

Poster Presentation Abstracts Session #1

10:30 to 11:30 a.m. Thursday, September 10, 2026 - Location: SUB Bottom Floor Atrium

These abstracts were published unedited to reflect the author's original submission.

Autman, Reiera - Major: Criminology, Marquette University

Mentor: n/a, n/a, n/a

Title: Behavioral Patterns in Urban Violence:

A Comparative Analysis of Homicide Trends in Milwaukee, Indianapolis, and Louisville

Abstract: This study aims to investigate homicide patterns in Milwaukee over the past decade and compares them to those in similar-sized Midwestern urban cities, such as Indianapolis and Louisville through a behavioral criminological lens. Using a mixed-methods approach, this research integrates quantitative data analysis with qualitative insights to discover spatial and behavioral factors of urban homicide. Quantitative methods include databases such as the FBI's Uniform Crime Reporting (UCR) Program and state-specific crime dashboards, as well as Geographic Information Systems (GIS) to identify trends and hot spots. Qualitative methods, including interviews and case studies, are used to provide context to the data, revealing how social, environmental, and behavioral factors all influence homicide rates. Rooted in theories such as social learning and differential reinforcement, the study underlines how behavioral criminology offers a powerful framework for interpreting statistical crime data. Anticipated findings suggest that while homicide patterns vary across cities, common factors, such as population density and lack of community resources, contribute to high rates. The study ultimately aims to provide evidence-based insights and theoretical explanations that can lead to homicide prevention or reduction strategies and contribute to a better understanding of urban violence.

Campbell, Nyana - Major: Psychology and Criminology, Cleveland State University

Mentor: Dr. Michael Horvath, Professor, Department of Psychology

Title: Interviewing AI: Understanding Large Language Model Decision-Making

Abstract: AI is transforming the modern workforce at a rapid pace, creating opportunities and challenges in terms of its use throughout a variety of occupational fields. For researchers, AI can be utilized to gain an alternative perspective, organize information, and simplify conclusions. These tasks can range from basic and repetitive to slightly more complex roles such as decision-making. Artificial intelligence has the potential of effectively assisting in multiple fields and aspects of life in the near future. This research project involves interviewing AI to gain a better understanding of the decision-making process that a large language model (LLM) goes through in order to simplify a 125-item survey on job-seeking strategies with 21 dimensions. The study will use one version of ChatGPT that is signed out and one that is signed in with an email that was created for the study to observe any differences or similarities in the quality of each explanation. When the LLM explains how it decided to shorten the survey, the researcher will begin the interview, focusing on the responses to gather information on the framework and themes within both models of the LLM. Knowing the reasoning behind the decision-making process of a large language model is crucial for research in fields that wish to utilize LLM software as a tool. This study has the intention of providing a broader explanation of the responses that are generated by ChatGPT in terms of reducing the number of items within a survey.

Castaneda, Carlos - Major: Psychology, San José State University

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Mentor: Dr. Karin Jeffery, Lecturer, Department of Psychology

Title: Using Creativity Among College-Level Students to Take Action on Complex Problems Like Climate Change: A Literature Review

Abstract: Climate change continues to accelerate regardless of whether people choose to address it. NASA and the World Meteorological Organization have documented rising sea levels, ocean acidification, and increasingly extreme weather. While most of these responses have focused on policy and technical solutions, Creative Problem Solving (CPS) offers a pathway and cognitive framework that positions individuals, in this case, students, to take action and develop solutions to complex, systemic problems like climate change and sustainability. This literature review asks whether creativity can be utilized to target climate change, and how implementing creative-based approaches within academia may benefit both people and the planet. A structured search through Google Scholar and PubMed (2023-2026) using terms such as "Climate change and creativity behavior" and "Climate change and Creative Problem Solving" identified literature linking CPS training to increased sustainability awareness, green creative behavior, and pro-environmental decision-making across contexts including higher education, team-based organizational settings, and health behavior. Findings suggest that emotional framing matters and appeals to hope, compared to fear, appear to be more effective at motivating sustainable action and creative engagement with environmental problems. Despite these connections, existing research remains geographically limited and rarely centers college and university student populations specifically. This review is one that addresses the gaps and outlines future directions for integrating Creative Problem Solving into college and university curricula as a strategy for equipping students to respond to climate change at both individual and community levels.

Clarke, Isabelle - Major: Psychology, University of North Dakota

Mentor: Dr. Alison Kelly, Associate Professor, Department of Psychology

Title: Communicating Identity Safety Through Diverse Historical Role Models

Abstract: Despite growing calls to diversify the discipline of psychology, students still encounter undergraduate curricula that center White, male, Western psychologists as the early eminent figures in the field. This lack of representation can influence how students from marginalized backgrounds perceive their place in the field, potentially undermining their sense of belonging. Research on Identity Safety Cues (ISCs) suggests that exposure to inclusive signals, such as seeing diverse disciplinary role models, can help counteract these effects. Yet little is known about whether early eminent marginalized psychologists (EEMPs), who were shaped by exclusionary contexts, can serve this role for undergraduate students with marginalized identities (i.e., gender and racial-ethnic minorities). In this study, a national sample of undergraduate students (N = 359) was randomly assigned to listen to a video lecture featuring the life and contributions of an early eminent psychologist (e.g., a Black woman, Black man, White woman, or White man) and answered two open-ended questions about their perceptions of who is valued and accepted within the field of psychology. Black female students were significantly more likely to report feeling more

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confident that their identities are valued and accepted within the field of psychology after learning about the early eminent Black female and Black male psychologists. No other significant differences emerged based on student race or gender. Additional qualitative data add nuance to these findings and suggest that early eminent marginalized figures within a discipline may effectively serve as ISCs for students with marginalized identities.

Edwards, Trinity - Major: Rangeland Resource Science and Management, California State Polytechnic University, Humboldt

Mentor: Dr. Daniel Uden, Associate Professor, University of Nebraska Lincoln, Dept. of Natural Resources and Dept. of Agronomy and Horticulture

Title: Productivity and Diversity Across Nebraska Grazed Systems

Abstract: Nebraska has diverse agricultural practices for beef cattle production from feedlots to open native rangelands. To support livelihoods and the economy, sustain native ecosystems, and continue producing into the future, these systems must be managed for productivity and resilience. This study, conducted during the summer of 2026, compares five grazed systems across a management intensity gradient. We examined trends in productivity, diversity, and habitat structure across systems ranging from annually planted C4 pastures to native Sandhills rangelands. By studying productivity and biodiversity, we aim to better understand the intersection of agricultural production and conservation in Nebraska rangelands. As an indicator of productivity, we used remote sensing to estimate the fraction of solar energy absorbed by plants for photosynthesis (fraction of absorbed photosynthetically active radiation [fAPAR]). As indicators of diversity and ecosystem resilience, we measured vegetation structure, cover, and species richness at each site and used autonomous recorders to document the presence of bird species with various habitat requirements. In ecology, birds are often used as indicators of habitat quality and ecosystem resilience because they are relatively abundant, highly mobile, and respond quickly to changes in habitat conditions. As the human population continues to grow, increasing demands are placed on the productivity of agricultural systems. However, meeting these demands should not come at the expense of ecosystem resilience. The results of this study will inform land-use decisions at the intersection of agricultural production and conservation by comparing agricultural productivity with patterns of ecological diversity.

Gallon, Kahlen - Major: Electrical Engineering, Michigan Technological University

Mentor: Dr. Flavio Bezerra Costa, Assistant Professor, Electrical and Computer Engineering Department

Title: