applications which utilize batteries. Traces of this heavy metal are all around us today, for example, the EPA estimates there are still approximately 6-10 million active lead service lines. Furthermore, if a home was constructed before the ban in 1978, then lead is indeed still present in millions of houses across the country. The goal of the study is to enable users to monitor the harmful effects of lead with an intuitive product that is handheld. The EPA set a maximum concentration of Pb2+ in public drinking water to be 15 ppb (0.015 mg/L). Due to this toxicity issue, the Basu Lab has patented the use of a small molecule capable of detecting lead in water at this very low level using a lab-based fluorimeter. Our in-house synthesized compound 4,4-dimethyl-4H-5-oxa-1,3-dithia-6,11-diazacyclopenta[a]anthracene-2-one (Lead Glow) has been utilized in an onsite system capable of detecting lead. This has been done for portable smartphone-based detection with two previously developed "prototypes". However, further analyses are needed for such devices to be utilized in situ, where optimization of the methodology is also required. The final goal is testing water on site, adding our lead-binding solution, then utilizing the presence of lead and its conjugation shift (due to concentration) in our optimized portable device, enabling safety of the waterway.

Mentor: Dr. Partha Basu

Understanding the role of PERK and translational control in liver fibrosis

Emely Bibian, School of Science, Forensic and Investigative Sciences, Life and Health Sciences

Liver fibrosis is the formation and accumulation of scar tissue in the liver and can lead to liver failure. Scar tissue forms in response to injury caused by metabolic disorders, obesity, alcohol use, and more. Formation of fibrotic tissue, or fibrogenesis, is driven by hepatic stellate cell (HSC) activation. HSCs release extracellular matrix (ECM) proteins to repair liver injury, but chronic injury results in persistent activation of HSCs and ultimately fibrosis. Activated HSCs increase transcription and translation of ECM proteins, causing stress which activates the unfolded protein response (UPR). One branch of the UPR that regulates translation during stress is PERK signaling. Other branches of the UPR are important for HSC activation and fibrogenesis, but whether PERK is involved is unclear. We hypothesized that PERK plays a crucial role in HSC activation. To test this, we treated LX-2 cells, (immortalized human HSCs), and primary mouse HSCs (mHSCs) with the pro-fibrotic cytokine TGFβ to activate HSCs and found that PERK signaling increased with HSC activation. Next, we engineered a PERK KO cell line by infecting LX-2 cells with a lentivirus expressing shRNA targeting PERK. Loss of PERK reduced TGFβ induction of HSC activation and extracellular collagen deposition. To determine whether the effects of PERK loss on HSC activation are due to impaired TGFβ signaling, we analyzed SMAD2/3 phosphorylation, a downstream effector of TGFβ. PERK loss did not impair SMAD2/3 phosphorylation. Altogether, we show that PERK is important for HSC activation and collagen deposition, and PERK acts downstream of SMAD phosphorylation.

Mentor: Jessica Maiers

Missouri River Flooding and its Relationship with Pre-Columbian Population Dynamics

Broxton Bird, School of Science, Hopper-Gaunce, Nora, School of Science, IU Indianapolis

Klezmer, Kyle, School of Science, IU Indianapolis
Norman, Nicholas, School of Science, IU Indianapolis
Rowley, Nina, School of Science, IU Indianapolis
Niehaus, Gregory, School of Science, IU Indianapolis
Wilson, Jeremy, Liberal Arts, IU Indianapolis, Physical Sciences
Flooding has been proposed as a key factor in the depopulation of Cahokia, the largest Mississippian-age (1050–1450 CE) archaeological site, located in present-day East St. Louis, IL. However, existing data is conflicting. While no direct evidence of severe flooding has been found at Cahokia, a sediment core from nearby Horseshoe Lake indicates an increase in flooding around the time of the site's abandonment. It remains unclear whether this flooding resulted from increased discharge of the Mississippi River, the Missouri River, or both, as no published flood records from these rivers cover the relevant time period. Here, we present a new flood record from MacLean Lake in the upper Missouri River watershed to examine the timing of Missouri River flooding relative

to the Horseshoe Lake flood record. Our findings reveal similar flooding patterns at Cahokia and in the upper Missouri River watershed, suggesting that Missouri River discharge played a significant role in flooding during Cahokia's abandonment.

Mentor: Broxton Bird; Jeremy Wilson

A Meta-Analysis Examining the Relationship Between Empathy and Political Affiliation

Alaina Blazwich, School of Science, Konrath, Sara, Department of Philanthropy, IU-Indianapolis
Sami, Nabbil, Department of Psychology, IU-Indianapolis
Feiock, Salvatore, Department of Psychology, IU-Indianapolis, Social and Behavioral Sciences

A Meta-Analysis Examining the Relationship Between Empathy and Political Affiliation

The main purpose of our research project is to understand the relationship between empathy and political beliefs, identities, and behavior. We are conducting a meta-analysis. First, we created a list of keywords relating to our variables, which generated a list of potentially relevant articles. Over the past year, we have completely finished screening all 8,137 abstracts, and now we are in the process of uploading the full texts for the abstracts we found relevant. Once we finish uploading, we will screen the full text of each relevant article and extract data for analysis. Meta-analysis is a research method that combines as many different studies as possible that are available to answer overarching research questions. This meta-analysis will examine the correlation between empathy and political variables and also determine whether this depends on the type of empathy, the recipient of empathy, or features of the study. This study will contribute to the growing body of empathy research and hopefully provide context behind existing assumptions.

Mentor: Dr. Sara Konrath

Is self-efficacy changing over time in American youth? A cross-temporal meta-analysis

Abby Bowers, School of Science, Psychology, Social and Behavioral Sciences

Self-efficacy (SE) is defined as the perception of one's own abilities to produce a desired outcome. Although Bandura initially employed the concept within child development, research finds that it persists throughout the lifespan. It is also a strong indicator of overall well-being. Lower self-efficacy is linked to lower self-esteem, higher stress and

anxiety, and more risk-taking behaviors, while the opposite is true for higher SE. Thus, it's important to monitor levels of SE over time; especially in American youth. We conducted a cross-temporal meta-analysis to examine changes in SE over time in American college students. We screened 8,181 articles that cited Schwarzer & Jerusalem's (1995) General Self-Efficacy Scale, and collected data from 194 samples with SE scores, for a total of 47,375 participants. Analyses find a significant linear change (β=-.15, p= .038) in American college students' self-efficacy from 1999 to 2022. Our final poster will also discuss nonlinear analyses and covariates as well as interpretations and implications considering other related recent trends.

Mentor: Sara Konrath

Applications of SARS COVID-19 Mpro Inhibition Screening Assay for Testing Experimental Compounds and Facilitating Undergraduate Classroom Research

Jacqueline Bozinovski, School of Science, Chemistry, Barnett, Wini. Department of Chemistry and Chemical Biology, IU-Indianapolis

Drug Discovery
The Distributed Drug Discovery (D3) SARS-CoV-2 project is screening potential synthetic target compounds for inhibition of the main protease (Mpro), a key enzyme in viral proliferation. Approximately 40 compounds have been tested, with several demonstrating biological activity against Mpro. Notably, a select few have shown inhibition comparable to Nirmatrelvir, the active antiviral ingredient in Paxlovid. To expand the impact of the D3 Lab, a student-led inhibitor assay has been integrated into an undergraduate cellular biology course at IU Indy. This initiative provides hands-on research experience while adapting the procedure to fit classroom constraints. Implementing the assay in multiple semesters will generate extensive data on promising compounds, ensuring reproducibility and reliability. Future directions include an IC50 protocol for high-performing inhibitors and the development of a cost-effective colorimetric assay. The IC50 assay will quantify the concentration required for 50% Mpro inhibition, guiding further drug development. Meanwhile, the colorimetric assay aims to provide an accessible alternative to fluorescence spectrophotometry by enabling inhibition assessment through visual color change. This approach could make screening more feasible for underfunded institutions, broadening participation in global drug discovery efforts.

Mentor: Dr. William Scott, J. Geno Samaritoni

Myelin Water Imaging (MWI)

Ayako Byers, Stark Neuroscience (Anatomy, Cell Biology & Physiology), neuroscience, Imaging

By examining the water that is trapped between myelin layers, Myelin Water Imaging (MWI), a sophisticated MRI-based method, may measure the amount of myelin in the brain. Multiple sclerosis (MS), Alzheimer's disease, Parkinson's disease, and schizophrenia are among the neurological and psychiatric disorders linked to anomalies in myelin, which is essential for effective brain signal transmission. MWI creates high-resolution myelin maps from multi-echo T2 MRI data, allowing for accurate tracking of demyelination and disease development. MWI offers a more precise quantitative evaluation of myelin integrity than traditional MRI, is non-invasive, and does not require contrast agents. With an anticipated completion date of March 28, 2025, and an estimated overall scan time of 1-2 hours per individual, this project intends to apply MWI to 23 samples. The findings might help develop better methods for myelin-related disease diagnosis and treatment.

Mentor: Dr. Brittney Needham, Dr. Jaymie Connerly

Interpretation of Duchamp's Subliminally Erotic Anti-Aesthetic Art: An Investigation of Fountain and The Bride Stripped Bare by Her Bachelors

Charlotte Calnek, Art History, Arts and Humanities

Marcel Duchamp's works The Bride Stripped Bare by Her Bachelors, Even and Fountain represent a radical reimagining of art that challenges traditional norms of sexuality, identity, and the relationship between art and the everyday. Through an analysis of these pieces, informed by the perspectives of Paul B. Franklin, Gerald J. Pape, and Joel Rudinow, it becomes clear that Duchamp's work uses subversion and playful provocation to critique fine art institutions and gendered representations. Franklin's "Object Choice: Marcel Duchamp's Fountain and the Art of Queer History" focuses on how Duchamp's work opens new avenues for queer interpretation, particularly of Duchamps's Fountain, while Pape's "Marcel Duchamp" explores the intellectual and psychological dimensions of The Bride Stripped Bare by Her Bachelors, Even, emphasizing desire, failure, gender, and hidden narratives. Rudinow's "Duchamp's Mischief" underscores how the readymade, with a focus on Fountain, blurs the lines between fine art and everyday life by using ordinary mass-produced objects to disrupt conventional expectations of artistic production. Together, these works illustrate how Duchamp dismantles conventional representations, creating a new space for examining desire, identity, and the autonomy of art in both playful and profound ways.

Mentor: Dr. Uranchimeg Tsultem

Recruitment Strategies and Preliminary for A Community Based Research Project among Black/African American Adults aged 45 years or older

Dane Ceniza, Nursing, Nenette Jessup. IU School of Nursing, IU-Indianapolis
Katz Amy, IU School of Nursing, IU-Indianapolis, Social and Behavioral Sciences

In the United States, Black/African Americans are significantly underrepresented in brain health and Alzheimer's Disease and (AD) Related Dementia (ADRD) research. Despite the greater incidence of diagnosis, their participation lacks in clinical trial studies. We developed and designed a CARE Platform, or, smart phone application, called Lola, to increase brain health, improve ADRD health literacy, and research engagement among Black/African Americans aged 45 years or older in central and northwest regions of Indiana. The goal of this abstract is to (1) describe the recruitment and retention strategies, challenges and successes encountered in the implementation of a one-month Pilot study and (2) report preliminary recruitment data. Since December 2024, a total of 8 strategies for recruitment and retention have been implemented and as of April 2025, 285 potential participants have expressed interest in the study. The project is ongoing until August 2025. The Lola App is designed to be self-accessed for one-month and was adapted with assistance from local community stakeholders and advisory boards. All data storage and collection are captured in REDCap, a web-based, HIPAA-compliant platform. This community-based research project is intended to promote brain health knowledge and engagement in clinical ADRD studies among Black/African Americans 45 years and older to better serve these vulnerable populations.

Mentor: Yvonne Lu

Made You Look: How Cindy Sherman uses Self-Portraits as a Tool for Questioning Woman's Identity

Jess Cheesman, School of Liberal Arts, Art History, Arts and Humanities

Control over the identity of women and the ownership over the discourse has been a controversy long rooted in history spanning thousands of years. Even with the rise of feminism and its respective waves in the later 20th century, the discourse surrounding the identity of women and the fight for ownership is still alive today. Self-portraits throughout time have been the solution for many artists, particularly women, as a method to regaining control and ownership over how their image is represented. I use the works of Cindy Sherman, a photographer specializing in self-portraits, as an exploratory method to compare her use of self-portraits, the images she produces, and the commentary she is making in comparison to "self-portraits" of the past but also focusing on the various ways' women are viewed from society's perspective, particularly the male gaze. The goal of this paper aims to address the substantial impact self-portraits have in a controversial society.

Mentor: Orna Tsultem

Abstract: Spring 2024 Bird Migration Collisions with Campus Buildings

Zeb Church, Center for Earth and Environmental Science, School of Science, Public and Environmental Affairs

The Central Flyway is a major bird migration route through the central North American continent. IUI campus is located along this flyway and campus buildings experience numerous collisions during the seasonal migration of birds South for winter. For years, the Center for Earth and Environmental Science has been conducting regular surveys to keep track of bird building collisions for 18 different buildings on campus in addition to their connecting skywalks. In this presentation, data from April 1st to May 31st, 2024, will be summarized. These dates align with the 2024 spring migration when various species of birds return to their native habitats. Of the 164 collisions recorded during this time, 136 were fatal. The deadliest building by far was the University Library, building code UL, with 24 fatal bird strikes during the spring migration. The most common place to find a bird that had survived a collision was in the XL garage with 7 incidents, which is unsurprising as this garage is a common place for many local birds to nest. One interesting case is Hine Hall and University tower, a conjoined building with code IP/HO. Individually, the surveys show that IP had 4 total collisions, all fatal, while HO had 3 nonfatal and 6 fatal collisions, which may not seem like a lot, but all these collisions happened within the inner courtyard shared by the 2 buildings making for 13 total collisions, 7.9% of collisions recorded in this time period. With the highest total percentages of collisions on buildings not including skywalks being University Library with 15.8% and Campus Center with 9.8%, IP/HO combined has the 3rd highest bird strike percentage. The number of different species that collided with buildings during the spring migration was predictably quite high with 35 species being recorded as having fatally collided with buildings on campus. Of those, the 3 most common were ovenbirds making up 16.2% of fatal collisions, Tennessee warblers with 14% and dark-eyed junco's making up 8.8%.

Mentor: Victoria Schmalhofer

Comparing Volcanic Plumbing Systems Between Boulder Batholith, Montana and Joshua Tree National Park, California

Carissa Cullen, School of Science, Earth and Environmental Science Department, Geology, Physical Sciences

The purpose of this study is to examine depth-dependent variations in chemical processes within Late Cretaceous (82 to 74 Ma), continental volcanic arc plumbing systems. Our selected study sites compare deeper, mid-crustal rock samples from Joshua Tree National Park in southern California with shallower samples from Porcupine Wash in Joshua Tree National Park, as well as from the upper-crustal inner and outer Boulder batholith in Montana, focusing on mineral textures and whole rock compositions. The analysis reveals that the mid-crustal Joshua Tree samples share more similarities with the Porcupine Wash and inner Boulder batholith rocks than with the outer Boulder batholith. Both regions contain intermediate to felsic rocks and show evidence of having undergone longer periods of crystallization, likely involving crystal fractionation. The outer Boulder batholith had shorter periods of crystallization to form intermediate-mafic granodiorite. Mineralogical data indicates that both the Joshua Tree and inner Boulder batholith samples have higher concentrations of intermediate and denser minerals clinopyroxene, hornblende, and magnetite. Chemical and thin section analysis further supports the idea that these inner rocks crystallized over extended time frames, allowing

for the separation of minerals during cooling. The time frame for this crystallization period is dated at 76.7 to 74.5 Ma. In contrast, the outer Boulder batholith samples exhibit a more varied mineral composition, reflecting an earlier crystallization history about 82 to 78 Ma. The broadly overlapping patterns of chemical variations suggests the origin of magmatic diversity arose yet deeper in these arc systems.

Mentor: Andrew Barth

Comparing Post-Fire Biodiversity to Historic Biodiversity in Oregon

Carissa Cullen, School of Science, Earth and Environmental Science Department, Geology and School of Liberal Arts, Geogrpahy Department, Geography, Geographic Information Systems

This research examines how wildfires influence the biodiversity of Oregon's keystone species—Chinook salmon, sea otters, gray wolves, and American beavers. By comparing post-fire ecosystem data with historical biodiversity conditions, the study investigates how modern wildfires, increasingly driven by climate change, affect long-term ecological recovery. Understanding these impacts is essential for conservation, land management, and ecosystem restoration.
Using tools such as FlamMap to model fire behavior, ArcGIS to map ecosystem changes, Maxent to model species distributions, and seek by iNaturalist for species observation data, the study analyzes shifts in habitat conditions and species populations. It focuses on habitat regeneration, species variation, and ecological resilience following fire events.
The findings provide insight into how wildfires may benefit biodiversity and support ecological restoration. These results contribute to the development of fire management strategies that promote ecological health while mitigating the risks associated with increasingly severe wildfires in Oregon's ecosystems.

Mentor: Daniel Johnson

Visualizing Health and Wellness

Amori Curiel, School of Science, Biology, Sprout, Kyleigh Ann. Herron School of Art + Design, IU-Indianapolis, Religious Studies and Art-Communication Design

Our project, Visualizing Health and Wellness, explores the intersection of community engagement, health, and wellness through public scholarship. In partnership with eight local religious communities in central Indiana, students engaged in focused conversations to understand diverse perspectives on health. They co-created visual representations that highlight how each community practices and embodies wellness.

The project's current efforts focus on developing a dynamic website to showcase the wisdom and work of our community partners. The website's design seeks to make visible how collaboration with community stakeholders educates and elevates health and wellness practices. Supporting this design is a new analysis of recorded interviews and

feedback sessions with community members. We aim to share the tangible outcomes and the intangible impacts of each community's support for wellness.

Visualizing Health and Wellness also examines how religious communities have responded to conversation with appreciative curiosity, viewing the process as an opportunity for mutual learning and respect. Capturing these reciprocal relationships between students, religious leaders, and community members helps inform the website's design, ensuring it serves as an effective platform for making public scholarship public. This approach ensures that shared knowledge and meaningful experiences are accessible to a wider audience, while honoring community partners. Ultimately, Visualizing Health and Wellness aims to visually communicate the breadth of community relationships and engagement.

Mentor: Pamela Catherine Napier and David Craig

Changes Over Time in Emotion Recognition on the RMET

Deborah Daluga, School of Science, Psychology, Social and Behavioral Sciences

The Reading the Mind in the Eyes Test (RMET) is a measure of theory of mind or emotion recognition (Baron-Cohen et al., 2001). Stronger emotion recognition skills are associated with intrapersonal and interpersonal outcomes (Schlegel et al., 2021; Ursu & Turliuc, 2020; Wells et al., 2021). We conducted a cross-temporal meta-analysis (CTMA) to examine changes over time in emotion recognition on the RMET in English-speaking countries. We identified articles that cited the RMET from the Web of Science and then screened articles from English-speaking countries that used the RMET on individuals aged 13+. Data included 445 samples with 816,854 participants. We ran regression analyses examining how the year of data collection predicted RMET scores, overall and by demographic factors (age and gender). Overall, there was a significant decline in RMET scores from 1998 to 2022 (β=-.23, p<.001), with results remaining significant when controlling for age (β=-.18, p<.001) and gender (β=-.23, p<.001). Our poster will report additional analyses (e.g., country-specific trends, nonlinear effects) and will discuss limitations and potential implications of our results.

Mentor: Sara Konrath

Silent Suffering: Understanding and Addressing Housing Sexual Harassment among College Women

Maddisonn Davila, School of Science, Psychology, Social and Behavioral Sciences
The rates of sexual harassment experienced in the context of housing have been estimated to be high and based on a history of systemic economic and racial oppression, women from lower income backgrounds and Women of Color have been most implicated by its effects (Cahan, 1987; Elengold, 2016; Oliveri, 2018; Oliveri, 2019; Tester, 2008). The goals of our study were to extend this research to understand the rates of sexual harassment related to housing, specifically among college students, and to examine its effects on housing vulnerabilities, as well as psychosocial and educational outcomes, particularly among marginalized students. Specifically, we assessed (a) the prevalence of experiences of sexual harassment occurring in off-campus rental housing

contexts among undergraduate students; (b) the impact of precarity (income, housing options, race/ethnicity, knowledge of FHA anti-harassment policies, etc.) on the likelihood of having those experiences; and (c) the impact of housing harassment on psychosocial (e.g., depression and anxiety) and academic outcomes (e.g., intentions to persist in school, grades, and engagement). The data collected from undergraduate students at a Midwestern university indicated that 29.2% of participants experienced some form of harassment, with 29.1% saying they experienced sexual harassment specifically, and 14.9% stating that they faced racialized sexual harassment. Although racial differences in harassment were not found, gender differences were observed, with women reporting higher harassment levels than men. Lastly, correlations found that racialized sexual harassment, sexual harassment, and housing sexual harassment impact sleep, somatic complaints, and anxiety, with depression having the strongest correlation.

Mentor: Peggy Stockdale and Jessica Kiebler

THE DIAGRAMMATICS OF JENNY HOLZER: An Analysis of Jenny Holzer's Truisms (1977-79)

Oluremi de Mora

As one of the most recognizable series of the 20th century, Truisms (1977-79) by Jenny Holzer remains a seminal work of contemporary art. While much of the critical analysis surrounding the series focuses on the meaning or political affiliation of individual truisms, this essay builds upon existing scholarship to create an understanding of Truisms through a diagrammatic framework that emphasizes a dependence on its surroundings and spectator interaction for the creation of meaning. Through a review of Holzer's education, interest in scientific diagrams, and artistic influences, I determine that language is only the artistic medium of Truisms. I discuss theory of public art to explain how the material presentation of Truisms and spectator engagement is necessary to give the truisms meaning and, in return, the truisms "caption" their surroundings. I conclude with a discussion of how Truisms challenges both the autonomy of the art object and the authority of the artist.

Mentor: Orna Tsultem

The Relationship Between Social Media and Empathy: A Secondary Data Analysis

Brooklyn Dearth, School of Science, Social and Behavioral Sciences

Social media has dramatically changed how we interact with others. With the high number of users, and a perceived lack of empathy on social media overall by laypeople, it is important to understand the effects social media can have on users' well-being. The current study conducts a secondary data analysis on the relationship between social

media and empathy. Using in-depth measures of Instagram usage (e.g. daily usage, types of posts seen, types of accounts followed, social media dependence) and empathy (e.g. emotion contagion, empathic concern, personal distress, perspective taking), we hypothesize that the relationship between social media and empathy will depend on how the person uses social media and the type of empathy that is being measured. Preliminary results support the idea that the type of empathy a person experiences influences how they use social media. Our study will contribute to the growing body of literature by providing specific, in-depth analyses of social media usage and empathy.

Mentor: Sara Konrath

Effects of Kinesio Tape on Delayed Onset Muscle Soreness

Dakota Deiwert, School of Health and Human Sciences, Kinesiology, Life and Health Sciences

INTRODUCTION: Kinesio tape (KT) is a therapeutic tape purported to help lift the skin off underlying tissue to enhance blood flow. KT may serve as an intervention to reduce the duration of symptoms associated with exercise-muscle damage. GOAL: This study investigated KT's effectiveness at recovering strength loss and improving delayed onset muscle soreness (DOMS) in upper body of exercise-naïve individuals following eccentric exercise (ECC) of the elbow flexors (EF). METHODS: 33 participants (male = 10; female = 23) were randomized into one of three groups: KT (n=12), placebo (n=10), or control (n=11) following maximal EF ECCs. Forty-eight and 72 hours after ECC, maximal voluntary EF contractions (MVCs) were measured via an isokinetic dynamometer, and pain pressure thresholds (PPTs) were measured via an algometer to assess strength recovery and DOMS changes, respectively. A mixed-model ANOVA was conducted to test group differences amongst days ($p<0.05$). The Tukey HSD procedure was used for significant main effects and interactions. RESULTS: There were no group x time interactions for MVC or PPT. However, ECC induced significant immediate reductions in MVC in all groups (-32.6±0.18%) and significant DOMS as measured by reduced PPT 48 hours post-ECC (-33.7±0.30%). Furthermore, MVC and PPT values did not return to baseline after 72 hours post-ECC (-20.6±0.21% and –29.8±0.28%, respectively). CONCLUSION: Our study suggests that KT does not improve pain sensitivity or the time in which an individual might recover strength after strenuous exercise. However, longer time points may be needed to support this.

Mentor: Monica Hubal

Opioid Knowledge and Attitude among Young Adults (OKAY)

Sophia Dickerson, School of Nursing, IU Indianapolis,
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Background and purpose: The Opioid Crisis has escalated into a major public health emergency in the United States, affecting millions and increasingly impacting young

adults through rising rates of fatal overdose. This study aimed to assess the knowledge of and attitude toward opioids among young adults.

Methods: A quantitative methodology was employed, collecting data through the Opioid Knowledge and Attitudes among Young Adults (OKAY) survey via Qualtrics. The survey included 7 knowledge items, 5 experience items, and 14 attitude questions, with yes/no and 4-point Likert-type questions. Undergraduate and graduate students aged 18 and above were recruited via flyers on social media and around campus. The flyer included QR code to OKAY survey and raffle entry for a $25 gift card as an incentive.

Results: Of the 168 participants, the majority were female, nursing students, and in their junior year, indicating a lack of diversity compared to the campus population. Alarmingly, 33% of participants lacked knowledge about Narcan, a critical medication that can reverse opioid overdoses and another 37% were unsure or had no opinion about the effectiveness of addiction treatment. Results also revealed existing stigma surrounding opioid misuse, such as 20% viewed moral strength plays a role in opioid addiction and 62% did not want to live with someone who is addicted to opioids.

Conclusion: The findings reveal an urgent need for educational initiatives aimed at the young adult population to increase their knowledge and foster a more informed environment regarding opioid misuse.

Mentor: Carol Shieh

Latine Adolescent Racial-Ethnic Discrimination Experiences and Mental Health: Exploring the Role of Caregivers

Dale Dlima, School of Science, psychology, Life and Health Sciences

Latine adolescents frequently experience racial-ethnic discrimination, which can negatively impact their mental health. Caregivers play a critical role in shaping resilience and coping strategies in adolescents facing such discrimination. This study explores caregiver-adolescent dynamics in managing discrimination experiences through a qualitative approach. As part of a larger mixed-methods study, 117 Latine adolescent-caregiver dyads in Marion County completed surveys, and 14 dyads participated in semi-structured interviews conducted in English or Spanish. Interviews were transcribed, translated when necessary, and analyzed thematically to identify recurring patterns. Preliminary findings reveal emerging themes related to how caregivers acknowledge, discuss, and guide adolescents in processing discrimination. These insights will contribute to the development of culturally relevant interventions aimed at strengthening family support systems and improving mental health outcomes for Latine adolescents.

Mentor: Natalie Guerrero

Exploring the Impact of Caregiver Interventions on Latine Adolescents' Mental Well-being

Dale D'lima, School of Science, Psychology, Social and Behavioral Sciences

In the U.S., Latine adolescents experience distinctive mental health challenges shaped by racial discrimination and identity development within the context of their culture. Project Salud explores how caregivers support adolescent mental health and well-being in response to these challenges. The study uses qualitative methods with thematic analysis to examine interviews with 18 adolescent-caregiver Latine dyads in Marion County, Indiana. In preliminary analyses, we have identified 10 overall themes that provide insight into significant areas, including the settings in which discrimination is experienced and adolescent responses such as resilience, avoidance, or confrontation. Additional themes highlight caregiver-adolescent communication, barriers to seeking care, and the broader quality of their relationships. This study advances scholarship on racial discrimination and adolescent mental health by highlighting caregivers' role in fostering resilience. By identifying the barriers and facilitators of caregiver support, this study provides a basis for the development of culturally responsive interventions to support adolescent family communication and improve mental health outcomes for Latine youth.

Mentor: Natalie Guerrero

How Participatory Art Touch Hearts in Félix González-Torres' "Untitled" (Portrait of Ross in L.A.) and Museum of Broken Relationships – Indianapolis

Min Durham , School of Liberal Arts, Department of Art History, Arts and Humanities

This paper examines the impact of participatory art through two case studies: Félix González-Torres' "Untitled" (Portrait of Ross in L.A.) and Museum of Broken Relationships – Indianapolis (MBRI). Nicolas Bourriaud first referred to participatory art in the 1990s as "rational aesthetics," focusing on social relationships and interpersonal connections. González-Torres' "Untitled" (Portrait of Ross in L.A.), a pile of vibrantly wrapped candies, represents the artist's partner's ideal weight, inviting audiences to partake in a metaphorical and emotional experience reflecting love, loss, and the effect of the AIDS epidemic. Similarly, MBRI crowdsources and exhibits objects that embody personal stories of heartbreak. This exhibition fosters a sense of shared human experience and connects visitors through individual stories. Both artwork and the international satellite exhibit highlight how participatory art challenges the traditional museums' practice of limiting audience access to art. Instead, they invite humans to connect on a deeper level. This relates to Mami Kataoka's perspective of participatory art, which creates a sense of belonging through physical and sensory experiences. By promoting inclusivity, collaboration, and a sense of belonging, participatory art challenges traditional museum practices and ultimately transforms the museum's space.

Mentor: Orna Tsultem

Characterizing Methods for Detection of Volatile Organic Compounds in Urine through Portable Gas Chromatography-Mass Spectrometry

Serenidy Eckerle, School of Science, Biology. School of Science, Forensic and Investigative Sciences, Life and Health Sciences

Canines can smell volatile organic compounds (VOCs) in human biological samples such as sweat, urine, and breath. The gold standard for analysis is gas chromatography-mass spectrometry (GC-MS), which is efficient in separating, quantifying, and identifying VOCs in urine headspace. Advancements in instrumentation have led to the development of a portable GC-MC system that analyzes VOCs at a point-of-care. This portable instrument is designed for environmental monitoring, emergency response, and manufacturing/processing. The purpose of this study is to repurpose the HAPSITE ER portable GC-MS for identifying urinary VOC biomarkers. Method development optimized sample preparation, off-column, and instrumental parameters that may affect performance. Once standardized, the method was used to analyze a urine standard (n = 10) to characterize intra-day reproducibility. n = 3 samples each from three volunteers (and the standard) were analyzed each day for a total of four days (n = 48 samples) to characterize inter-day performance. Results showed the method could detect VOC signals with adequate reproducibility and distinguish VOC profiles from different volunteers with 100% accuracy. Future studies should focus on utilizing preconcentration modules to enhance method sensitivity and analyzing samples in the context of medical conditions to evaluate the ability to discern biomarkers.

Mentor: Mangilal Agarwal, Mark Woollam, Eray Schulz

Microglia and Occludin Changes in a Model of Diabetic Retinopathy

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Diabetic retinopathy (DR) is a complication of diabetes mellitus resulting from elevated blood glucose, leading to vision loss. Microglia cells work to mediate inflammation as well as regulate passage between the blood-retinal barrier. Work in the Belecky-Adams lab has shown morphological changes in retinal microglia in a diabetic mouse, the leprdb/db. Additionally, literature on occludin, a tight junction protein which contributes to the integrity of the blood-retinal barrier, has shown a decrease in the protein under hyperglycemic conditions. Eyes were obtained from 3-week leprdb/db and wildtype mice. The eyes were fixed, retinas were dissected, and cuts were made to create 4 petals. Retinas were placed in cold methanol before immunohistochemistry. Two primary antibodies were used, Ionized calcium binding adaptor molecule 1 (IBA1) for identification of microglia, and occludin to identify the protein's presence within the barrier. Once stained, retinas were placed in an alkaline solution (AKS) for tissue clearing. The retinas were imaged using the Nikon AKR confocal, z stacks were taken in two regions: <1000µm from the optic nerve and 1001µm-3000µm from the optic nerve

head. Using the GA3 on the Nikon Analysis software, microglia cell counts and occludin total volume was quantified. The results showed an increase in microglia count in diabetic retinas. Occludin did not show a significant volume difference in diabetic retinas. Analysis was performed using Graphpad Prism.

Mentor: Teri Belecky-Adams

Burnout in the Nonprofit Sector

Salvatore Feiock, School of Science, Psychology, Konrath, Sara. Department of Philanthropy, IU-Indianapolis
Akobi, Ifeoma. Department of Philantropy, IU-Indianapolis, Social and Behavioral Sciences

Although burnout has been identified as an occupational problem since 1974, the Covid-19 pandemic brought forth newfound awareness regarding this particular issue. Concerns surrounding burnout only increase when they are applied to the nonprofit sector, as third sector workers often have high demands and low resources, as reflected by the Job-Demands Resource Theory (Demerouti et al, 2001). Since burnout is a major concern for occupational wellbeing, there is a multitude of burnout research, but the studied populations are typically limited to healthcare workers or other people-oriented, altruistic job types. Our study employs a Systematic Literature Review (SLR) method where we initially searched databases for articles that included “nonprofit” and “burnout” and any other related terminology. We aim to properly assess the impact burnout has on nonprofit populations and seek to find a way to alleviate the consequences it poses. At the project’s current state, we have finished the full text screening process. We began with 2,168 screened abstracts and found 420 texts eligible for full-text screening. Out of those 420 texts, we have moved forward to the extraction stage with 204 total articles. We will be assessing the themes present in the text to gain a better understanding of burnout’s impact on the nonprofit sector.

Mentor: Sara Konrath

Gender Differences in Mental Health Profiles among Formerly Incarcerated Older Adults

Sydney Furman, School of Science, Psychology, Hulak, Zdenka. School of Science, IU Indianapolis, Social and Behavioral Sciences

Previous research has documented mental health disparities among people who have experienced incarceration. More recently, researchers have considered the unique mental health profiles of women and men who have been incarcerated. However, most of the research to date has focused on younger and midlife samples, which neglects the mental health of formerly incarcerated older adults. The objective of this research is to understand gender differences in mental profiles among formerly incarcerated older adults. Using data from the Health and Retirement Study (HRS), which is a nationally representative sample of Americans aged 50 and older, we examine differences in

depressive symptoms, anxiety, loneliness, substance use, and diagnosed psychological conditions by incarceration status and gender. Bivariate tests of statistical significance were used to examine differences for each psychological attribute. In the full sample (n=13,813), formerly incarcerated older adults had more depressive symptoms, anxiety, loneliness, substance use, and diagnosed conditions than those who had not been incarcerated. Among formerly incarcerated older adults (n=997), women had more depressive symptoms, anxiety, higher rates of currently smoking and diagnosed psychological conditions. Formerly incarcerated men reported drinking more alcoholic beverages per week. Both groups reported similar levels of loneliness. Taken together, former incarceration is a vital area of study because mental health and incarceration are often taboo topics, which can lead to a lack of information. This research also underscores the importance of re-entry programs tailored to the unique experiences of men and women, and the need for continued support throughout the life course.

Mentor: Kenzie Mintus

Amending Icons: Comparing Los Cuatro Grandes and Las Four

Jaqueline Gaeta, Art History, Arts and Humanities

Through iconographic analysis, I review and compare Ernesto de la Loza's Los Quatro Grandes (1993) and Judy Baca's Las Four (1997), two Chicane murals in the Estrada Courts Projects in Los Angeles, California. In both murals, figures, icons, and histories draw from similar sources, including Mexican and Chicane pop culture, Mexica legends, and historical revolutionaries, but diverge in what specific figures to immortalize. De la Loza's omission of female figures in his mural, save for a sexualized image of Mexica icon Iztaccihuatl, demonstrate a machismo narrative that ignores women's contributions to history. Baca's mural response directly to this absence by designing a mural that compliments de la Loza's work. Referencing Indigenous, Mexican, and Chicana figures, Baca provides a more holistic history. Through her works, Baca empowers all to question current canons and consider who is missing from our history.
Keywords: Judy Baca, Ernesto de la Loza, Chicana mural, Chicane mural, Estrada Courts murals, Los Angeles murals, Machismo, Chicana feminism

Mentor: Orna Tsultem

Effect of music on nociception and morphine analgesia.

Thomas Goldberg, School of Science, Addiction Neuroscience, Social and Behavioral Sciences

Recent studies have examined music's potential as a treatment for pain. Clinical research shows promising results for music's analgesic effect alongside opioids, but there is limited research on how music interacts with opioids in mice. This study aims to address that gap by replicating music's effect on nociception, exploring its interaction with morphine's antinociceptive effect, and developing a model for further research. 48 C57BL/6J mice were divided into three groups: music (recording of a tambura), white

noise, and ambient noise control. Each group had 16 mice (8 male and 8 female) housed four per cage. They received their respective sound treatments for 30 minutes daily over four days. On day three, anxiety was assessed using an elevated plus maze test (EPM) immediately after sound treatment. On day four, mice received an intraperitoneal injection of either 16 mg/kg morphine or saline before the sound treatment, followed by a hotplate test after sound treatment for thermal pain sensitivity. EPM test results showed no significant effect of sound treatment on anxiety. Hotplate test results indicated a main effect of sound treatment ($p < 0.05$), with a significant difference between white noise and music ($p < 0.05$). The difference between white noise and silence was trending toward significance ($p < 0.06$). Overall, sound treatment did not affect anxiety, and white noise provided greater antinociceptive effects compared to music. Further research will need to be conducted to explore whether white noise also induces an antinociceptive effect when compared to silence.

Mentor: Stephen Boehm

The process of survey development using RedCap

Vianney Gonzalez-Gonzalez, School of Science, Biology, Life and Health Sciences
Using surveys for research

Surveys play a pivotal role in our understanding of patient attitudes toward the end-of-life (EOL) planning. They are an important tool for quantifying human experiences and beliefs. In a clinical setting, surveys enable us to evaluate the most effective treatments and patient preference on most effective practices. In palliative care, surveys are instrumental in ascertaining patient attitudes towards EOL planning, a crucial aspect of our work.
One of the most essential steps in EOL planning is completing advanced care directives. Integrating these documents into the electronic medical records is even more crucial, as it ensures that patient care aligns with their values and wishes. Our recent research study, focusing on patients with Parkinson's (PWP), aims to understand the barriers they face in completing these directives and having them available in medical records, ultimately improving patient care.
Methodology
Our research project is a prospective survey questionnaire that does not collect identifying information or use medical record review. We have developed questions about demographic information to gather, barriers to completing advance care planning and entering it into the EMR, and how likely specific changes in their medical condition would prompt them to complete or change their forms. The research team designed the close-ended questions to be user-friendly, utilizing multiple choice, single answer, and Likert scale. We have used REDCap, a robust and reliable tool for developing surveys, de-identifying data, and downloading data for analysis to collect answers to these questions.

Mentor: Dr. Amber Comer, JD, PhD

Effect of a Music-Based Intervention on Anxiety and Binge Drinking Behaviors in Mice.

Stephanie Gutierrez, Department of Psychology, Social and Behavioral Sciences

Alcohol Use Disorder (AUD) is a chronic disease in which individuals engage in persistent alcohol drinking despite negative social and health problems. This study explored the potential of a music-based intervention to reduce anxiety and binge drinking behaviors. Methods. Twenty C57BL/6J mice were divided into two groups of 5 males and 5 females each, housed in separate rooms, and given one week to acclimate to their respective environments. During weeks 2-4, mice in the first room were exposed to music (six hours per day), consisting of the constant harmonic droning sound of a Tambura. The second group was not allowed music exposure. Open-field behavior (anxiety) was assessed before and after the first week of music exposure. Then, all mice were given two-hour access to a 20% (v/v) alcohol solution in 10 mL ball-bearing sipper tubes, available only during a designated two-hour period each day in weeks 3 and 4. Results. The music-based intervention did not appear to alter anxiety-like behavior in the mice ($p>0.05$). However, there was modest evidence that the music-based intervention reduced binge-like alcohol drinking in mice ($p<0.05$). These results may suggest that music-based intervention strategies may serve as a therapeutic approach for individuals diagnosed with AUD. However, the experiment will need to be repeated to achieve sufficient statistical power to determine whether the music-based intervention effects depended on sex. Future studies will aim to replicate and expand these findings to further explore the behavioral and neurological effects of music-based interventions.

Mentor: Stephen L. Bohem

Adolescent social isolation increases alcohol self-administration in adulthood

Daniella Hagans, School of Science, Psychology and Neuroscience, Life and Health Sciences

Adolescent social isolation can negatively affect the behavior and health in adulthood, increasing the risk of developing psychopathologies such as anxiety, depression, and alcohol use disorders (AUDs). In the past, studies have shown in rats that females are more vulnerable than the males to adolescent stressors. The purpose of this research is to test how the parvalbumin interneurons in the amygdala contribute to stress-like symptoms that develop into psychological disorders in humans and to also see their impact on alcohol self-administration behaviors. The behavioral methods used in this experiment were social isolation during adolescence as the stressor, operant self-administration of 10% ethanol to test alcohol usage, and open field and social interaction tests to observe social and anxiety-like behaviors. In one cohort, surgeries to express Designer Receptors Exclusively Activated by Designer Drugs (DREADDs) allowed activation of parvalbumin neurons in the basolateral amygdala during alcohol self-administration. A second cohort was run that demonstrated similar behavioral effects of adolescent isolation in a second cohort. Brains from both cohorts are being processed via vibratome slicing to observe possible neuronal structure changes using immunohistochemistry or by western blotting. In the end, this study aims to help us

understand the role that parvalbumin interneurons play, asses sex differences and point towards possible treatments for adolescent stress-related psychopathologies in the future. The results can be used to interpret how social isolation causes psychopathologies in humans and to also aids in understanding the long-term effects of the COVID-19 lockdown.

Mentor: Dr. Marian Logrip

Preliminary Results of Pedagogical and Instructional Evaluation of the Distributed Drug Discovery (D3) Program

Meghan Hamilton, School of Science, Chemistry/Biology, Taylor, Avi. Department of Chemistry, IU-Indianapolis, Physical Sciences

This presentation explores how the Distributed Drug Discovery (D3) program supports students in understanding the multidisciplinary nature of science, developing their sociocultural and philosophical perspectives of science in society, and engaging students in meaningful learning. The D3 program at IUI has undergraduate students participate in the drug discovery process as either undergraduate researchers or students in the Organic Chemistry II teaching laboratory course. Several publications have been produced highlighting the work students do in the D3 program, which focuses on creating novel antimicrobial compounds through solid-phase synthesis to combat neglected diseases. Currently, no scientific literature investigates the instructional or pedagogical effectiveness of the D3 program.
To fill this gap, we are surveying and interviewing undergraduate research and teaching students. We have revised and adapted the Laboratory Course Assessment Survey (LCAS) and Meaningful Learning Laboratory Instrument (MLLI) to characterize the teaching laboratory and describe the extent to which students engaged in meaningful learning. Additionally, semi-structured interviews, designed using the Bildung and Meaningful Learning frameworks, were conducted with the instructors, teaching assistants, undergraduate researchers, and teaching laboratory students. The surveys and interviews are analyzed using descriptive statistics and deductive coding, respectively. Preliminary results of the ongoing research will be discussed, including that students in the teaching laboratory felt less negative about the D3 labs than the traditional labs; however, students reported that the traditional lab structure might engage the cognitive domain more. Furthermore, participation as an undergraduate researcher was cited as a significant factor in the decision to pursue graduate education.

Mentor: Lyniesha Ward

Leveraging a partnership between a local health department and a school of public health to advance health equity, workforce development, and emergency preparedness through shared resources.

Jacob Heintzelman, School of Public Health, master's in public health, Public Health

The Marion County Public Health Department (MCPHD) serves a diverse urban population in Indiana’s capital and has developed a successful partnership with the

Fairbanks School of Public Health (FSPH) at Indiana University Indianapolis (IUI). This collaboration addresses pressing public health challenges such as declining vaccination rates, workforce shortages, and growing social vulnerability. Funded by the state's Health First Indiana (HFI) program, which has expanded public health resources across all Indiana counties, the initiative supports school-based health services to improve long-term outcomes. Research highlights that public health investments yield substantial returns, with up to $14.30 for every dollar spent, and that healthier students achieve better academic and lifelong health outcomes. The HFI School Health program aims to increase access to services like vision, hearing, and dental screenings while promoting wellness policies and strategies that reduce youth risk behaviors and support development into adulthood. Through school-based vaccination clinics, emergency preparedness training, and community-driven wellness initiatives, the program addresses health inequities and workforce needs. FSPH students actively participate in these efforts, gaining practical experience while enhancing MCPHD's capacity to serve underserved populations. This collaboration exemplifies the power of academic-public health partnerships to strengthen health systems, advance equity, and train the next generation of public health professionals. Programs like the K-12 School Health Liaison initiative and trainings in CPR/AED, Stop the Bleed, and Harm Reduction are making a tangible impact on public health in Marion County. Together, MCPHD and FSPH are creating a healthier and more resilient community for all residents.

Mentor: Shanda Eickelberger

The Affinity Vitamin E for Membrane Lipids

Janice Hsu, School of Science, Physics , Physical Sciences

Vitamin E is an essential micronutrient that protects polyunsaturated lipids in cell membranes from oxidation. The aim of this research project is to investigate whether vitamin E preferentially co-localizes with polyunsaturated lipids to optimize the protection. Here we present a report on our progress on developing a method to measure the relative binding affinity of vitamin E for different lipids. The experimental approach involves incubating donor vesicles containing a control lipid and vitamin E with acceptor vesicles composed of another lipid. The distribution of vitamin E between acceptor and donor vesicles following incubation, indicating its affinity for different lipids, will be determined through fluorescence polarization measurements on a fluorescent probe incorporated in the acceptor vesicles. We began with cholesterol instead of vitamin E, leveraging existing research that shows cholesterol has poor affinity for polyunsaturated lipids. These experiments demonstrate that we can observe the exchange of cholesterol between vehicles and confirm that cholesterol has less affinity for more unsaturated lipids. Initial experiments establish that the same method may be applied to observe the exchange of vitamin E between vesicles and potentially determine differences in the affinity of vitamin E for different lipids.

Mentor: Stephen Wassall (Mentor)

Gender Differences in Mental Health Profiles among Formerly Incarcerated Older Adults

Zdenka Hulak, School of Science, Furman, Sydney Lynn. Department of Psychology, IU Indianapolis, Social and Behavioral Sciences

Previous research has documented mental health disparities among people who have experienced incarceration. More recently, researchers have considered the unique mental health profiles of women and men who have been incarcerated. However, most of the research to date has focused on younger and midlife samples, which neglects the mental health of formerly incarcerated older adults. The objective of this research is to understand gender differences in mental profiles among formerly incarcerated older adults. Using data from the Health and Retirement Study (HRS), which is a nationally representative sample of Americans aged 50 and older, we examine differences in depressive symptoms, anxiety, loneliness, substance use, and diagnosed psychological conditions by incarceration status and gender. Bivariate tests of statistical significance were used to examine differences for each psychological attribute. In the full sample (n=13,813), formerly incarcerated older adults had more depressive symptoms, anxiety, loneliness, substance use, and diagnosed conditions than those who had not been incarcerated. Among formerly incarcerated older adults (n=997), women had more depressive symptoms, anxiety, higher rates of currently smoking and diagnosed psychological conditions. Formerly incarcerated men reported drinking more alcoholic beverages per week. Both groups reported similar levels of loneliness. Taken together, former incarceration is a vital area of study because mental health and incarceration are often taboo topics, which can lead to a lack of information. This research also underscores the importance of re-entry programs tailored to the unique experiences of men and women, and the need for continued support throughout the life course.

Mentor: Kenzie Mintus

Marketing Battle of Basketball at IU Indy

Nathanael Jeffries, School of Health and Human Sciences, Dell, Emma. School of Health and Human Sciences, IU-Indy
Warbritton, Kennedy. School of Health and Human Sciences, IU-Indy
Linville, Matt. School of Health and Human Sciences, IU-Indy, Business

The IU Indianapolis men’s basketball team has faced challenges in its marketing efforts, but recent developments highlight the potential for significant growth. Events like the bus fire demonstrate the power of media attention in shaping the team and university's brand image. By amplifying marketing efforts both on and off campus, and leveraging major social media platforms, IU Indianapolis can elevate its visibility and stand out within the Horizon League. Research conducted through extensive student surveys reveals both the team's current flaws and untapped potential. With increased marketing initiatives, such as the new athletic facility, throwback jerseys, and student giveaways, IU Indianapolis is capable of further building momentum and improving its stature, shifting perceptions, and gaining more support.

Mentor: Soonhwan Lee

Inside and Outside: The Transcendent, Boundaries, and the Trouble with Spaces

Deisha Johnson, School of Art and Design, Art History, Arts and Humanities

“Outsider art” is a term that was developed within gallery spaces during the 1970s. Outsider art as a category has often been plagued by the issue of balancing the work of artists, who often belong to vulnerable demographics like the mentally ill, and the dissemination of respectful thought surrounding their work. In this paper I compare and contrast the works of the two outsider artists, Oswald Tschirtner and Annie Hooper, and their subject matter, methods of creation, and interaction with the formal art world. In “Inside and Outside: The Transcendent, Boundaries, and the Trouble with Spaces”, I base my understanding of mental illness on Michel Foucault’s work “Madness and Civilization” [1961]. These theories show how mental illness interacts with art in both the sense of adding therapeutic value to the creators and how it adds monetary or social value for galleries. I analyze the way these gallery spaces can help or harm our understanding of art based on the dynamics of display practices. The goal of this paper aims to reexamine practices of how to utilize gallery spaces without fetishizing the artist.

Mentor: Orna Tsultem

Harnessing the Sun: Artwork Throughout History

Nicholas Johnson, Herron School of Art, Art History, Arts and Humanities

Throughout history, humanity’s relationship with the sun has been immortalized through art, architecture, and spirituality. This paper explores three monumental works—Stonehenge, Chichen Itza’s Castillo, and James Turrell’s Roden Crater Project—that exemplify how different cultures have harnessed the sun’s power to create awe-inspiring, celestial experiences. From the Neolithic ceremonial rituals at Stonehenge to the Mayan civilization’s precise astronomical alignments at The Castillo, and finally, to Turrell’s contemporary exploration of light and space, these structures reveal a shared desire to connect with the cosmos. By examining their design and purpose, this paper highlights how the sun continues to inspire both ancient and modern expressions of human creativity and spirituality.

Mentor: Uranchimeg Tsultem

Blowflies, Biodiversity, and Better Scientists: Enhancing Genetics Education Through Guided Inquiry

Tiara Jones, School of Science, Biology, Education

This study investigates the role of guided inquiry in undergraduate genetics laboratory courses through the integration of the blowflies as ecological monitors lab, as a practical assessment of experimental design. By employing a guided-inquiry approach, students engage in authentic research experiences that enhance scientific reasoning, collaboration, and the practical application of genetic techniques. The laboratory module utilizes the natural behaviors of blowflies to collect DNA from various organisms, offering a cost-effective and innovative approach to biodiversity assessment. Pre- and post-course surveys indicate significant improvements in students' confidence in experimental design and data collection, with a notable impact from the blowfly lab. Furthermore, the analysis of students' experimental designs using the TIED rubric (Killpack & Fulmer, 2018) demonstrates a statistically significant improvement from their initial experiments in the "Mystery Yeast Lab" (M=12.45/20, D- average) to their work in the "Blowflies as Ecological Monitors Practical" (M=17.27/20, B average, p=0.0023). These findings suggest that incorporating guided-inquiry practices within laboratory courses fosters deeper learning and better prepares students for future scientific endeavors.

Mentor: Patrick Gentry

Understanding Maya Women's Social Status Through Visual Representation

Bailey Jones, Herron School of Art + Design, Art History, Arts and Humanities

During the 7th century, women played varying roles throughout the world. In Greece, the art reflects that women had a home-centered lifestyle, rarely able to leave home alone. The women of Rome were sexualised through sculpture and were depicted for political agendas. In China, the Tang Dynasty had its first and last female emperor. However, Mesoamerican women in Maya sites like Palenque, Calakmul, and Yaxchilan had a higher social status. They were visually represented in art, having official duties involving the military and outside the house. Maya lintels recorded the duty of a queen, tablets showed women having roles within coordination ceremonies, and murals displayed in public places emphasized women of a higher class. Analyzing clothing, social distinction, visual narratives, and women's duty seen through art conveys their status within their community, proving that Maya women had more rights and opportunities than other 7th-century women around the world.

Mentor: Uranchimeg Tsultem

Latine teen racial-ethnic discrimination and mood and anxiety: The role of parental practices, communication, and conflict

Haleigh Kampman, PhD in Health Policy and Management, Social and Behavioral Sciences

Introduction:
Latine adolescents in the U.S. frequently encounter racial-ethnic discrimination and is frequently associated with poor mental health outcomes. Family dynamics - particularly parental practices, communication, and conflict - may serve as protective or exacerbating factors. This study examines whether positive family functioning moderates the relationship between racial-ethnic discrimination and teen anxiety, mood, and behavioral health.

Methods:
Data were used from dyads of Latine teens and their caregivers. Teens self-reported racial-ethnic discrimination experiences using the Everyday Discrimination Scale. Mental health was assessed via the GAD-7 (anxiety), Strengths and Difficulties Questionnaire (SDQ), and Mood and Feelings Questionnaire (MFQ), reported by both teens and caregivers. Parental practices, communication, and conflict were assessed using a 17-item scale, reported separately by teens and caregivers. Regression analyses will be used to test the association between teen-reported discrimination and mental health outcomes. We will also examine whether family functioning buffers the relationship between discrimination and mental health.

Results:
We anticipate finding that positive parental practices and communication, and less family conflict, as reported by both teens and caregivers moderate the relationship between discrimination and poor mental health.

Discussion:
This research highlights the important role that parental practices, communication, and family conflict have in mitigating the mental health impact of discrimination. Interventions that enhance caregiver-teen communication while providing mechanisms to reduce conflict may help reduce the negative effects of racial-ethnic discrimination among Latine youth.

Mentor: Natalie Guerrero

Hope as a Predictor of Physical Activity Behavior in Older Adults with Musculoskeletal Pain

Renee Kessler, Health and Human Sciences, Social and Behavioral Sciences

Musculoskeletal pain is a barrier to physical activity (PA), enhancing functional decline in older adults. Thus, identifying psychological factors that promote PA in older adults with musculoskeletal pain is warranted. Prior research shows the psychological construct of hope predicts the frequency of exercise in healthy younger adults. However, the impact of hope on PA behavior in older adults with musculoskeletal pain is unknown. This observational study was designed to determine whether hope predicted self-reported and objective PA levels in older adults with musculoskeletal pain. Fifty-two older adults (age range 55-84 years) completed all assessments. Participants completed questionnaires to assess hope (Adult Hope Scale), self-reported PA (PA Scale for the Elderly), bodily pain (SF-36), kinesiophobia (Tampa Scale of Kinesiophobia), and pain catastrophizing (Pain Catastrophizing Scale). Participants also wore accelerometers on

the hip for one week to objectively measure PA levels. Correlations were conducted to determine relationships between variables. Hierarchical regressions were conducted to determine whether hope predicted self-reported and objective PA levels after controlling for relevant demographics, pain, and other psychological variables. After controlling for bodily pain, hope significantly predicted self-reported PA and was associated with greater PA levels. Bodily pain, but not Hope, significantly predicted average daily steps derived from the accelerometer. Lower bodily pain was associated with more daily steps. Clarifying the role of hope in the PA behavior of older adults could present a novel target for intervention.

Mentor: Dr. Kelly Naugle

Impact of FGF variants on voltage-gated sodium channel protein properties

Havva Koksal, School of Science, Biology, Life and Health Sciences

Voltage-gated sodium channels are integral membranes that are responsible for starting and triggering action potentials in nerve and muscle cells. The channels are encompassed by an alpha subunit and accessory subunits. These include beta subunits and an array of other proteins such as fibroblast growth factors (FGFs). Several FGFs have been found to be critical sodium channel regulators that are able to regulate the kinetic parameters of the channel's function and location, especially the voltage dependence of inactivation and long-term inactivation in response to repetitive stimulation. Genetic variants in FGFs have been identified in patients with epilepsy and other neurological disorders. We hypothesize that the S8P variant in FGF12 and L43V variant in FGF13, will be located in regions that interact with the sodium channel protein and will alter long-term inactivation. Using the alpha fold 3 program, mutants on different proteins that have not been crystallized together can be observed to see if they might alter the protein-protein interaction. We looked at both the S8P and L43V mutants to see the interaction between the sodium channel and the FGF variants. We use site-directed mutagenesis to introduce the variants into the FGF proteins and study their impact on sodium channel function using patch-clamp electrophysiology. Our modeling will serve to explain the S8P and L43V variants on sodium channel properties and how they may potentially contribute to the pathophysiology of neurological disorders.

Mentor: Theodore Cummins

Novel approaches to suppressing hypersecretion and protecting β-cell function for type 2 diabetes

Rachel Kuntz, School of Science, Biology, Social and Behavioral Sciences

Glucose-stimulated insulin release by pancreatic β-cells is dysfunctional in both type 2 diabetes (T2D) and congenital hyperinsulinism (HI). In pre-T2D, β-cells have elevated insulin production to combat peripheral insulin resistance. Conversely, in HI, genetic

mutations cause β-cells to release insulin inappropriately, leading to hypoglycemia. Insulin hypersecretion in these conditions triggers a stress response, ultimately leading to β-cell failure. One approach to selectively target β-cells is to use the glucagon-like peptide 1 (GLP1) receptor, whose activation enhances insulin secretion and β-cell survival under stress. Additionally, inhibiting Ca2+ influx can prevent insulin release and protect β-cells from stress. We hypothesize that GLP1 signaling and Ca2+ influx inhibition can be used to synergistically suppress β-cell function while promoting long-term β-cell health. To identify new biology and therapeutic avenues, we studied insulin hypersecretion using human islets and mouse MIN6 β-cells modified to secrete a luciferase-linked insulin as a proxy reporter for insulin secretion. In control conditions, GLP1 enhanced insulin secretion as expected, nifedipine suppressed insulin secretion due to its inhibition of Ca2+ influx, and avexitide suppressed insulin secretion due to blocking the GLP1 receptor. We plan to expand our studies on the combinations of drugs directed to β-cells to determine their ability to preserve β-cell function and health, as well as synergistic properties associated with inhibiting Ca2+ influx. The conjugation of drugs like nifedipine to GLP1 could also improve its delivery to β-cells. We anticipate creating a method of drug delivery that could lead to innovations in therapeutic treatments for both HI and T2D.

Mentor: Michael Kalwat

Comparative Study of Hydride and Oxygen Transfer Mechanisms in Molybdenum Cofactor-Containing Periplasmic Nitrate Reductases

Madison Lisenko, School of Science, Chemistry, Physical Sciences

The periplasmic nitrate reductase (Nap) complex in Campylobacter jejuni catalyzes nitrate reduction via its catalytic subunit, NapA, which contains a molybdenum cofactor (Moco) active site and an iron-sulfur cluster. In the DMSO reductase family, bulky amino acids near the Mo center are often involved in catalysis and active site stability. Conserved tyrosine residues have been hypothesized to confer substrate preference toward S-oxides, potentially explaining the divergence between DMSO reductase and NapA. This study examines conserved NapA residues involved in redox reactions and their impact on Moco reactivity. Several NapA variants were overexpressed and kinetically analyzed with various substrates. The typical reaction pathway of the DMSOR enzymes involves oxygen atom transfer, but activity of NapA variants with N-/S- oxides was nearly abolished, indicating the residues are an integral part of catalysis and substrate preference. To analyze this, the H175D mutation is introduced near the active site and is suggested to impact oxygen atom transfers. Emphasis on the role of histidine is studied due to its catalytic significance. Further studies utilized dimethyl sulfoxide (DMSO) as a substrate to investigate charge-related effects on substrate affinity. Additionally, selenocysteine (Sec), the 21st amino acid, is proposed to enhance catalytic rate due to the lower pKa and higher nucleophilic activity. Since C176 acts as the coordinating cysteine, NapA variant C176U is utilized to investigate the effects of Sec and its impact on substrate preference. Steady-state kinetic assays were performed to characterize the functional impact of these NapA variants, to examine the mechanistic roles of conserved residues.

Mentor: Partha Basu

Impact of Habitat Restoration on Invertebrate Biodiversity

Addison Lopian, School of Science, Biology, Stephenson, Melanie. Department of Biology, IU-Indianapolis
McClanahan, Jack. Department of Biology, IU-Indianapolis
Hoppes, Avery. Department of Biology, IU-Indianapolis, Life and Health Sciences

Earth's biodiversity promotes healthy ecosystems, adequate food supplies, clean water and air, and ultimately, a habitable planet. We are currently facing a biodiversity crisis, and habitat degradation is a significant cause. Our community partner, Keep Indianapolis Beautiful (KIB), is a local non-profit that restores habitats by removing invasive and re-introducing native vegetation. Restoring degraded habitats offers a way to help curb the effects of biodiversity loss. The objective of this research is to determine how restoration efforts are affecting biodiversity, with a focus on terrestrial and aerial invertebrates. This is an ongoing project with data collection from fall 2023 to fall 2024. To carry out this research, we collected invertebrates at two restored (treatment) sites, and two unrestored (control) sites at Riverside Park (RP) in downtown Indianapolis. We used pitfall traps and sticky traps, two standardized collection methods, and identified our specimens to Family-level for this analysis. To evaluate biodiversity, we estimated species richness and abundance then used the data to calculate the Shannon diversity index for each site, using data from an entire year to assess temporal trends. Our results show that biodiversity is higher in restored sites than non-restored sites at Riverside Park. Our data suggests that KIB's restoration efforts are having an impact, and that restoring and maintaining native habitats improves local ecosystems. We plan to continue sampling RP to see if biodiversity continues to increase, sample new sites to see if the pattern holds outside RP, and begin individual projects focused on Araneae, Odonates, fungi, and Lepidoptera.

Mentor: Forrest Brem

Recruitment Strategies and Preliminary for A Community Based Research Project among Black/African American Adults aged 45 years or older

Yvonne Lu, School of Nursing, Presenter, Dane Ceniza, Undergraduate student (as mentee), School of Nursing, IU-Indianapolis
Co-Presenter, Nenettee Jessup, Project Manager, School of Nursing, IU-Indianapolis
Social and Behavioral Sciences

In the United States, Black/African Americans are significantly underrepresented in brain health and Alzheimer's Disease and (AD) Related Dementia (ADRD) research. Despite the greater incidence of diagnosis, their participation lacks in clinical trial studies. We developed and designed a CARE Platform, or, smart phone application, called Lola, to increase brain health, improve ADRD health literacy, and research engagement among Black/African Americans aged 45 years or older in central and northwest regions of Indiana. The goal of this abstract is to (1) describe the recruitment and retention strategies, challenges and successes encountered in the implementation of a one-month Pilot study and (2) report preliminary recruitment data. Since December 2024, a total of 8 strategies for recruitment and retention have been implemented and as of April 2025,

285 potential participants have expressed interest in the study. The project is ongoing until August 2025. The Lola App is designed to be self-accessed for one-month and was adapted with assistance from local community stakeholders and advisory boards. All data storage and collection are captured in REDCap, a web-based, HIPAA-compliant platform. This community-based research project is intended to promote brain health knowledge and engagement in clinical ADRD studies among Black/African Americans 45 years and older to better serve these vulnerable populations.

Mentor: Mentee: Dane Ceniza (Undergraduate student, IU School of Nursing)

Assessing Contributors to Lead Exposure and Prevalence in Residential Environments

Sal Mahoney, School of Science, Geology, Physical Sciences

Lead (Pb) poses a significant environmental health due to its unique bioaccumulative and toxic properties. Numerous studies have addressed health risks in relation to total lead concentration; however, often, there are no warnings of what may be concentrated with lead other than old paint and lead gasoline. This study aims to bring awareness to the dangers that may be present inside an individual's home, whether that be lead lined pipes, gutters, furnace filters, or even old furniture. Using an X-Ray Fluorescence machine, dust and soil samples from Indianapolis community members were received and analyzed for heavy metals—most notably lead. Data hypothesizes that certain community members may be at higher risk of exposure to lead due to area-specific circumstances such as previous lead leaks on a large area of properties that were then sold. Other community members may be at risk due to internal factors such as vintage furniture, specific brands of furnace filters, or old gutters. Differentiating the potential dangers and qualifying them is essential to the community's right to knowledge and information. Believing that the suburbs are safe because they're far from an old smelting accident is much less informed than knowing that your air may be contaminated due to the filters in your vents or furnaces.

Mentor: Angela Herrmann

Investigating the Role of KLF10 in Cancer associated Cachexia Using the Tamoxifen-Inducible ACTA-Cre Model

Harry Mann, School of Science, Chemistry, Life and Health Sciences

Cancer associated cachexia, a syndrome characterized by involuntary loss of body weight which entails muscle wasting, affects up to 80% of pancreatic cancer patients and significantly reduces treatment efficacy and survival rates. While the TGF-β signaling pathway has been implicated in muscle atrophy, clinical trials targeting this pathway have been unsuccessful. Recent studies suggest that Krüppel-like factor 10 (KLF10), a transcription factor induced by TGF-β, plays a critical role in muscle

degradation. To investigate this, we utilize a tamoxifen-inducible ACTA1-Cre/Esr1 (ACTA-Cre) model to induce skeletal muscle-specific deletion of KLF10 at various stages of muscle wasting in tumor-bearing mice. This approach allows for temporal control of gene deletion, providing insights into whether KLF10 is necessary for the initiation or progression of muscle atrophy. By analyzing relative lean mass, atrophy-associated gene expression, and downstream signaling pathways, this study aims to determine the therapeutic potential of targeting KLF10 in pancreatic cancer-associated cachexia.

Mentor: Dr. Jason Doles

A Case Study of Probable Craniofacial Microsomia from the Indianapolis Greenlawn Cemetery

Emily Massa, School of Science, Biology, Arts and Humanities

Craniofacial microsomia (CFM) is the second most common congenital condition affecting the face and characterized by underdevelopment of the facial structures, especially the jaw, ear, cheeks, and eyes. Although well documented in modern clinical contexts, its identification in skeletal remains presents a unique challenge due to variable preservation and the difficulty of distinguishing it from similar conditions. This presentation analyzes a potential case of bilateral CFM and explores skeletal markers associated with CFM in bioarchaeological contexts. Burial 186 from the Greenlawn Cemetery exhibits abnormal facial bone development and auditory exocytosis, as well as related side effects like cubitus valgus, vertebral malformation, and non-facial asymmetry. The goal is to distinguish this case of CFM from other craniofacial pathologies and congenital conditions. Furthermore, these findings contribute to broader discussions in paleopathology by improving the recognition and diagnostic criteria for congenital anomalies in the skeletal record, as well as enhancing our understanding of their genetic, environmental, and developmental influences.

Mentor: Jeremy Wilson

The Ongoing Fight for Women's Rights

Bailey McKendry, Art History, Arts and Humanities

Emerging in the 1960s, the Feminist Art Movement sought to challenge male dominance in the art world and advocate for gender equality. Historically, women artists struggled for visibility, with their work often dismissed or excluded from major exhibitions. This movement provided a platform for women to voice their frustrations and assert their identities through diverse artistic mediums. Figures such as Judy Chicago, Barbara Kruger, and Carolee Schneemann used their art to critique societal expectations and redefine women’s roles. Protests at major institutions such as the Museum of Modern Art (MoMA) and the Whitney challenged institutional biases, sparking dialogue on representation, power, and autonomy. Feminist art remains an evolving force, continuously responding to shifting landscapes of rights and recognition. This analysis explores its ongoing impact not as a relic of the past, but as a continuing fight for equity, resistance, and redefinition.

Mentor: Orna Tsultem

Photovoice Methodology in Resilience Studies: A Systematic Review

Helen McKinney, O'Neill School of Public and Environmental Affairs, Public Policy, Public and Environmental Affairs

As resilience has become a popular research topic for its public policy implications across a plethora of focus areas, researchers have used various methodologies to study the concept. Photovoice, a community based participatory research (CBPR) method that calls on participants to identify community assets and concerns through photography, find solutions through facilitated dialogue, and advocate to policy makers, has been used so that participants have a voice in communicating their individual and community level of risk in order to build resilience to a host of hazards. This systematic literature review investigates how Photovoice has been used to study resilience. By conducting a systematic search from four influential and broad databases: Academic Search Complete by EBSCO, ProQuest Central, Scopus, and Web of Science; this review captures a view of how resilience researchers have used Photovoice. This research provides a greater understanding of how Photovoice can be used, the potential for it as methodology for studying resilience, and how the methodology can be used in the policy making process.

Mentor: Courtney Page-Tan

Effect of Lavender Essential Oil and Calcium Chloride on Bacterial Growth in Thermoplastic Starch Films

Andie Meyer, School of Science, Chemistry, Physical Sciences

Thermoplastic starch (TPS) is a promising compostable alternative to petroleum-based plastics, particularly for single-use applications. However, due to its starch content, TPS is inherently prone to bacterial growth, which limits its practical use in applications such as food packaging. This study investigates the addition of antibacterial agents, namely, lavender essential oil and calcium chloride. The TPS formulation used in this study includes potato starch, glycerol as a plasticizer, deionized (DI) water as a solvent, and acetic acid from white vinegar as a catalyst. The TPS was prepared in a biosafety cabinet to ensure that no contamination occurred. Antibacterial activity was tested using agar diffusion with E. coli incubated in an oven at 37°C for 24 hours to measure the zone of inhibition. The samples tested included pure TPS, TPS with calcium chloride, TPS with lavender essential oil, and pure lavender essential oil. Controls of a positive control of an antibody and a negative control of a plastic bag were used. Controls of a positive control of an antibody and a negative control of a polyethylene plastic bag film were used. Consistent with prior findings, TPS films exhibited substantial bacterial growth when compared to the plastic bag film, attributed to the starch content. While pure lavender essential oil demonstrated antibacterial properties, its effect diminished when incorporated into TPS. All samples with TPS exhibited bacteria growth. Despite working in a sterilized environment, significant bacteria growth was present on TPS, suggesting

contamination occurred. These findings highlight the need for further optimization for safe use in food packaging and other applications.

Mentor: Amanda Seigel and Mangilal Agarwel

Assessing the Risk Factors of Heart Disease Among University Students: A Case Study at Indiana University

Jamila Mohammed, School of health and sciences, Life and Health Sciences

Introduction. Heart disease remains a significant public health concern, with lifestyle choices playing a crucial role in its development. College students, often facing unique pressures, frequently engage in unhealthy behaviors such as poor dietary choices, insufficient physical activity, and inadequate sleep, all of which may elevate their risk for cardiovascular issues. This study investigates the impact of these lifestyle factors on full-time students at Indiana University-Indianapolis.
Methods. Participants were recruited during various wellness events at IU, including the "Know Your Status" event, where they underwent blood pressure screenings and completed lifestyle surveys assessing their dietary habits, physical activity levels, smoking behaviors, and sleep patterns.
Results. The sample shows that many students had higher-than-normal blood pressure, weren't getting enough exercise, and had poor eating habits. A lot of them also weren't sleeping as much as they should, which can impact heart health. Recent data is currently being analyzed via surveys for their healthy eating and physical activity levels and quality of sleep.

Discussion. Preliminary findings indicate that a large portion of students had elevated blood pressure levels, reported low levels of physical activity, and demonstrated poor dietary habits. Additionally, many participants acknowledged insufficient sleep duration, which is known to adversely affect heart health. These results support the need for campus health initiatives, such as nutrition workshops, structured exercise programs, and sleep awareness programs. By equipping students with the knowledge and tools to adopt healthier lifestyles, we may significantly reduce their risk of developing heart disease in the future.

Mentor: Navin Kaushal

Investigation of the influence of inter-subunit interaction among E. coli NapA and NapB on the catalytic efficiency of NapAB complex

Chanakarn Mongkonpruthangkoon, School of Science, Chemistry, Life and Health Sciences

Periplasmic nitrate reductase (Nap) is a nitrate-reducing enzyme that is prevalent in pseudomonadota (previously known as proteobacteria). Nap is suspected to play a role in the survival of pseudomonadota, yet the formation, function, and mechanistic

pathways of Nap enzymes in certain species of pseudomonadota, such as E. coli, are relatively uncharacterized. Determining the dissociation constants (KD) of the E. coli Nap enzyme complex and the rate of nitrate reduction in different molecular environments like pH levels and salt concentrations can give an insight into how environmental factors affect the survival of these bacteria. It is hypothesized that the varying pH levels and salt concentrations will affect the rate of enzyme activity and KD. To test this hypothesis, NapA and NapB, which are subunits of the Nap enzyme complex were purified, and the nitrate reductase activity was measured spectrophotometrically. The initial results indicated that the efficiency of nitrate reduction is influenced by pH. This information can be used to further understand the formation of the Nap enzyme complex and the mechanistic pathway of nitrate reduction via the Nap enzymes in pseudomonadota.

Mentor: Partha Basu

BOC Deprotection Using Formic Acid

Alexander Morris, School of Science, Chemistry, Physical Sciences

Distributed Drug Discovery (D3) is an educational research lab that produces small-molecule peptides to develop new potential inhibitors for the SARS-CoV-2 (COVID-19) main proteolytic enzyme (Mpro). Inhibition of this enzyme prevents further replication of the virus during a COVID-19 infection. The compounds previously produced in this lab contained a capping group on the N-terminus; however the group has extended this to molecules with an uncapped, free-amine at the N-terminus. In a collaboration with Jacob Durrant from the University of Pittsburgh, D3 has taken on several molecules using Dr. Durrant's modeling software, "DeepFrag", which predicts biological inhibition of Mpro. Some targeted molecules from DeepFrag feature a free primary amine. The precursor BOC protected amines had been prepared, but traditional methods of removing the BOC group have proven unsatisfactory. A serendipitous observation led to the use of an uncommon method of BOC removal using formic acid.

Mentor: Dr. Jack Geno Samaritoni and Dr. Bill Scott

Streamlining Genetic Data Analysis with AI and Python

Hannah Morrison, School of Science, Biology, Computational Biology/Genetics

With the assistance of AI, this research project aims to use the Python coding language within Visual Studio Code to efficiently obtain genetic data from across multiple databases for visualization purposes. Starting broad with a reference SNP number (rsID), the nearest upstream and downstream genes were retrieved. From these genes, ENS IDs were obtained, therefore enabling further investigation of phenotypic data, gene ontology (GO) terms, Variant Effect Predictor (VEP) scores, and allele frequencies. This data allows for convenient collection of information, with only rsIDs necessary. This output was originally in multiple .CSV files and was further consolidated into one .CSV file containing all the data. As a result of this project, biology researchers will have the option to easily utilize a variety of data to expedite their own work within the field.

Mentor: Ryan Eller

Behavioral and Developmental Effects of Lead Acetate Exposure in Embryonic Zebrafish

Lillianna Myers, School of Science, Biology, Barr, Hayley. Department of Biology, IU-Indianapolis
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Lead toxicity may threaten early development and behavior in aquatic organisms. Zebrafish (Danio rerio) were used to investigate the effects of lead acetate exposure on neural development, behavior, and gut morphology. Embryos were exposed to 0.4 µg/mL lead acetate, with and without calcium supplementation, between 6- and 48-hours post-fertilization (hpf). Various behavioral assays were conducted at 3- and 7-days post-fertilization (dpf). In the novel tank test, lead-treated fish exhibited increased anxiety-like behaviors, such as bottom dwelling and freezing. Calcium co-treatment partially reduced these effects. In light/dark locomotion and optomotor assays, lead exposure was associated with decreased activity and impaired visual-motor response. Circle swimming behavior, a potential marker for photosensitive seizures, was more frequent during light cycles in lead-treated larvae. Thigmotaxis assays revealed enhanced peripheral swimming, consistent with heightened anxiety.

Additionally, lead disrupted swim bladder inflation and coordinated swimming ability. Histological analysis using E-cadherin and ZO-1 markers revealed altered gut morphology in lead-exposed fish, while calcium appeared to preserve structural integrity. These findings support a role for lead in disrupting the gut-brain axis, potentially through microbial or epithelial changes. Future work will assess gut microbiota composition to determine correlations between microbial shifts, gut morphology, and behavioral abnormalities.

Mentor: Dr. James Marrs

Formulation development for Apurinic/apyrimidinic endonuclease 1/redox effector factor 1 (APE1/Ref-1) inhibitors for enhanced oral bioavailability

Mansi Nayak, School of Science, Biology, Life and Health Sciences

APE1/Ref-1 is a multifunctional protein that plays a dual role in DNA base excision repair and redox regulation of transcription factors. While critical for normal cellular function, APE1/Ref-1 is frequently overexpressed in aggressive cancers such as pancreatic, breast, and prostate cancers, correlating with poor prognosis. Pancreatic ductal adenocarcinoma (PDAC) remains especially challenging, with a five-year survival rate of approximately 12.5%, largely due to late-stage diagnosis and aggressive tumor biology. Although surgical resection offers the best chance for long-term survival, only 20% of patients are eligible at diagnosis.

Approximately 40% of new chemical entities and 65% of oral anticancer drugs are poorly water-soluble, leading to reduced bioavailability and therapeutic efficacy. Our laboratory has developed several naphthoquinone-based APE1/Ref-1 inhibitors and demonstrated their efficacy in both in vitro and in vivo PDAC models. However, the poor aqueous solubility of these compounds limits their gastrointestinal absorption, necessitating higher doses which could result in adverse reactions.

To address this, we have formulated these compounds using FDA-approved excipients and principles derived from amorphous solid dispersions and self-emulsifying drug delivery systems—approaches successfully applied to over 50 marketed drugs. Our formulations have shown enhanced solubility and were well tolerated in experimental animals. Currently, we are conducting short-term stability studies in 0.1N NaOH, HCl, PBS, and water, and are preparing to evaluate the pharmacokinetics and therapeutic performance of these novel formulations in mice under IACUC-approved protocols.

Mentor: Mark Kelley; Sudip Das

Polarization of Polyvinylidene fluoride effect on dominant electronic-state of [CO(sq)(cat)(3-tpp) _2]

Jackson Oles, School of Science, Physics, Physical Sciences

In the field of spintronics a spin-crossover material is a material where there exist two electronic states with distinct properties. Ideally the material can be freely manipulated to switch between these two states via some change in external parameters. Research has demonstrated that some spin-crossover molecules can be switched between electronic-states by adsorbing a thin-film of fluoropolymer Polyvinylidene fluoride (PVDF), then applying an external electric field. Varying the polarity of this electric field can induce electronic-state changes. This research investigated the effect of PVDF layer-location with respect to electrode and polarization time on electronic-state switching.

Mentor: Joseph Soruco

Capturing 20 years of using YouTube in Chemistry Education

Colin Owens, School of Science, Chemistry, Physical Sciences

While the YouTube platform is well-known for entertainment, it also has hundreds of millions of educational videos. These videos play a role in chemistry education, given the visual nature of the discipline. Students pursue YouTube when they require new modes of representation to grasp abstract concepts. Instructors use YouTube to supplement their instruction with demonstrations that may not be possible in the classroom. With the recent 20th anniversary of YouTube, we present a systematic literature review across two prominent chemistry education journals to characterize how YouTube has been leveraged, including research on its efficacy. Over 200 publications were identified as being relevant to this study. Of these, 163 publications discussed using YouTube as part of a chemistry course (classroom or laboratory), and more than half leveraged YouTube to replace a normal activity or function of said course. Moreover, the magnitude of publications describing course practices with YouTube outpaced research articles about YouTube videos by twofold, with very few manuscripts evaluating the content or quality of videos. Our findings cement YouTube's prominent role in chemistry education and identify a lack of substantial research to validate YouTube's accuracy and efficacy in the classroom, providing implications for students, instructors, and content makers.

Mentor: Lyniesha Ward

"Bridging Communities and Research: The Role of Community Research Assistants in Urban Field-Based Inquiry"

Bhavana Parupalli, Luddy school of informatics & Computing / Bioinformatics, Social and Behavioral Sciences

Abstract: - In recent community-engaged research, the role of Community Research Assistants has become increasingly vital in facilitating qualitative inquiry and immersive field engagement to understand the lived realities of urban populations. As part of the Urban Field Camp at the Department of Earth and Environmental Sciences, School of Science, IU Indianapolis, the Community Research Assistant plays a central role in collecting rich qualitative data through structured and semi-structured interviews with residents, stakeholders, and local organizations. Through active participation in community events and efforts to build trusted relationships, this role supports a deeper understanding of social dynamics, environmental challenges, and the social determinants of health that shape urban life. Community Research Assistants contribute to capturing nuanced insights that are often missed in more traditional forms of research. Their field-based methods, grounded in ethical research practices, participatory observation, and thematic analysis, serve as a foundation for identifying recurring patterns and amplifying community voices. The findings help inform more inclusive and responsive urban development strategies, rooted in the real-life experiences of residents. By bridging academic research with community needs, this role strengthens the relevance and impact of urban studies, making it a vital component of research aimed at fostering sustainable and equitable cities.

Mentor: Samuel C. Nyarko

PGI2 signaling inhibits IgE production from B cells in Allergy and Asthma

Rahi Patel, School of Medicine, Anatomy: cell biology and Physiology, Life and Health Sciences

Prostaglandin I_2 (PGI_2) plays an important role in immune regulation, particularly in allergic responses and asthma. This study investigates the effect of PGI_2 signaling on immunoglobulin E (IgE) production in B cells using prostacyclin receptor knockout (IPKo) mice. IPKo and wild-type (WT) mice were intranasally challenged with Alternaria alternata, which is a common fungal allergen, to induce an allergic response. Following the challenges, right & left lungs and lymph nodes were harvested, and $CD4^+$ T cells were isolated to assess the contribution of PGI2 on a special subset of CD4 T cells, T follicular helper cells (Tfh), and the subsequent impact on IgE regulation. Blood serum was collected to quantify IgE levels using enzyme-linked immunosorbent assay (ELISA). Results showed a significant increase in serum IgE levels in IPKo mice compared to WT controls, suggesting that PGI_2 signaling inhibits IgE production. This effect may be mediated through altered Tfh responses in the absence of PGI_2 signaling, although more experiments are needed to confirm this hypothesis. Our findings highlight that PGI_2 is a potential modulator of B cell and Tfh cell function and thus IgE regulation, providing insights into therapeutic strategies for allergic diseases and asthma.

Mentor: Allison E. Norlander, Ph.d.
Sponsor - Kathleen A. Marrs, Ph.d.

Investigating the role of eIF5A in regulating beta cell abundance and function

Dana Peng, School of Science, Biology, Life and Health Sciences

Pancreatic islets contain beta cells that produce and secrete insulin to maintain glucose homeostasis. This process requires synthesizing insulin and other proteins to respond to metabolic needs; thus, beta cells require highly regulated mRNA translation “on demand”. In line, our lab discovered that a specialized mRNA translation factor, eukaryotic initiation factor 5A (eIF5A), is essential for beta cell function. To act in translation, eIF5A must be post-translationally modified by deoxyhypusine synthase (DHPS) to produce the active, hypusinated form of eIF5A (eIF5AHYP). Beta cell-specific deletion of Dhps (DHPS□BETA) resulted in impaired on-demand protein synthesis and diabetes. Interestingly, there are two isoforms of eIF5A, eIF5A1 and eIF5A2, and both can be hypusinated and act in translation; however, their expression patterns vary significantly. Whereas eIF5A1 is highly and ubiquitously expressed, eIF5A2 is lowly expressed and restricted to certain tissues, which suggests these factors have additional distinct functions. To parse the roles of eIF5A1 and eIF5A2 in the beta cell, we generated a mouse model with a beta cell-specific deletion of Eif5a1 (Eif5a1LoxP/LoxP;Ins1-cre; eIF5A1ΔBETA). Preliminary data shows that, unlike DHPS□BETA mice, fed blood glucose and body weight of the eIF5A1ΔBETA mutants are equivalent to controls. Moreover, we observed increased islet number in the

eIF5A1ΔBETA pancreas. Therefore, we hypothesize that eIF5A2 is sufficient to maintain beta cell function, possibly by facilitating compensatory proliferation of beta cells. Ongoing analyses are using morphometric analysis to determine if islet structure and organization are maintained in the absence of eIF5A1.

Mentor: Teresa Mastracci, Catharina Villaca

Youth Philanthropy: Studying Potential for Inequalities in Outcomes

Natalie Penman, School of Science, Psychology, Social and Behavioral Sciences

This poster shares results from a study of youth philanthropy. Findings from a prior analysis in this series indicated that the program fosters positive youth outcomes. Data is from a youth philanthropy program that is currently hosted within 12 community organizations located in 10 US states. Youth participate for two years as juniors and seniors in high school, and the outcome data are collected annually upon youth graduating from the program at the end of the second year. This report is based on youth surveys collected to date (n=180). The goal of the current study is to assess answers to this research question: Are there inequalities in youth philanthropy outcomes? This report presents two types of answers to this question. First, the analysis focuses on whether and how youth outcomes vary across social and demographic characteristics, such as gender, race and ethnicity, socioeconomic status, parental marital status, religiosity, technology usage, and activity engagement. Second, the analysis focuses on whether and how youth outcomes vary across programs and cohorts. This includes the program's state and region (program analysis) and the years in which youth completed the program (cohort analysis). Results indicate that there are not yet detectable differences by program or cohort. There are outcome differences by social and decision comfort, religious service attendance frequency, and parental closeness.

Mentor: Patricia Herzog

Black STEM Instructors as Identity Safety Cues

Lydia Peterson, School of Science, Biology and Psychology, Social and Behavioral Sciences

Problem or Purpose: Like Black men and women, White women face ongoing exclusion and identity-based mistreatment in many STEM (Science, Technology, Engineering, Mathematics) fields, contributing to their avoidance of STEM settings altogether. Exposure to an identity-safety cue, or an aspect in an environment that signals to minoritized members that their identities are valued, can foster belonging and promote attraction to STEM. For example, STEM professors can act as identity-safety cues, and past research has found that the presence of Black professors promotes identity safety among Black women students (Johnson et al., 2019). However, despite both Black individuals and White women having similar experiences with underrepresentation and discrimination in STEM, previous research has yet to examine whether access to Black professors may also benefit White women students. To address this gap, we

investigated whether exposure to a Black professor would act as an identity- safety cue among White women students in a STEM setting.

Procedure: White women students (N = 374) completed an online experiment featuring a fictious School of Science & Technology homepage. Participants were instructed to imagine themselves as a student in the school and were randomly assigned to view one of four professor profiles: a Black man, a White man, a Black woman, or a White woman. The featured professor was presented as a computer scientist teaching an introductory computer science course, and we manipulated the featured photo of the professor to match participants randomly assigned condition. After viewing the professor profile, participants rated their identity-safety (i.e., belonging, trust, and interest) for their randomly assigned professor.

Results: A 2 (Professor race: Black vs. White) × 2 (Professor gender: Woman vs. Man) between-subjects ANOVA revealed participants reported greater identity-safety when viewing the women (versus) men professor profiles, $p < .001$, $MD = 0.34$, $SE = 0.10$, and as predicted, when viewing the Black (versus) White professor profiles, $p < .001$, $MD = 0.33$, $SE = 0.10$. Put differently, the Black woman professor condition elicited the most identity safety, and both the Black woman ($p < .001$) and Black man conditions ($p = .044$) encouraged significantly greater identity safety than the White man condition.

Conclusions and Implications: These findings highlight the benefit of Black professors' role in signaling identity safety for White women students. Future research will examine the efficacy of other minoritized professors as identity-safety cues amongst both White and Black women students.

Mentor: India Johnson

"The Air is Deadly Here:" Examining Severe Asthma Rates Near Indiana Oil Refineries

Restauri Peyton, O'Neill School of Public and Environmental Affairs and School of Liberal Arts, Public Policy and Law in Liberal Arts, Public and Environmental Affairs

Crude oil refineries release production waste that pollutes the air with a variety of measurable chemical compounds. This study investigates the proximity to Indiana oil refineries (within 35 miles) and the respiratory health of surrounding communities. A spatial and statistical analysis is used to analyze rates of severe asthma near the BP Whiting Refinery and the CountryMark Refinery in Mt. Vernon, Indiana. Using a Hot Spot Analysis (Getis-Ord Gi*), we find statistically significant clustering of rates of severe asthma at the Census tract level within 35 miles of each oil refinery, especially in the case of Census tracts located within downwind proximity to oil refineries. Further, we found that Census tracts in statistical clusters were more likely to have higher measures of socioeconomic ($F (1, 1747) = 5.91$, $p = .015$) and household characteristic ($F (1, 1747) = 5.34$, $p = .021$) vulnerabilities. These findings contribute to the environmental justice literature, revealing that oil refineries in Indiana may be a contributing factor to respiratory health in communities that live closest and downwind to them, suggesting that health and policy interventions may be necessary to mitigate these harmful effects, especially in vulnerable and disadvantaged communities.

Mentor: Courtney Tan

HPV Vaccination Trends in Indiana (2018–2022): Impact of COVID-19, Provider Shortages, and Socioeconomic Factors

Charulata Sree Pokala, Health Informatics - Luddy School of Informatics, Computing and Engineering, Informatics

This study investigates the impact of the COVID-19 pandemic on Human Papillomavirus (HPV) vaccination rates in Indiana, focusing on geographic, provider-based, and socioeconomic disparities. We conducted a retrospective analysis using county-level vaccination data (2018–2022), Health Professional Shortage Area (HPSA) and Dental Professional Shortage Area (DPSA) designations, and statewide Behavioral Risk Factor Surveillance System (BRFSS) indicators. The analysis was enriched with clustering, geospatial, and regression techniques to understand trends before, during, and after the pandemic.

Results revealed that although HPV one-dose and two-dose rates were adversely affected in some counties during 2020, Indiana showed a strong rebound post-pandemic. Average HPV one-dose rates increased from 14.9% pre-pandemic to 20.4% post-pandemic. Regression analysis showed DPSA status had a significant positive impact on vaccination rates post-COVID ($\beta = 3.89$, $p < 0.001$), highlighting the potential role of dental providers in vaccine promotion. KMeans clustering identified three distinct county groups, with Cluster 1 counties exhibiting the largest improvement (+8.07%) in HPV uptake. Counties like Warrick, Jackson, and Hancock showed the most substantial gains.

BRFSS data supported the resilience of health behaviors—routine checkups and exercise rates remained high during the pandemic, and health coverage significantly increased after 2020. These shifts may have facilitated catch-up vaccination.

This integrated analysis underscores the importance of healthcare access, particularly in DPSAs, and highlights the resilience of Indiana's public health efforts. Targeted interventions in provider-shortage and underserved areas can help close the HPV vaccination gap and achieve Healthy People 2030 targets.

Mentor: Dr Anubhuti Shukla, Dr Tom Stucky

Exploring the Enzyme Mechanism of Chorismate Mutase Using Gaussian-Process-Enhanced QM/MM Simulation

Hysum Qazi, School of Science, Department of Chemistry, Physical Sciences

We present a machine learning-accelerated QM/MM framework for simulating the free energy profile of the chorismate mutase (CM) enzyme mechanism. CM catalyzes a

Claisen rearrangement, making it a solid benchmark for evaluating the accuracy and efficiency of QM/MM methods. To overcome the cost of ab initio QM/MM (AI-QM/MM) sampling, our approach couples semiempirical QM/MM (SE-QM/MM) calculations with Gaussian process regression (GPR) to learn and predict high-level energy and force corrections on-the-fly during molecular dynamics (MD) simulations. This framework is implemented through a setup that links CHARMM with GPyTorch and GPflow using the PyCHARMM interface, allowing communication between molecular simulation and machine learning. Training data are gathered along the minimum free energy path (MFEP) using the string method. To represent the local atomic environments in a way that is both physically meaningful and machine-readable, we also employ atom-centered symmetry-function (ACSF) descriptors. These descriptors serve as the input features for both energy-only GPR models and energy-force GPR models with derivative observations (GPRwDO), allowing for the inclusion of gradient information and improved force prediction accuracy. Once trained, these GPR models are deployed during MD simulations to provide corrections to the SE-QM/MM potential, yielding free energy profiles that closely match those obtained from accepted literature, at a fraction of the computational cost. This results in simulation that is sped up by several orders of magnitude while retaining DFT-level accuracy.

Mentor: Jingzhi Pu

Creating a Clinical Site Database: Improving Faculty Awareness of Service-Learning Opportunities

Lavanya Ranganatham, Health informatics, Informatics

I have developed a comprehensive database of service-learning sites throughout Indianapolis specifically for IU School of Nursing students, organized within Microsoft Teams for easy access. Each organization has a detailed profile document containing crucial information including location, populations served, operating hours, volunteer requirements, application processes, and specific nursing learning opportunities available. The standardized format enables students to efficiently compare sites and identify opportunities that match their educational goals and schedules. By creating this centralized repository, I've eliminated the need for students to conduct extensive individual research while ensuring they have access to verified, current information about community partners. This resource actively supports the School of Nursing's commitment to community engagement while enhancing students' educational experiences through practical application of nursing skills in diverse settings. I've structured the database to be easily maintainable and expandable, allowing for regular updates and additions of new service sites as they become available, ensuring this remains a valuable resource connecting nursing education with community service needs throughout Indianapolis.

Mentor: Dr. Cindy Hill

A Raisin in the Sun: Its Impact on The Black Arts Movement

Micah Rayburn, School of Liberal Arts, Arts and Humanities

The purpose of this research is to validate and deliver evidence that theatre, often seen as an art form for entertainment, can be an important and impactful contributor to help elevate social consciousness in a social movement. Though scholars recognize that Lorraine Hansberry's play, A RAISIN IN THE SUN, 1959, is an important theatrical work, studies have not connected the theme, conflicts, characters' actions and values of this play to the values of the social movement out of which it was created and helped to ignite, the Black Arts Movement. By using the self-created research tool of scriptural content analysis, this research will extract and examine the appropriate lines, actions and beliefs of the characters and compare them to the values, beliefs and activist social justice goals of the Black Arts Movement of the 60's. In so doing, this research will validate the hypothesis that the art form of theatre can stir an ethos for group action and, therefore, be an important and impactful contributor to the success of a social movement.

Mentor: Regina Turner, Tonya Shelton

Cognitive and behavioral influences of Down syndrome orthologous gene mbk-1 in knockout Caenorhabditis elegans strains

Alexandria Robbins, School of Science, Biology, Life and Health Sciences

Down syndrome (DS), known as Trisomy 21, is a genetic condition characterized by the presence of three copies of human chromosome 21 (Hsa21). Abnormal expression of a gene of interest, dual specificity tyrosine-phosphorylation-regulated kinase-1A (DYRK1A), contributes to phenotypes such as delayed development of motor and cognitive skills. The impact of DYRK1A on behavioral phenotypes can be studied using genetically modified organisms with altered gene-dosage levels. However, in mammalian models, a complete knockout of Dyrk1a from conception is embryonic lethal. C. elegans express a DYRK1A ortholog, minibrain kinase 1 (mbk-1). Knockout (EK228) of C. elegans may clarify effects of DYRK1A dosage in development. We hypothesize that mbk-1 knockout model of C. elegans will display altered motility and impaired learning when compared to the wild-type N2 strain. Motility is evaluated by measuring the distance traveled over a 24-hour period. Learning in C. elegans is assessed using classical conditioning of associations between a chemosensory cue, Butanone, with the manipulated presence or absence of a food source, NA22 E. coli. Testing has revealed motility deficits in EK228 strain. Conditioning has indicated N2 and EK228 strains are capable of conditioning with a trend toward a deficit in EK228 strain. Future studies include further testing of short-term classical conditioning and the addition of long-term memory retention. These studies analyze the roles of mbk-1 in motor and cognitive development in C. elegans and provide a model to help identify the role of DYRK1A in the behavioral patterns and neurological function in DS.

Mentor: Randall Roper, Charles Goodlett

Executive Function in Children with ADHD, Autism, and Co-Occurring ADHD and Autism

Jasmine Rodriguez, School of Science, Life and Health Sciences

Executive function impairments are present among children with autism spectrum disorder (ASD), ADHD, and co-occurring ADHD and autism, but may differ in severity across diagnoses. Understanding this distinction will allow us to identify diagnostic profiles and inform targeted interventions for each of these diagnoses. To measure executive function, psychologists in the Division of Developmental Medicine at Riley Hospital administered the Behavior Assessment System for Children, Third Edition (BASC-3) to caregivers of 157 children diagnosed with ADHD, autism, or both. The data from the evaluation were entered into a Redcap database with the family's consent and analyzed using SPSS software. A one-way ANOVA was completed to compare the severity of executive function problems across groups. Based on the results, patients diagnosed with both ADHD and ASD had more executive function problems compared to patients only diagnosed with ASD. Patients with ADHD only did not significantly differ from patients with autism only or patients with co-occurring ADHD and autism. This finding is largely consistent with previous research suggesting that executive function problems are primarily driven by ADHD symptoms in children diagnosed with autism. However, children with both diagnoses may have greater executive function impairments, requiring targeted intervention.

Mentor: Eva Kurt-Nelson

Bird-Building Collisions on IU Indy Campus: Fall Migration 2024

Ivey Ross, Earth and Environmental Science, Physical Sciences

Located along a major migration route (the Central Flyway), the IU Indianapolis campus experiences many bird-building collisions during fall migration. The Center for Earth and Environmental Science monitors 18 buildings on campus during fall migration (Aug. 15 - Nov. 15), collecting data on bird activity. 237 collisions, with 83% resulting in fatality, and 43 species were recorded. 5 buildings alone accounted for 54% of collisions, with the Science and Engineering Laboratory (EL) accounting for the most (12%). This data allows information for potential bird-deterrent protocols to reduce the issue of bird-building collisions on campus.

Mentor: Dr. Victoria Schmalhofer

Life and Death in 19th Century Indianapolis: The Greenlawn Cemetery Research Project

Catchpole Samantha, Mary Blankman

In early 1821, the Indiana General Assembly identified and named Indianapolis as the third state capital and directed Alexander Ralston and Elias Pym Fordham to survey and design a square-mile city plan still recognizable today despite our city's dense urban landscape. With an influx of immigrants from the Ohio River valley and elsewhere, the new capital required infrastructure and resources, including a cemetery for the deceased. The four-acre "original/old burying ground" for Indianapolis' residents was established in the very same year as the capital along Kentucky Avenue on the east bank of the White River immediately southwest of downtown. By the early 20th century, city officials and the state legislature would legally write off Greenlawn as a formal cemetery, leaving it to be effaced, forgotten, and sold off for development despite the thousands of individuals that remained below the ground surface. In advance of the Henry Street bridge and road extension as part of the larger White River Innovation District Infrastructure Project, city officials have now committed to a complete mitigation and recovery, including the exhumation, analysis, and reburial of everyone interred in the acre of the cemetery owned by the City of Indianapolis. Here we provide an overview of the ongoing project, highlight the university-industry partnership, and showcase the methodologies and technologies being utilized in the field and lab. We also emphasize the importance of our community outreach and involvement, including Indy-ology- a hands-on archaeology learning experience this coming summer for Marion County high school students.

Mentor: Jeremy Wilson

Iron deficiency prohibits histone modifications thereby blocking osteoblast differentiation

Samantha Santangelo, School of Science, Biology, Physical Sciences

It is known that mesenchymal progenitor cells (MPCs) will transition to osteoblasts to form bone. The lab has found that iron deficiency blocks this process. Osteoblast differentiation shows histone modification transition from Histone 3 Lysine 9/27 tri-methylation (H3K9me3/H3K27me3: closed) to acetylation (H3K9ac/H3K27ac: open) which is a key regulatory mechanism for gene expression and an enzymatic process that requires iron. This study investigates the hypothesis that iron deficiency prohibiting histone modifications thereby blocking osteoblast differentiation. In this study MPCs were treated with an iron chelator deferoxamine (DFO) during osteoblast differentiation with histone isolation to evaluate H3K9me3, H3K9ac, H3K27me3, and H3K27ac modifications on western blot at days 4, 7, and 10. On day 4 we already observed 3 um and 4 uM DFO treatment increased H3K9me3 signal compared to control. In contrast, the DFO treated samples had reduced H3K9ac levels. On day 7 the pattern continued. On day 10 we found that H3K9me3 was higher in 4 uM DFO treated samples compared to all of the other groups. On day 10 we observed 3um and 4um DFO treatment decreased the H3K27ac signal compared to the control. In contrast, the DFO treated

samples had an increased H3K27me3 signal. Our findings suggest that iron deficiency disrupts histone modifications, impairing the expression of osteogenic genes and blocking proper osteoblast differentiation.

Mentor: Erica Clinkenbeard

Trisomy 21 Alters Sensory Neuron Development in Down Syndrome Mouse Models

Alan Santes-Diaz, School of Science, Life and Health Sciences

Down syndrome (DS) is a genetic disorder caused by an extra copy of human chromosome 21 (Hsa21), affecting approximately 1 in 700 live births. Individuals with DS exhibit a range of phenotypic traits such as cognitive and motor developmental delays, skeletal abnormalities, and reduced sympathetic innervation. Prior research indicates that DS is associated with peripheral nervous system (PNS) deficits, leading to decreased organ innervation and lowered pain perception. Recent findings suggest that the skeleton is highly innervated, and that bone homeostasis is influenced by both the PNS and central nervous system (CNS), implicating neuronal innervation in bone remodeling. We hypothesized that increased gene dosage reduces the number of sensory neurons in the dorsal root ganglia (DRG) leading to reduced innervation. To test our hypothesis, we utilized the Ts65Dn mouse model, which carries a segmental trisomy of mouse chromosome 16 (Mmu16) homologous to Hsa21, and the Dp1Tyb DS mouse models that carries a 23 Mb duplication of all Mmu16 genes orthologous to Hsa21. Both mouse models recapitulate several features seen in individuals with DS, including reduced bone mineral density and cognitive deficits. To investigate Dyrk1a's role in sensory neurons, we normalized Dyrk1a copy number using Cre recombinase driven by the Advillin promoter, a sensory neuron specific gene. Using Ts65Dn and Dp1Tyb mice, L4 DRGs were extracted, subjected to immunofluorescence staining that identified calcitonin gene-related peptide-positive (CGRP+) sensory neurons and protein gene product 9.5 (PGP9.5)-a pan-neuronal marker. Our preliminary results indicate a trend of reduced sensory neurons in Ts65Dn and Dp1Tyb mice.

Mentor: Randall J. Roper

Bird Windor Strike Project - Strikes Only

Finch Saywell, School of Science, Environmental Science Earth and Water Resources - 1RIP under Victoria Schmalhofer, Environmental Science

Located along the Central Flyway (which is a major migration route), the IU Indy campus experiences many bird-building collisions during those migrations between summer breeding grounds and winter habitats. The Center for Earth and Environmental Science is monitoring these collisions for 18 buildings on Campus. My presentation focuses on collisions just at Campus Center. During the year, Spring 2024 - Winter 2024, 46 bird strikes were recorded. Not all of the collisions resulted in fatalities; 43 (93%) were fatal, and 3 (7%) were non-fatal. The strike frequencies changed through the year, and the majority peaked during fall migration, and spring migration had the next highest number

of collisions. Few occurred in winter and summer. Campus Center had the second-highest collision rate of the 18 buildings, and the Library was the first. North American bird populations have undergone a significant decline in the past few decades, and much of that is a result of human activity. Our data provides information for potential bird-deterrent protocols to reduce bird collisions and, as a result, bird mortality on campus.

Mentor: Victoria Schmolhofer

Can meteorite impacts produce melts with primary carbonate inclusions

Lior Segal, School of Science, Earth and Environmental Science, Physical Sciences

The Canyon Diablo meteorite impacted Earth ~50,000 years ago, forming Barringer Crater (aka Meteor Crater) in Arizona, which is 3,900 ft in diameter and 560 ft deep. The heat and pressure of the impact also melted and vaporized some of the rocks present at the target site, producing new materials known as impact melts. At Meteor Crater, some impact melts contain anomalous carbonate inclusions, the formation of which is heavily debated because carbonate minerals are known to vaporize completely at relatively low temperatures. One hypothesis is that the carbonates melted during impact but did not vaporize completely and then recrystallized as they cooled, forming primary mineral inclusions. The other hypothesis is that original carbonate minerals present in the target rocks volatilized (i.e., vaporized) completely from the melt and that the carbonate inclusions found in the impact melts at Meteor Crater formed sometime later, through a secondary process unrelated to the impact itself. The goal of this project is to determine if the carbonate inclusions formed from the impact or if they formed from a secondary process by conducting high temperature experiments in an aerodynamic levitation laser furnace. Samples of the target rocks at Meteor Crater were melted at temperatures associated with meteorite impacts and then polished and analyzed using a Scanning Electron Microscope (SEM). Initial experiments produced glasses with few distinct mineral phases or inclusions, and no carbonates. A second set of experiments produced visible mineral phases and will be further analyzed to determine the presence of carbonates.

Mentor: Catherine Macris

The Organization of the Renaissance Workshop and an Exploration of its Relationships

Jenna Servizzi, Herron School of Art and Design, art history, Arts and Humanities

The Italian Renaissance (approximately 14th - 17th century C.E.) was a pivotal moment in the history of art. The return to ideas from Ancient Greece and Ancient Rome provided an important influence on the artists of the time. Central to this ‘rebirth’ and the development of this revolutionary artistic period was the artist’s workshop. The workshop was a space where there were not only artworks being produced, but knowledge was being exchanged. This created a space that became a vital communication center for the Italian Renaissance. Within this communication network, there were two key relationships - the artist and their patron(s) and the master artist and their assistant(s).

The relationship between the artist and the patron influenced the works that were created and often represented the classical ideas that were most important to society at the time. The relationship between the master artist and their assistant(s) was central to the steady production of artworks and the development and spread of technical and theoretical artistic knowledge. The following paper is an exploration of how these relationships functioned and how they contributed to the success of the Italian Renaissance.

Mentor: Dr. Uranchimeg Tsultem

Acute Bone Loss and Infrapatellar Fat Pad Fibrosis in the Knee After an In Vivo ACL Injury in Adolescent Mice

Simran Shergill, School of Science, Biology and Neuroscience, Life and Health Sciences

This pilot study investigated sex differences in the post injury response while focusing specifically on the aggressive fibrotic responses in females following an anterior cruciate ligament (ACL) tear. Using the C57BL/6J mouse strain, 5 male and 5 female mice aged 18 weeks were examined. The mice had an ACL rupture on the right knee, while the left knee served as an internal control. 3 weeks post injury, three mice of each sex were euthanized, while the remaining 2 mice of each sex were euthanized 6 weeks post injury. The main purpose of this study was to explore changes in gene expression in response to the ACL injury while placing an emphasis on identifying key pathways that drive inflammation and fibrosis. Findings from a previous study with young females indicated an aggressive fibrotic response, which limited range of motion and severely impacted recovery. Post ACL surgery, females are more prone to arthrofibrosis than their male counterparts. Through this study, we sought to uncover underlying genetic and molecular factors that contributed to arthrofibrosis development and direct the path for future treatments. This research was directly tied to a forthcoming clinical study in patients, providing insight into potential therapeutic targets for managing arthrofibrosis and improving post-injury recovery outcomes, particularly in females.

Mentor: Stephen Schlecht

Synthesis of Polymer-Bound Burgess Reagent for Solid-Phase Applications

Joseph Shittu, School of Science, Physical Sciences

The purpose of this project is to synthesize a polymer-bound version of Burgess Reagent in the laboratory to serve as a more stable, convenient, and viable method of dehydration when compared to the classic technique of dehydration using solution phase Burgess reagent. The polymer-bound reagent was tested alongside the classic version of the Burgess reagent on an amide molecule that was synthesized, the effectiveness of dehydration between the two methods was analyzed using various analytical techniques to determine if the polymer-bound reagent is a more effective method of dehydration when compared to the usual method of dehydration in solution using Burgess reagent.

Mentor: Geno Samaritoni, William Scott

Optimizing staining conditions for microplastic visualization in biological tissues

Tyler Sisk, Department of Emergency Medicine, Life and Health Sciences

Microplastics accumulate in biological tissues, raising concerns about their potential health and environmental impacts. While existing methods quantify microplastics in tissues, they often require digestion, preventing direct visualization of particle distribution within intact biological structures. This study aims to develop an optimized staining protocol to enable fluorescence-based visualization of microplastics while preserving tissue integrity. To achieve this current we used Rit dye to stain the microplastics. Previous staining techniques used RIT dye at a concentration of 275 mg/mL and 5 mins of heating the histological section at 100 C to visualize the microplastics. Though the staining attempts successfully labeled microplastics but caused tissue disintegration, limiting their applicability for intact tissue analysis. Optimization of the staining condition of microplastics will be carried out using a central composite experimental design testing the effect of three factors i.e. temperature, incubation time, and dye concentration on staining efficiency. The optimized protocol will provide conditions that can overcome this limitation by minimizing tissue damage when maximizing microplastic visibility.
This improved method can be used in direct histological examination of microplastics in biological tissues for environmental research.

Mentor: Nathan Alves

The Race to Relevance: The Fight to Rebuild Reebok

Isabella Smith, School of Health and Human Sciences, Sport Marketing, Day, Chanel. Department of Health and Human Sciences
Blundall, Nicholas. Department of Health and Human Sciences

Rust, Isaiah. Department of Health and Human Sciences, Life and Health Sciences
Once a dominant force in the athletic footwear and apparel industry, Reebok has faced significant challenges in maintaining market relevance. After gaining prominence in the 1980s through the aerobics boom and expanding into basketball in the 1990s, Reebok's competitive position weakened following its acquisition by Adidas in 2006 and subsequent sale to Authentic Brands Group in 2021. Operating under a licensing model, Reebok lacks direct control over product innovation and marketing strategy, contributing to fragmented decision-making and diminished brand identity. This study examines Reebok's marketing challenges, including weak brand differentiation, low market penetration among younger consumers, and limited innovation capacity. The analysis explores strategic opportunities such as expanding sports sponsorships, enhancing youth engagement through NIL partnerships and influencer collaborations, and investing in performance technology and digital storytelling. The findings will provide insight into how Reebok can strengthen its market position and regain competitive relevance.

Mentor: Soonhwan Lee

Establishing brain region-specific gene expression analysis from ribosomal populations

Babs Snyder, Psychology, Life and Health Sciences

Commonly used methods of quantifying RNA are limited to measuring cytoplasmic mRNA and determining the gene expression for proteins therein. However, known natural processes often silence specific mRNA targets and result in them never being translated by ribosomes. Divergencies consequently form between the genetic possibility of protein production and that which is actually created and utilized by a cell. The latter may prove to be more informative on the molecular physiological changes as a result of some physical or emotional disturbance. This project aims to establish a method that can directly measure mRNA targeted for translation into proteins by quantifying only mRNA currently attached to ribosomes. In order to accomplish this, we utilized a dual viral infection approach to express both Cre recombinase and a green fluorescent protein-tagged ribosomal subunit (L10a-GFP) and subsequently sequestering GFP and all attached items (e.g., L10a-GFP) with a GFP antibody attached to magnetic beads. These ribosomal subunits were purified using a magnet, ribosomally attached RNA isolated, and levels quantified by qPCR. Using prefrontal cortical samples, we saw possible differences in Pde10a and Bdnf mRNA expression between control rats and those isolated during adolescence (postnatal days 21-42). By applying this method to a neural circuit of interest, we hope to observe the molecular basis of behavioral changes in circuit activity in rat models of adolescent stress.

Mentor: Marian Logrip

Like a Girl: Art, Sports, and Inclusion

Jess Stapp, Herron School of Art and Design, Arts and Humanities

Like A Girl explores the shared values between contemporary artists and athletes in the advancement of women's and LGBTQ+ rights in the United States. Athletes and artists have both proven to be cultural forces that not just respond and react to culture but shape it. As we navigate difficult conversations around LGBTQ+ inclusion in sports, specifically the inclusion of trans girls, this exhibit offers the unique opportunity to celebrate queer participation in sports while imagining a more inclusive America. This spring exhibition at Patina aims to uplift women and queer athletes through works by Max Trumpower, Meghan Curran, Oliver Bowling, Rebecca Entrican, and more. From their own personal love of athletics and relationship to sports and queerness, this group of artists employ a wide range of strategies to share their perspectives through video art, sculpture, painting, stained glass, illustration, collage, and ceramics.

Mentor: Orna Tsultem

Understanding the Use of Artificial Intelligence in Design Curricula

Ria Vavhal, Herron School of Art + Design, Master of Design (M.Des.) program, Education

Artificial Intelligence (AI) is rapidly transforming industries, and Design, as a specific area of application, is no exception. Workforce development is increasingly becoming dependent on AI literacy. The integration of AI into creative processes has led to new tools, workflows and industry expectations for creative professionals. However, higher education, particularly design education, has struggled to keep pace with these advancements. This thesis project engages with the design education community, to explore AI's role in design curricula. By understanding their perspectives, needs, and challenges, the project aims to bridge the gap between academic preparation and industry expectations.

A participatory, project-based approach underpins this research. Human-centered design thinking and collaborative action research methods are employed to develop an AI guidelines booklet tailored to design education. Through structured interviews and focus groups, educators and students will share their perspectives on AI's role in their field. Insights from these discussions will inform the iterative design of the contents of the booklet. By providing structured guidelines and resources, this Beginner's Guide will assist educators in navigating AI's complexities and leveraging its potential in design classrooms. Additionally, this work contributes to the broader conversation on AI's impact on creative education, fostering awareness and preparedness among students entering AI-driven work environments. While this study lays the foundation for AI integration in design education, future work will focus on refining and expanding the proposed framework responding to emerging AI tools and industry developments.

Mentor: Aaron Ganci

Impacts of Quantifiable Soft Tissue Manipulation (QSTM) on Gait Speed, Vertical Jump Height, and Hamstring Flexibility

Kate Wagner, SHHS, physical therapy, Life and Health Sciences

Soft Tissue Manipulation (STM) is a commonly used technique in physical therapy for pain management and musculoskeletal rehabilitation. Despite it being widely used, there is little research to determine how effective the treatment is and what lasting impacts it may have for patients. Dr. Loghmani's lab has developed two handheld devices for Quantifiable Soft Tissue Manipulation (QSTM) that provide real-time feedback about the force and rate of the applied strokes, as well as several other parameters. A recent study in Dr. Loghmani's lab utilized these devices to collect data of four clinicians and 46 patients to assess potential stroke application patterns. The goal of this analysis will be to determine the possible impact of stroke force, rate, and inclination on post-treatment gait speed, jump height, and flexibility assessment scores. By evaluating these criteria, this research seeks to identify better application methods to continue to improve patient satisfaction and treatment efficacy. Findings from this study and concurrent studies

taking place in Dr. Loghmani's lab may contribute to QSTM protocols and enhance training and application practices for physical therapists.
Mentor: Dr. Mary T. Loghmani, Dr. Rachael Powell

Investigating Barriers and Facilitators to TB and TB-HIV Care in East Africa
MaKayla Waugh, Richard M. Fairbanks School of Public Health, Epidemiology, Social and Behavioral Sciences
Tuberculosis (TB) is a leading cause of morbidity and mortality globally and presents tremendous health burdens in TB-endemic areas such as East Africa. Understanding current barriers and facilitators to TB diagnosis, treatment adherence and completion, and post-TB care, may inform patient-centered approaches. We sought to investigate these factors among individuals with TB and with healthcare workers, in the Tuberculosis Sentinel Research Network (TB-SRN) study of the international epidemiology Databases to Evaluate AIDS (IeDEA), underway in Kenya and Uganda. Semi-structured interviews have been conducted with 72 individuals with TB and 12 healthcare workers, using a guide structured by overarching research questions in TB care access. Probes investigate barriers and facilitators to care using a socioecological model, and specific questions explore possible COVID-19-related impacts, youth-specific challenges (among those aged 15-24), and post-TB health issues. On preliminary thematic analysis of interviews, systemic barriers to TB and TB-HIV care include challenges related to poverty and financial disruptions experienced by families and communities affected by TB. Further challenges to adherence and treatment completion included patient mobility and migration, communication barriers, needs for intensive TB education or counseling, problematic alcohol use, and stigma surrounding seeking TB services. Further thematic analysis will include establishment of overarching themes and exploration of specific challenges affecting particularly vulnerable groups within this cohort. Data regarding facilitators and desired support will inform considerations around potential interventions in this setting. Findings will be shared with researchers, clinicians, and public health practitioners, as well as affected communities in Kenya and Uganda.

Mentor: Leslie Enane

Adaptive Experimental Design of Waxy Thermoplastic Starch Filament for Fused Filament Fabrication

Gracie White, Luddy School of Informatics, Computing, and Engineering, Engineering and Technology

Fused filament fabrication (FFF), the most widely used additive manufacturing technology, typically employs readily available and inexpensive thermoplastics such as PLA, ABS, and PETG. However, concerns have emerged regarding the environmental impact of these materials, particularly the emission of volatile organic compounds (VOCs) and limited biodegradability. Thermoplastic starch (TPS) presents a promising biodegradable alternative, though its application has largely been limited to use as an additive due to challenges in filament fabrication. This work investigates the development and optimization of a compostable, bio-based waxy TPS filament. The TPS mixture is made of potato starch, water, glycerol, acetic acid, and candelilla wax. The mixture is gelatinized at 60 C and retrograded at room temperature. An adaptive experimental design approach, guided by machine learning methods including Gaussian Process Regression (GPR) and Bayesian optimization is employed to iteratively refine

filament composition. The experimental framework systematically varies glycerol and wax content over five iterations (30 experiments), with the objective of achieving filament properties suitable for FFF, targeting improved flexibility and hardness.

Mentor: Agarwal

Advance Care Planning in Parkinson's Disease: Completed and in the Electronic Medical Record?

Lorena Williams, School of Health and Human Sciences, Life and Health Sciences
Stephanie Bartlett, PT MS, PhD candidate1, Elizabeth Zauber MD2, Asia E. Madayag BS1, Vianney Gonzalez-Gonzalez1, Lorena Williams1, Mazie Ade1, Avery Chadd, MD2, Lynn D'Cruz PT, MPA, PhD candidate1, James, Slaven MS2, Amber Comer JD PhD1
1Department of Health Sciences, School of Health & Human Sciences, Indianapolis, IN; 2IU School of Medicine, Indianapolis, IN

Introduction: Parkinson's Disease (PD) is a neurodegenerative disease that results in loss of physical and cognitive function; therefore, people with PD would benefit from Advanced Care Planning (ACP). (1)
Objectives: This study aimed to determine the frequency and characteristics of patients with PD who self-reported having ACP and those with ACP documented in the electronic medical record (EMR).
Methods: A retrospective study was performed from November 2022 to November 2023 at a Midwest Parkinson's Foundation Center of Excellence. Patients answered questionnaires self-reporting completion of ACP. Researchers compared patients who self-reported completing ACP to ACP documentation in the EMR.
Results: Questioners were collected from n=329 patients with PD. The mean age was 63.7 (9.6), nearly all patients were white (98.8%), more than half were male (61.4%), and 39.8% had Parkinson's symptoms >10 years. On questionnaires, n=236 (71.7%) patients reported having some form of ACP; however, only n= 56 (23.7%) patients had documented ACP in the EMR. Patients who reported having ACP were older, with a mean age of 65 years ($p=0.002$). Patients with a documented ACP in the EMR were more likely to be unmarried ($p=0.001$), have a longer disease duration ($p=0.001$), have palliative care consultation ($p<0.001$), and hospice consultation ($p=0.013$).
Conclusion: This study found discordance between self-reported ACP completion and EMR documentation among patients with PD. While almost three-quarters of patients who attended the PD clinic self-reported having ACP, less than one-quarter of ACPs were documented in the EMR. People who reported having ACP were older. Those with ACP documented in the EMR, were more likely to be unmarried and have a longer disease duration. The results of this study show a need to improve process measures to ensure that once completed, ACP is documented in the patient's EMR.

Mentor: Dr. Amber Comer, Stephanie Bartlett

Mapping the Oratory of Frederick Douglass

Jake Williams, School of Liberal Arts, History, Estifanos, Yosef. Department of History, IUI School of Liberal Arts

Tate, Anisa. Department of Political Science, IUI School of Liberal Arts, Arts and Humanities

Frederick Douglass was one of the most influential human rights activists of the nineteenth century. Despite being born into slavery, he would go on to become an unimaginably important figure as an internationally acclaimed statesman, editor, author, and orator. His orations and their surviving records are specifically what this study focused on. Our objective is to track down and document Douglass's speaking events within a defined set of years, trying to identify exactly when and where he spoke.

Here we are presenting a compilation of data from select years in which we can confidently confirm both Douglass's participation not just as a visitor but also as a speaker. Additionally, by mapping these events, as can be seen, we try to transform the simple and raw data into a more visual representation. This ultimately allows for a much clearer reflection of the information and makes it easier to identify spatial patterns and trends in Douglass's speaking.

Mentor: Jack Kaufman-McKivigan, Jeff Duvall

Fostering Transformative Connections: Co-Creating Knowledge with Community Partners

School of Liberal Arts, Museum Studies (MA), Arts and Humanities

This ePortfolio highlights my contributions as a Community Engagement Associate (CEA) where my work has centered around assisting in the preparation of the Community Collaboration and Curation (ANTH A-477/A-577 and MSTD A-477/A-577) course and collaborating with the community members whose efforts are integral to its success. My role involves enhancing the curriculum - particularly its community-based components - and fostering meaningful communication with our esteemed partners, the Saginaw Chippewa Tribe and the Ziibiwing Center of Anishinaabe Culture and Lifeways. Building on a partnership established in 2017, this initiative prioritizes time, care, and responsiveness to the needs and priorities of the community. By enhancing the curriculum and providing Indiana University students with a safe learning environment, the course prepares them for deeply engaged community work rooted within a social justice framework.
Through this position, I have strengthened my expertise in curriculum development, cross-cultural communication, and community-centered pedagogy. This ePortfolio reflects my dedication to fostering educational environments that inspire connection, inclusivity, and social justice.

Mentor: Holly Cusack-McVeigh

Assessing Bird-Building Collisions on Campus: Winter 2023/2024 and Summer 2024 Monitoring Results

Center for Earth and Environmental Science, Environmental Science
North American bird populations have undergone significant declines in recent decades, with nearly 3 billion birds lost since 1970. Among the leading human-associated causes of avian mortality are bird-building collisions, which pose a particular threat during migration seasons.

To address this issue locally, the Center for Earth and Environmental Science monitored bird-building collisions at 18 buildings on campus during the 2023/2024 winter season (November 16–March 31) and the 2024 summer season (June 1–August 14). During this period, Z collisions were recorded. Of these, x% were fatal, while y% of birds survived. Non-fatal incidents included w% standard collisions and z% stairwell entrapments, in which birds entered parking structures and became trapped inside stairwells. Notably, no entrapments were recorded during the summer months, as this phenomenon is more common in spring and fall.

Collisions were concentrated at a small number of buildings. R buildings accounted for P% of total strikes, with the highest numbers occurring at [Building 1], [Building 2], and [Building 3]. A total of N bird species was involved in collisions, with the most affected species including [Species 1], [Species 2], and [Species 3].

These data highlight specific areas on campus where mitigation efforts could have the greatest impact. As bird populations continue to decline across North America, local monitoring and targeted deterrent strategies offer valuable tools for reducing bird-building collisions and supporting conservation efforts.

Mentor: Dr. Victoria Schmalhofer

Examining Extrinsic Physical Influences on Hematopoietic Stem Cell Expansion

School of Medicine, Microbiology and Immunology, Life and Health Sciences

Degradation of bone and increased incidence of blood disorders in the aging population often occur together, leading to various health outcomes and imposing a significant economic burden. The decline in osteogenic and hematopoietic function within the bone marrow (BM) of aging populations is associated with reduced bone mineral density, impaired healing, heightened risks of hematological malignancies, and worsening conditions such as anemia, neutropenia, and thrombocytopenia. The BM niche is managed by an intricate regulatory network which includes mesenchymal stem cells (MSCs), cytokine/growth factors, hematopoietic stem and progenitor cells (HSPCs), mature immune cells, and the extracellular matrix (ECM). The ECM is essential for the regulation of hematopoiesis (the process by which blood cells are formed). With aging, the equilibrium of the regulatory network shifts. The transition in aged MSCs from bone-forming (osteogenic) to fat-forming (adipogenic) development is associated with the tendency of HSPCs– responsible for generating blood and immune cells – to shift

towards the myeloid lineage. However, the biological mechanism through which the aging BM niche, particularly the interactions between HSPCs, MSCs, and the ECM, contributes to hematopoietic dysfunction with age remains unclear. Building on advancements in ECM biology, this study sought to clarify how age-related changes in the ECM and to MSC regulatory cues affect HSPC function. Using specialized biofabricated plates, which had wells coated with microphysiological analogues of young (≤ 25 years old) or aged (≥ 60 years old) BM ECMs, created by human MSCs, I explored how the ECM influences HSPC development. Utilizing HSPCs isolated from cord blood units, I evaluated HSPC function using colony-forming unit assays and characterized them immunophenotypically through flow cytometry at input and following 7 days of culture on either tissue culture-treated (TCP), young ECM (yECM), or aged ECM (aECM) wells. I demonstrated that all conditions resulted in increased nucleated cell number compared to input after expansion. By phenotype, we saw: 1) significant increases of HSCs and Multipotent Progenitors (MPPs) compared to input only when cultured on aECM, 2) significant increases in Multi-lymphoid Progenitors (MLPs) in all culture conditions when compared to input, 3) significant increases in Common Myeloid Progenitors (CMPs) when cultured on either ECM condition, and 4) no changes to Granulocyte-Monocyte Progenitor (GMP) numbers in any condition. There were no functional differences demonstrated by colony formation other than those associated with an increased proportion of those cells in culture. This suggests that perhaps different culture conditions favor the expansion of different cell populations within less ‘mature’ cord blood HSPCs. In the future, we wish to examine the effect of ECM on 1) a more ‘mature’ HSPC population (isolated from BM), and 2) a co-culture system of HSPCs and MSCs on our ECM plates to examine the crosstalk between these two populations.

Mentor: Dr. Maegan Capitano

A Developmental Project Supporting Combined Online Clinician Training Module and Modified Screening, Brief Intervention, and Referral to Treatment (SBRTI) Approach for Screening for Head and Neck Skin Cancer (HANSC)

by Dental Professionals, School of Dentistry, Dental HygieHygiene,a Rozakis (Fairbanks School of Public Health, Undergraduate), Life and Health Sciences

Head and neck skin cancers (HANSC) account for over 85% of all skin cancer cases in the United States and affect more than 6 million adults annually. While many forms are treatable, aggressive types like melanoma—which represent a small portion of cases—are responsible for most skin cancer-related deaths. Early identification can significantly improve survival rates, yet comprehensive skin cancer screenings are rarely performed in primary care settings. Given their routine and close examination of head and neck structures during patient visits, dental professionals are in a unique position to support early detection of HANSC. However, a lack of familiarity with skin cancer screening

techniques and referral protocols has been a reported barrier in dental settings. To address this gap, we are conducting a systemic review of the literature, with the aim of identifying existing screening tools, summarizing their key features, and evaluating how they incorporate risk factors and lesion characteristics. A total of 61 articles were selected for review and analysis to help inform next steps. Findings from this review will directly support the creation of a training module and electronic screening algorithm designed specifically for dental professionals. These tools will be guided by the Screening, Brief Intervention, and Referral to Treatment (SBIRT) framework, promoting structured decision-making and appropriate referral pathways. This project aims to empower dental providers to play a more proactive role in identifying patients at risk for HANSC. Preliminary findings will be presented.

Mentor: Dr. Paul Edwards (Co-PI), Dr. Gerardo Maupome (Co-PI)

Building Confidence and Community Through Adaptive Fitness

Department of Kinesiology; Adapted Movement Program, Boissy, Jeb. Department of Kinesiology, IU-Indianapolis
Leppert, Matt. Department of Kinesiology, IU-Indianapolis, Life and Health Sciences

Working as a Community Engagement Associate (CEA) for the Adapted Movement Program (AMP) has been a deeply fulfilling experience, shaping both personal and professional growth. As staff members, we work closely with students, clients, and families in the community. Being physically active is a privilege that many take for granted, and AMP provides individuals with disabilities the opportunity to exercise in ways that meet their unique needs. As CEAs, we witness and assist exercise science students in helping clients achieve their goals and empower them to become more independent. This program is not just about fitness; it's about building confidence, fostering connections, and making movement accessible for everyone. The AMP has also given us the opportunity to take on leadership roles by organizing clinics and guiding students through their experience. Being part of this program has equipped us with the skills to advocate for individuals with disabilities in our future careers in healthcare. Understanding the importance of accessibility, both in physical activity and in society as a whole, has been a pivotal part of our personal development. The lessons learned through AMP will remain relevant, shaping how we support and uplift individuals with disabilities in the future.

Mentor: Amy Oliver

Ethnography as a Means of Empowerment and Empathy

School of Liberal Arts, Anthropology, Social and Behavioral Science

This project focuses on the ways in which ethnographic inquiry can sharpen an individual's engagement with their community and provide a way to more thoroughly understand the broad concepts of identity and community through the specifics of lived realities. Dr. Wendy Vogt's class, Global Migrations, provided the intellectual basis for

this project, and the timing of the work has felt particularly compelling amid a Presidential campaign, and election, that frequently demonized immigrants and the very concept of migration. After exploring the ideas and practices behind various forms of ethnographic research, the students completed an autoethnography that focused on how migration and immigrant communities show up in their own lives. Students were then tasked with identifying community organizations or individuals who might offer a unique window into the experiences surrounding migration. By focusing on individuals and their stories, and by employing ethnographic techniques, students were able to engage with family members, friends, and community members in ways that were intellectually rigorous, open-minded, and remarkably empathic. The work provided the students with a deeper understanding of the wide range of experiences and realities that are associated with migration. Each of the students created an ePortfolio to document and present their work - including their initial autoethnography, interview transcripts, and their final written work. Dr. Wendy Vogt and her CEA, Matthew Jose, are currently working on an academic article that will explore ways in which the pursuit of ethnographic research can empower students and provide greater understanding of unexamined communities.

Mentor: Wendy Vogt

Physics for Community Benefit (Fall 2024 & Spring 2025)

Luddy informatics, Physical Sciences

In Fall 2024, students engaged in a service-learning physics project focused on measuring the flow rate of the White River as part of the SLCE initiative. Two methods were employed: buoy timing and a custom-built sensor-based apparatus using Vernier photogate sensors. Alongside scientific experimentation, students participated in the “Keep Indianapolis Beautiful” campaign by cleaning the riverside, linking environmental stewardship with experiential learning.

In Spring 2025, the class contributed to IU’s largest student-run fundraiser, Jagathon, blending physics with philanthropy. Students raised funds through the sale of roses and premium chocolates, with profits donated toward pediatric research. Physically, students tracked metrics like steps, heart rate, and energy expenditure, applying physics principles to calculate work done and distance traveled. The class's full participation, including registration donations, made the campaign both a scientific and charitable success.

Mentor: Dr. James Tucci

Exploring the Impact of Health Literacy and Language as Barriers to Accessing Autism Diagnostic Services in the Latine Community

Department of Pediatrics, Social and Behavioral Sciences
The HEART Lab aims to minimize autism and neurodevelopmental health disparities through the implementation of evidence-based programs like the Early Autism

Evaluation (EAE) Hub. My work with the HEART Lab has focused on Hub Spanish, an initiative that centers around the Spanish-speaking population.

Background: Latine children face greater disparities in autism diagnosis which may be attributed to differences in caregiver understanding of the healthcare system and access to interpretation services.

Objectives: This project examines how health literacy influences access to autism diagnostic services and experiences with medical interpreters in Spanish-speaking Latine families.

Results: Participants were 11 Spanish-speaking Latine mothers (M=31 years; M=6 years lived in US; M=44% completed 13+ years of school; M=73% monolingual Spanish) of children with autism (M=28 months; 82% male) who completed an autism diagnostic evaluation. Mothers completed a social validity interview and survey on experiences obtaining a diagnosis (86 items across 8 domains rated on a 4-point Likert scale: “strongly disagree” to “strongly agree”) and demographics. Although 91% of mothers found medical interpreters helpful (M=3.64), the process of getting an autism diagnosis caused stress within families (M=3.09) and caregivers found it difficult to understand how the medical system worked (M=2.60).

Discussion: Spanish-speaking families do not feel fully equipped to make well-informed health decisions for their children with autism. Although medical interpreters are a useful tool, they are not the solution to the health literacy barrier in the Latine community.

Mentor: Ann Marie Martin

Infant sleep and Parenting Practices in First-Generation Latinx Immigrants

School of Health and Human Sciences, Exercise Science, Life and Health Sciences

Previous studies have examined infant sleep in US Latinx populations, which include individuals who have come to the US recently, as well as those who have lived in the US for several generations. Parenting practices of first-generation immigrants may be more culturally influenced by their country of birth. This study aims to describe infant sleep patterns and parenting practices in first-generation US mothers born in Mexico and Central American countries. Mothers of healthy infants (4-6 months) completed online questionnaires including the Brief Infant Sleep Questionnaire – Revised (BISQ-R), a demographic form, and a 24-hour recall diary for seven days/nights. Each were part of a larger study, Sleep and Health in the Home (SHH) Study, on infant sleep and culture in Black and Latinx families. Assessment measures were completed in Spanish.

Mentor: Sarah Honaker

Experience at the IU Student Outreach Clinic

School of Social Work, Medical Social Work

This presentation will solely focus on what the IU Student Outreach Clinic is, what it does for the community, how I have contributed to it during my time as a CEA, and examples of what I've done for them.

Mentor: Patricia Howes

Chinelo Nnatubeugo's ePortfolio

School of Science, Psychology, Personal-Professional ePortfolio
This ePortfolio showcases my CV, research, and conferences attended as a part of the IUI Post-baccalaureate Research Education Program (IPREP). It also includes previous research and my goals in the future.

Mentor: Drs. Ann Kimble-Hill, Peggy Stockdale, Jessica Kiebler

Felix, Dunjee and the Big Wild World
Herron School of Art, Arts and Humanities
This project is a children's book written, designed, and traditionally printed about Felix and Dunjee who leave their quiet neighborhood to wander the big wild world and meet many of the animals within it. They meet elephants, giraffes, chimpanzees, sea lions, penguins, and more, gradually becoming more adventurous. When completed it will incorporate etching, screen-printing, and bookbinding.

Mentor: Debbie Oesch-Minor

Beyond the Design: Community, Healing and the Museum of Broken Relationships Indianapolis

School of Liberal Arts, Arts and Humanities

This ePortfolio showcases my work from the Fall 2024 semester and current projects as a Research Support Community Engagement Associate for the Museum of Broken Relationships Indianapolis (MBRI) under the mentorship of Dr. Lois H. Silverman, Professor of Museum Studies at IUI. The ePortfolio describes two main projects: the integration of design elements into the MBRI Evaluation Report, including the report cover, photo placement, adjusting the layout and formatting charts and graphs; and the development of the educational program titled MBRI Tabling Valentine’s Day Table. Both projects demonstrate community engagement through cohesive design choices and meaningful activities created to reflect the report’s findings.

Mentor: Dr. Lois H. Silverman

Breaking the Cycle of Addiction: A Collaborative Recovery Experience

Luddy School of Informatics, Social and Behavioral Sciences

Breaking the Cycle of Addiction is an interactive program designed to engage students, faculty, staff, professionals, and community partners in understanding the complexities of substance use disorders (SUDs). Through real-life scenarios, participants "walk in the shoes" of individuals experiencing addiction and explore its impact on families, friends, and communities. Facilitated by experts from local organizations, the program fosters meaningful discussions and provides educational resources to enhance participants' future interactions with patients and clients.
To assess the program's effectiveness, surveys were conducted to evaluate students' learning experiences and perception shifts regarding individuals with SUDs. Data analysis of these responses helped measure changes in awareness, empathy, and attitudes among health profession students. The findings highlight the role of interactive learning in breaking stigmas and improving preparedness for working with individuals affected by addiction.
By combining experiential learning with data-driven evaluation, this study demonstrates how collaborative and immersive programs can foster a deeper understanding of SUDs while informing future educational approaches in healthcare and community engagement.

Mentor: Dr. April Newton

Building Belonging: Reflections from a Year with Quest for Meaning

School of Science, Psychology, Bowman, Makayla, Department of Liberal Arts (Religious Studies), Arts and Humanities

Over the past academic year, we have served as Community-Engaged Associates within the Religious Studies Department, working to create spaces of dialogue, connection, and curiosity through the student-led club Quest for Meaning. As a nonsectarian organization, Quest for Meaning invites students of all backgrounds to explore religion and its intersections with everyday life in open, judgment-free conversation. Our weekly meetings and community events have become a hub for students to ask deep questions, challenge assumptions, and share experiences without fear of being silenced or misunderstood.

Together, we facilitated regular discussions, co-organized field trips to local religious sites—including a visit to Botánica Ana and the Magick Candle—and contributed to the department newsletter. These experiences not only deepened participants' understanding of diverse religious traditions but also helped cultivate a shared sense of belonging. We witnessed a growing number of students returning each week, often bringing friends, and forming authentic bonds across lines of difference.

In this presentation, we reflect on the power of dialogue and presence in building inclusive communities. We will highlight the events we've hosted, share the impact we've seen in our peers, and consider how engagement with religious diversity can offer new models for friendship, empathy, and collective care. Ultimately, our work through Quest for Meaning has shown us how spaces rooted in openness can transform both individual perspectives and the broader campus culture.

Mentor: Kelly Hayes

Community Engagement Through Service-Learning Initiatives

School of Liberal Arts, Political Science, Arts and Humanities

This portfolio explores the work conducted and programs implemented over eleven months through the Community Engagement Associate Program, the IU School of Social Work, and the DJ Center for Youth. This includes writing grant proposals, implementing service-learning projects, contacting and building relationships with community organizations and partners, and engaging youth in service-learning experiences that will help them grow as leaders. Over this period, I have been awarded six grants and have planned and implemented a multitude of service projects, including the YSA 9/11 Day of Remembrance Service Project: Care Packages for Service Members, Delta Dental: Dental Health Workshop, YSA Martin Luther King Jr. Day of Service Project: Day of Justice, Solidarity, and Renewal, and most recently the Youth Health Summit: Navigating Future Strategies of Success. In partnership with local youth-serving organizations like the DJ Center for Youth, these initiatives have impacted and engaged over 300 youth in the Indianapolis area, addressing issues like financial literacy, digital wellness, and creating healthy habits, while also providing unique service-learning opportunities to those not usually asked to volunteer. Through working closely with a youth-serving and youth-led organization like the DJ Center for Youth, we were able to identify and address specific issues and needs impacting our local community. Each of these initiatives addresses those community needs while providing unique and valuable service-learning opportunities and education to local youth, having a greater impact in the long term.

Mentor: Devina Jani

Femur Innervation in Down Syndrome Mouse Models

School of Science, Biology, Life and Health Sciences

Down Syndrome (DS) is caused by Trisomy 21 (Ts21) and affects about 1 in 700 live births. Individuals with DS often exhibit skeletal defects such as shortened stature, low bone mineral density (BMD), and low bone mass. The Ts65Dn mouse model recapitulates these phenotypes, including altered craniofacial structure and reduced BMD (BLAZEK et al. 2011; BLAZEK et al. 2015b; ABEYSEKERA et al. 2016; THOMAS et al. 2021). As a result, DS individuals are more prone to fractures, osteopenia, and early-onset osteoporosis. The peripheral nervous system (PNS) regulates bone metabolism, which may be altered in DS. Bones are innervated by sensory and sympathetic nerve fibers, which play a key role in bone remodeling, fracture healing, and skeletal growth (ELEFTERIOU 2018; BRAZILL et al. 2019; TOMLINSON et al. 2020). We hypothesize decreased innervation in the femurs of DS model mice compared to euploid mice. Immunofluorescence, confocal microscopy, and ImageJ analysis were used to visualize sensory and sympathetic nerve fibers in adult male Ts65Dn and

euploid mice at 16 weeks of age. The fibers were stained using primary antibodies for tyrosine hydroxylase, calcitonin gene-related peptide, and DAPI. The density of these nerve fibers was quantified in the periosteum of the distal femurs of DS mice. Preliminary data suggest a significant decrease in both sympathetic and sensory nerve fiber density in Ts65Dn mice, indicating altered innervation compared to euploid controls. Further research will quantify differences in medullary densities between DS models and control mice.

Mentor: Randall Roper

Targeting PRDX1 in Combination with Ref-1 Inhibition to Enhance PDAC Treatment Response

School of Science, Biotechnology, Life and Health Sciences

Pancreatic Ductal Adenocarcinomas (PDACs) exhibit metabolic plasticity that enables resistance to conventional therapies. This study investigates the role of PRDX1, a key redox-regulating peroxiredoxin, in enhancing PDAC treatment response when combined with Ref-1 redox inhibition. A metabolic CRISPR screen in MIAPaCa cells identified PRDX1, G6PD, SEPHS2, TXNRD1, NADK, ALAD, and ALAS1 as potential vulnerabilities when combined with the Ref-1 inhibitor APX2014. Among these, PRDX1 emerged as a promising target due to its role in oxidative stress defense and its strong synergy with APX2014 in increasing PDAC cell death, overcoming intrinsic resistance mechanisms.
Current efforts focus on optimizing PRDX1 knockdown strategies and evaluating its impact on redox homeostasis and treatment response. SEPHS2, another critical redox-related enzyme, has demonstrated an additive effect with APX2014 due to its knockdown impact on cell viability. Further exploration of other metabolic and antioxidant pathways influenced by these targets will help clarify their role in PDAC survival under disrupted Ref-1 redox control. By elucidating PRDX1's function in PDAC resistance and its interaction with Ref-1 inhibition, this research aims to inform novel combination therapies targeting metabolic and redox vulnerabilities in PDAC.

Mentor: Dr. Mark Kelley, McNelis Lee, James

Knee Extensor Fatigue Differences between High-Intensity Interval and Moderate-Intensity Continuous Rowing

School of Health and Human Science, Exercise Science, Life and Health Sciences
INTRODUCTION: High-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) are widely used exercise modalities, but their impact on lower-body muscle fatigue remains unclear. This study aimed to compare knee extensor fatigue following workmatched HIIT and MICT rowing in healthy young adults.
METHODS: Sixteen participants (M=6, F=10) completed both HIIT and MICT rowing protocols in a randomized, crossover design. Knee extensor strength was assessed pre- and postexercise, with fatigue quantified as the percent change from baseline (%CKE).

Paired t-tests were used to determine differences between conditions.
RESULTS: The percent decrease in knee extensor strength was similar between MICT (%CKEMICT: -9.27±7.4%) and HIIT (%CKEHIIT: -10.04±8.4%), with no statistically significant difference (p=0.41). Despite differences in cardiovascular demand and perceived exertion, both training modalities induced comparable levels of knee extensor fatigue. CONCLUSION: The results showed that knee extensor fatigue was about the same after both HIIT and MICT, with no significant difference between them. This means that even though HIIT includes rest periods and is often thought to reduce fatigue, it didn't make a noticeable difference compared to MICT in this study. These findings suggest that both types of training have similareffects on knee extensor fatigue when the total work is the same. More research should look at long-term effects and whether different training styles might impact fatigue over time.

Mentor: Dr. Monica Hubal

Physical Activity and Mood Levels in College Age Adults While Playing the Virtual Reality Game Gorilla Tag

School of Health and Human Sciences, Life and Health Sciences

Introduction: The prevalence of chronic diseases linked to sedentary lifestyles underscores the necessity of exploring innovative approaches to promote physical activity among adults. Despite the rising popularity of virtual reality (VR), the potential of VR to enhance physical activity in adult populations remains largely unstudied. Objective: To determine 1) the intensity and amount of movement of participants while playing Gorilla Tag and 2) the mood of participants when playing the game compared to exercising on the cycle ergometer at a moderate intensity. Methods: Participants (n=20, ages 18-35 years) played GT for 15 minutes for 4 sessions on separate days and rode a stationary cycle during another session, at a predetermined intensity. All subjects wore accelerometers on the wrist and waist to quantify movement. To measure mood, participants completed the Positive Affective Negative Affective Schedule after gameplay and exercise. Repeated measures ANOVAs were conducted to evaluate outcome measures between sessions. Results: Data from the accelerometer on the wrist revealed that over 90% of GT gameplay was spent in arm MVPA, with no differences between GT sessions. Data from the accelerometer on the waist revealed that approximately 13-20% and 60-65% of gameplay was spent in moderate to vigorous and light whole-body movements, respectively. No significant differences existed between sessions for mood measured by the PANAS. Conclusions: Through these investigations, it seems that the VR game Gorilla Tag has the potential as an enjoyable and effective mode of light to moderate physical activity for adults.

Mentor: Keith and Kelly Naugle

Intramuscular Adipose Tissue Effects on Muscle Quality in Resistance Training

School of Health and Human Sciences, Life and Health Sciences

INTRODUCTION: Forty percent of U.S. adults over 20 years old have obesity. Obesity decreases one's mental and physical desire to do physical activity. This physical inactivity can increase intermuscular adipose tissue (IMAT), leading to negative cardiometabolic risks. Resistance training (RT) has been shown to mitigate obesity effects and can be performed with low cardiorespiratory fitness. Although RT has been shown to increase muscle quality (MQ), IMAT may limit an individual's progress with RT. Sex differences also contribute to different IMAT amounts, which may lead to differing MQ improvement. GOAL: Using MRI images from retrospective cohort from the previous Functional Polymorphisms Associated with Human Muscle Size and Strength study, we will see how much IMAT affects MQ adaptation to RT in both males and females. METHODS: Using MicroDICOM software, MRI images will be anonymized from original CDs in a secure location. We will quantify IMAT and muscle volumes from each image. Linear regression will be run in both males and females separately to assess the IMAT vs relative change in MQ relationship. Statistical significance will be set at $P < 0.05$. RESULTS: Based on the current literature, we hypothesize that participants with a greater volume of IMAT will have attenuated increases in MQ in males but not in females. CONCLUSION: If this hypothesis is true, these findings will have implications for prescribing more sex-specific RT programs for those with obesity.

Mentor: Monica Hubal, Dakota Diewart

Intermuscular Adipose Tissue Effect on Muscle Quality in Resistance Training

School of Health and Human Sciences, Life and Health Sciences
Intermuscular Adipose Tissue Effect on Muscle Quality in Resistance Training
Ethan Shelby, Dakota Diewert, Dr. Monica Hubal

INTRODUCTION: Forty percent of U.S. adults over 20 years old have obesity. Obesity decreases one's mental and physical desire to do physical activity. This physical inactivity can increase intermuscular adipose tissue (IMAT), leading to negative cardiometabolic risks. Resistance training (RT) has been shown to mitigate obesity effects and can be performed with low cardiorespiratory fitness. Although RT has been shown to increase muscle quality (MQ), IMAT may limit an individual's progress with RT. Sex differences also contribute to different IMAT amounts, which may lead to differing MQ improvement.

GOAL: Using MRI images from retrospective cohort from the previous Functional Polymorphisms Associated with Human Muscle Size and Strength study, we will see how much IMAT affects MQ adaptation to RT in both males and females.

METHODS: Using MicroDICOM software, MRI images will be anonymized from original CDs in a secure location. We will quantify IMAT and muscle volumes from each image. Linear regression will be run in both males and females separately to assess the IMAT vs relative change in MQ relationship. Statistical significance will be set at $P < 0.05$.

RESULTS: Based on the current literature, we hypothesize that participants with a

greater volume of IMAT will have attenuated increases in MQ in males but not in females.

CONCLUSION: If this hypothesis is true, these findings will have implications for prescribing more sex-specific RT programs for those with obesity.

Mentor: Monica Hubal

Exploring the Impact of Dual Targeting APE1's Major Functions and the Implications in PDAC Treatment

IUSM, Biochemistry, Life and Health Sciences

Pancreatic ductal adenocarcinoma (PDAC) is a notoriously lethal cancer diagnosis driven by its adaptability to harsh micro-environments and resistance to standard therapies. Apurinic/apyrimidinic endonuclease 1/redox effector factor 1 (APE1/Ref-1) is multifunctional protein dually named for its two primary functions of base excision repair (BER) and redox regulation. APE1 is often over-expressed in the most aggressive cancers such as PDAC where it alters redox signaling pathways that promote multiple cancer phenotypes. Potential inhibition of APE1 stands as a novel pathway to new targeted therapies for PDAC as well as other diseases. Our lab has previously investigated mutant cell lines with disruptions in either the redox or the endonuclease function of APE1/Ref-1 independently, revealing distinct phenotypic consequences in PDAC models. However, the combined impact of impairing both functions has been difficult to study due to a lack of cell models and effective endonuclease inhibitors. In this study, we characterize a novel APE1/Ref-1 double mutant harboring specific alterations that disrupt both BER and redox activities. Studying this double mutant and characterizing its phenotypic aspects will provide insight into the full effect of the inhibition of APE1/Ref- 's two primary functions and how this will affect PDAC homeostasis. This can be crucial in potential therapeutic measures in the future.

Mentor: Mark Kelley

Training an adaptive stress response results in altered chromatin accessibility in hematopoietic stem cells.

School of Science, Biology, Life and Health Sciences
Hematopoietic stem and progenitor cells (HSPCs) are essential for lifelong blood cell production, and their transplantation serves as a therapeutic option for patients with leukemia, lymphoma, and other blood disorders. However, during chemotherapy and post-transplantation inflammation, HSPCs can become exhausted, leading to poor long-term blood production and increased complications. Recent work from our lab has shown that treatment with a small molecule GW4869 (GW) can improve long-term HSPC function training cell tolerance to inflammation; however, the cellular mechanisms underlying this phenotype are unknown.
We hypothesize that GW induces epigenetic alterations such as histone modifications, which result in transcriptional repression of inflammatory genes, contributing to improved

HSPC function under stress. To test this hypothesis, global chromatin condensation was measured in both murine and human GW-treated HSPCs by a DNAse hypersensitivity assay followed by gel electrophoresis. Striking variation in chromatin condensation was observed after 24 hours of treatment, suggesting that GW induces significant changes in chromatin structure. To further examine specific histone H3 post-translational modifications (HPTMs), including methylation and acetylation, we utilized a multiplex enzyme-linked immunosorbent assay (ELISA), demonstrating durable HPTMs after GW treatment of human HSPCs that likely alter long-term transcriptional programming of cells.
Future studies will focus on identifying genomic regions associated with HPTM changes after GW treatment. Altogether, these studies will provide insight into the long-term preservation of HSPC function through training an adaptive stress response, and in the future could improve strategies for enhancing HSPC transplantation outcomes and managing blood disorders.

Mentor: Stephanie Hurwitz, MD, PhD

Phage Therapy as an Alternative for Antibiotics in Clinical Settings

School of Science, Life and Health Sciences

Antimicrobial resistance (AMR) is a phenomenon in which bacteria develop immunity to the antibiotics used to treat them, resulting in further complications such as sepsis, amputations, or even death. AMR is also prominent in hospitals, where bacteria proliferate and develop resistance rapidly. Bacteriophages, also known as phages, are a natural viral predator to bacteria, with one phage being able to infect one strain of bacteria to procreate and survive. This makes phages highly selective, and therefore less likely to harm beneficial bacteria in the body. Phage therapy is a treatment that harnesses these viruses to target bacteria specifically and lyse them without inducing harmful side effects or antibiotic resistance. With the right conditions, phages can be utilized in place of antibiotics to selectively treat a bacterial infection. The purpose of this study is to find the conditions in which phages work best in the human body whilst mitigating any side effects. Different strains of bacteria were dosed with phages capable of infecting them, then had their optical density measured to quantify the levels and rates of bacteria killed. PCR and QPCR were also utilized to ensure that specific phages were infecting the theorized bacteria meant to be infected. The study is in its infancy, so results are still being compiled. When gathered, these results can be used to fuel further research and develop practical drug trials with phages at their forefront. The potential this treatment has is limitless, both in the field of saving lives and reducing expenditures in healthcare.

Mentor: Mentors: Brittany Needham, Department of Anatomy, Cell Biology, and Physiology, IU School of Medicine; Anne Tanner, Department of Anatomy, Cell Biology, and Physiology, IU School of Medicine

Building Connections: A Year of Community Engagement

General Studies, with a focus in Behavorial Science and earning a Child Abuse and Neglect Certificate. , Social and Behavioral Sciences

For my presentation about my time as a CEA, I will talk about the many ways that I have engaged with the many local nonprofit organizations and communities around me that are aimed at serving the youth. I will also talk about the process that took place with identifying topics that were most relevant to today's youth and how my team and I connected on a wider community scale with both the organizations and the different schools. I will also talk about the steps of creating a list of vendors we wanted to work with, creating lines of communication with them, and the ways that we constantly found to work on setting up for our event, the Youth Health Summit, which would showcase this work. I will also talk about the fundraisers that took place to make this event take place. I will also talk about any difficulties that were faced in the process of putting this event together. I will also talk about the tasks that I took on this year. I will also highlight any difficulties that I have faced and how I have overcome them. I also plan on highlighting the skills I have learned while being a CEA that will benefit me both in my professional and personal life. Lastly, I will summarize how impactful being a CEA was to me.

Mentor: Devina Jani

Virtual Reality as a Non-Pharmacological Intervention for Special Needs Dental Patients: A Community-Engaged Approach

School of Science, Luddy School of Informatics. Indiana University, Indianapolis - MS in Computer Science, Simhambhatla, Aruna Prasanna. Department of Biomedical Engineering and Informatics, Luddy School of Informatics, Indiana University - Indianapolis., Life and Health Sciences

Background: Nearly half of bio-psychosocially and medically complex special needs dental patients avoid visits due to dental fear, anxiety &/or pain. These underserved patients need non-pharmacological, non-addictive, & innovative behavioral patient management by using Extended Reality (XR) techniques. Research demonstrates, for example, that Virtual Reality (VR) relaxation applications reduce self-reported dental anxiety, decrease physiological markers of distress, increase patients' perceived control, and minimize vivid negative memories associated with dental procedures.

Project Aims:
The recent Community Engagement Initiative at the Indiana University School of Dentistry (IUSD) leverages our newly formed XR Clinical Practice Education Lab (XRCPEL). This year's CEA project has led to the comprehensive design and recent development of this lab, which contributed to our recent proposal for collaborating with various cancer survivor groups to evaluate their satisfaction, interest and application of using XR/VR technologies.

Assessment Methods & Future Expectations:
We anticipate that the intended data collection will include: (1) a questionnaire about user satisfaction and use ability, (2) open-ended questions about advantages and improvements for using technology and ways to enhance the patient experience, and (3)

focus group session to gather anecdotal data which will inform future best practices protocols involving XR/VR. After conducting a descriptive statistical and thematic grounded theory analysis of the data, the lab members will write up an evaluation report intended for future testing of newly learned outcomes within a standardized objective structured clinical simulation examination (OSCE) that helps students better apply the technologies within clinical practice.

Mentor: Dr. Stuart Schrader

Muscle Fatigue Differences between High-Intensity Interval and Moderate-Intensity Continuous Rowing

School of human and health sciences, kinesiology, Life and Health Sciences
INTRODUCTION: High-intensity interval training (HIIT) is an increasingly popular exercise modality praised for its time efficiency and cardiovascular benefits. However, its impact on muscle fatigue compared to moderate-intensity continuous training (MICT) remains unclear, particularly in rowing. This study aimed to compare muscle fatigue, perceived exertion, and heart rate responses between HIIT and MICT rowing in healthy young adults.

METHODS: Sixteen participants (6 male, 10 female) completed two rowing protocols in a randomized, crossover design. Both HIIT and MICT sessions were work-matched to 50 Calories on a rowing ergometer. Heart rate (HR), time-to-completion (TTC), rating of perceived exertion (RPE), and strength loss (grip and knee extensor) were assessed pre- and post-exercise. Paired t-tests determined differences between conditions.

RESULTS: HIIT elicited significantly higher peak HR (172.6±5.6 bpm) than MICT (148.5±6.3 bpm; $p<0.001$). RPE was also greater in HIIT (13.4±1.2) than MICT (11.9±1.1; $p=0.004$). However, TTC was significantly lower in HIIT (13:34±1:12 min) compared to MICT (13:40±1:05 min; $p=0.029$). Strength loss was not significantly different between conditions.

CONCLUSION: Despite higher cardiovascular strain and perceived exertion, HIIT resulted in shorter TTC without exacerbating muscle fatigue compared to MICT. These findings suggest HIIT may be a time-efficient alternative to MICT for improving cardiovascular fitness without increasing post-exercise fatigue. Future studies should explore long-term adaptations and applicability in diverse populations.

Mentor: Monica Hubal

Disparity in Perceptions of Caregiver Support Between Gender-Diverse Youth and Their Caregivers

Psychology (School of Science) & Data Science (IU Luddy School of Informatics, Computing, and Engineering), Social Work

This research examined perceptions of caregiver support among gender-diverse youth (GDY) and their caregivers. GDY receive varying degrees of caregiver support, and perceptions of their caregivers as unsupportive can lead to poor health outcomes for GDY. The goal of this research was to answer the question of whether or not there is a disparity between GDYs' and their caregivers' perceptions of caregiver support, and if so, then to what extent. GDY who presented for treatment at the Riley Gender Health Clinic and their caregivers rated their perceptions of the caregivers' support using the Parental Attitudes of Gender Expansiveness Scale (PAGES), which comprises two subscales: parental acceptance and non-affirmation. Agreement between youth and caregiver perceptions was analyzed by calculating Intraclass Correlation Coefficients (ICCs) for each subscale. There was poor reliability between GDY and their mothers on both acceptance and non-affirmation. Mothers' reports on acceptance were higher than youths' perceived acceptance from mothers, and mothers' reports on non-affirmation were lower than youths' reports. Similarity was higher between GDY and their fathers with moderate reliability on acceptance and non-affirmation. Fathers' reports on acceptance were higher than youths' perceived acceptance from fathers, and fathers' reports on non-affirmation were lower than youths' reports. GDY in these analyses perceived their caregivers as less supportive than the caregivers perceived themselves. This information will help inform social workers, healthcare and school professionals in the treatment of GDY. These results also prompt other research questions, such as whether or not youth depression negatively skews their ratings of caregiver support.

Mentor: Richard A. Brandon-Friedman, Ph.D.

Targeted Therapeutics are Influenced by Different Oxygen Tensions

School of Science, Biology, Life and Health Sciences
Targeted Therapeutics are Influenced by Different Oxygen Tensions
Juan S. Delvasto1, James G. Gorman2 and Lindsey D. Mayo2
1Department of Biology, IUI School of Science, 2Department of Pediatrics, IU School of Medicine

The microenvironment differs across sections of a tumor. One such difference includes variability in oxygen tension, which several studies correlated to significant changes in responsiveness to chemotherapy. However, the specific pathways and extent of these changes are not well defined.
There is significant interest in personalized medicine to target pathways predominantly utilized by tumors. One such pathway includes the oncogene Mdm2, a crucial factor in cell growth and survival. Over 19 drugs target Mdm2, with some currently in clinical trials with varying responsiveness. We aimed to determine if oxygen tension was a critical factor in the responsiveness of an Mdm2 inhibitor. Non-small cell lung carcinoma cell lines were grown in 5% (physiological levels in the body) and 21% oxygen (ambient) conditions. Our findings revealed that 5% oxygen dramatically decreased Mdm2 expression, but only in cells with mutations in another oncogene, the epidermal growth factor receptor (EGFR). A cell survival assay was performed with all the cell lines, administering varying concentrations of the Mdm2 inhibitor, SP141. As expected, Sp141 was ineffective at killing cells at 5% oxygen since its target, Mdm2, was absent, while these cells were sensitive to SP141 at 21% oxygen when Mdm2 was detectable. Differences in oxygen levels, similar to those in live organisms, can influence the practical effects of drug compounds, indicating that understanding the physiological and

pathophysiological conditions of the drug target is essential for achieving better outcomes.

Mentor: Lindsey D. Mayo, Department of Pediatrics, Department of Biochemistry and Molecular Biology, IU School of Medicine

Mentor: Lindsey Mayo

“I couldn’t take in the info all at once, the shock of diagnosis was so great”: A Qualitative Analysis of Patient Experiences and Preferences for When to Introduce Options for Osteosarcoma Surgery

School of Liberal Arts, Philosophy and MD School of Medicine, Life and Health Sciences

Background. In cases where there is no clear best surgical option for osteosarcoma, it is important that families are engaged in shared decision making. However, there is no standard of care for these conversations; options may be discussed at any point from diagnosis to surgery, or not at all. We sought to explore both the patient experience and the ideal patient experience for when to communicate options.
Methods. A two-question survey about when to discuss options was disseminated to four Osteosarcoma Facebook Groups. Thematic analysis using open, axial, and selective coding was conducted.
Results. There were 52 respondents, primarily parents. Data was thematically organized using a Who, What, When, Where, and Why approach for both questions. These themes were further organized into categories during axial coding.
Recommendations.
Who. Improve communication delivery, include other members of the medical team, introduce patient-to-patient peer support.
What. Include all options, focus on long-term outcomes, provide written resources for options, suggest second opinions.
When. Stage discussion intentionally, start slowly but early, ongoing, in multiple visits.
Where. In clinic or in-patient; virtual for follow-up Q&A and second opinions.
Why. Time is limited, diagnosis is traumatic, time to process, tailor to needs.
Conclusion. This study suggests these conversations are not happening in ways that optimally benefit families. Conversations often occur at diagnosis during an emotional time and families are not feeing supported throughout the decision making process. We aim to develop an evidenced-based timeline for communicating options.

Mentor: Janet Panoch and Chris Collier

City Streets to Forest Trails: Cracking the Code of Biodiversity Across Cityscapes and Countryside's

School of Science, Biology, Smith, Sarah, Department of Biology, IUI
Torres, Alexys, Department of Biology, IUI, Ecology

Biodiversity measurements of vertebrate species are critical to understanding the wellbeing of an ecosystem, regardless of size. Camera traps are noninvasive and can be

used to measure biodiversity of vertebrate species passively. Multiple camera traps were placed in urban, suburban, and rural areas in Indiana. Invertebrate DNA (iDNA) of blowflies and mosquitoes may contain vertebrate DNA due to feeding habits. Vertebrate DNA can be extracted from iDNA and sequenced to identify vertebrate match. The data was interpreted using Shannon's Index and the Gas Model. Significance tests were conducted using a 1-way ANOVA. Higher density and diversity of vertebrate species was found in urban areas, despite the smaller area compared to the other sampling locations. This phenomenon is known as urban funneling. The results of this study exemplify the importance of maintenance and protection of green spaces, particularly those in urban areas.

Mentor: Patrick Gentry

Experimental Evaluation of Dermal Lymphatics in Lymphedema Prevention

Division of Plastic Surgery, Indiana University School of Medicine; Biology, Life and Health Sciences

BACKGROUND:
Secondary lymphedema is characterized by limb swelling following lymphatic disruption. Lymphedema results in slowed transition of lymph through the lymphatic collecting ducts and dermal backflow in the subdermal lymphatics. The role of dermal lymphatics in the development of lymphedema is poorly understood. The purpose of this study is to evaluate the effect of dermal lymphatic preservation in the development of lymphedema in a murine tail experimental model.

METHODS:
A standard murine lymphedema tail model was used as the study control. This involved a 3 mm circumferential excision 20 mm from the base of the tail. Both lymphatic channels adjacent to the veins were clipped (Control n=6). The experimental group was a modification of the standard model consisting of a 3 mm hemi circumferential excision and a mirrored hemi circumferential excision, 3 mm proximal to the first site (Experimental n=8). This experimental surgical design resulted in the disruption of both large lymphatic vessels with preservation of a dermal bridge between the two surgical sites. Serial tail volume was assessed at days 7, 14, 21 and 28 using caliper tail measurements calculated with the truncated cone equation. Near infrared indocyanine green (ICG) laser lymphangiography was performed for functional assessment of lymphatic clearance.

CONCLUSION:
This study shows dermal lymphatics can preserve lymphatic function in this experimental model. Dermal lymphatics may have the potential to be leveraged for lymphedema prevention at the lymphatic injury site.

Mentor: Aladdin H. Hassanein MD, MMSc

The Effects of Kinesio Tape on Delayed Onset Muscle Soreness

School of Health and Human Sciences, Life and Health Sciences
The Effects of Kinesio Tape on Delayed Onset Muscle Soreness
John Maibauer, Dakota Deiwert, Dakota Tiede, Keith Naugle, Monica Hubal, Kelly Naugle, Indiana University, Indianapolis

BACKGROUND: Kinesio Tape (KT) is a commonly used therapy to relieve the symptoms of pain and delayed onset muscle soreness (DOMS) following strenuous exercise by improving tissue circulation in the taped area. AIM: Our study determines the effect of KT on pain and DOMS over 3d following eccentric exercise. METHOD: Untrained participants (N=35; 69% female) performed 30 maximal eccentric actions of the nondominant elbow flexors to induce moderate muscle damage. Participants were randomized to: control group (n=11), KT group (n=12; with tension) and a sham KT group (n=11; no tension). Pain rating during movement, QuickDash surveys and pressure pain thresholds (PPT) were obtained before, 48h and 72h post-exercise. Mixed model ANOVAs (group*time) were used ($p<0.05$). RESULTS: Significant time effects were present for pain, QuickDash score and PPT following exercise, indicating the presence of muscle damage. These measures remained elevated 72 hours post-exercise. However, no significant group*time interactions were found (pain $p=0.452$; QD $p=0.572$; PPT $p=0.108$). CONCLUSION: The exercise protocol induced symptoms of damage at 48 and 72 hours post-exercise. KT did not improve the recovery of muscle soreness back to baseline following eccentric exercise. These results do not validate KT as an effective treatment for DOMS.

Mentor: Monica Hubal

Musical Coding in Grades K-5 in an After-School Informal Learning Environment

Music and Arts Technology, Austin, Jerelle. Music and Arts Technology, IU-Indianapolis
Carbello, Miguel. Music and Arts Technology, IU-Indianapolis
Filler, Grace. Music and Arts Technology, IU-Indianapolis, Education

In this presentation, we report on a teaching intervention at a community center's after-school program for K-5 students, where we use open-source software, microcontrollers, and art to introduce musical coding concepts in an informal setting. Our work centers on three tools to engage STEM education concepts: design, critical thinking, and teamwork. First, Soundtrap, an online platform, lets students record and edit music, creating tracks while sharpening critical thinking. Second, Scratch, a block-based coding program, teaches coding basics as students add music or sound effects to their projects, boosting computational thinking and creativity. Third, Makey Makey invention kits turn conductive objects—like bananas or aluminum foil—into musical instruments by completing circuits to trigger sounds, sparking design and experimentation. These hands-on projects encourage collaboration and problem-solving as students troubleshoot and build together, from touch-sensitive instruments to animated sound stories. The community center's flexible space supports playful exploration, making learning approachable yet deep. The presentation highlights how these methods blend technology, music, and art to support STEM and broaden participation in both coding and creative fields. We'll share practical examples of student projects, implementation strategies, and outcomes, showing how these low-threshold, high-ceiling activities foster skills like teamwork and

creativity. We aim to make learning accessible and fun, inspiring young students to explore coding and design through music and play.

Mentor: Dr. Daniel Walzer

Reframing Family: How Indigenous Teachings Can Help Parents Support Gender-Diverse Youth

School of Social Work, Social and Behavioral Sciences
Many gender-diverse youth today face challenges in their relationships with parents or guardians, especially when their identities don't align with traditional gender norms. These tensions are often shaped by Western ideas of gender that see difference as something to fix or control. In contrast, many Indigenous cultures have long recognized gender-diverse people as important, respected, and spiritually significant members of the community.

This research explores how Indigenous cultural perspectives can help parents see gender-diversity not as a weakness, but as a strength. Using a mixed-methods approach, this study will include surveys and interviews with gender-diverse youth, parents or guardians, and Indigenous leaders. The goal is to better understand the current state of parent-child relationships, and to learn how cultural teachings can help reshape these relationships in more supportive and affirming ways. By comparing today's challenges with traditional Indigenous understandings, this project hopes to offer a model for families to reconnect, communicate, and grow together.

Mentor: Richard Brandon-Friedman

Synchronicity (Music for Two Resonating Bodies)

School of Art & Design, Music Technology, Arts and Humanities

Synchronicity (Music for Two Resonating Bodies) is a live interactive musical piece that involves sculpture and speaker transducers to make a forever changing musical atmosphere. Live microphones pick up the sounds of the audience and process them with custom software built in Cycling 74's Max 9. The software takes audio samples and randomizes the transients, creating a "jumbled" version of the original audio. The samples are recorded until no more sound is detected, and then the audio is played back as a combined loop. The combined loop is then sent through a speaker transducer, which will vibrate the physical sculpture involved in the piece. These vibrations will produce resonating unexpected sound out of the object, creating an almost metaphysical connection between the audience and the sculpture. This piece is inspired by the concept of Synchronicity. Synchronicity is a term that was coined by Carl Jung, founder of analytical psychology. This term is used to describe events that coincide and appear meaningfully related yet lack a discoverable causal connection. Synchronicity (Music for Two Resonating Bodies) displays these odd coincidences right before the audience's eyes, raising questions about how one interprets the world around them in the first place.

Mentor: Jordan Munson

Recyclable Material Detection

Luddy, Engineering and Technology
A common challenge in achieving sustainability goals is the lack of awareness about recyclable materials and proper disposal methods. To address this issue on campus, we are developing a computer vision-based system that identifies recyclable items and informs users of their recyclability. This system will utilize black-box devices mounted above trash cans to detect disposable bottles and cups, encouraging proper recycling habits, and promoting environmental awareness.

Mentor: James Hill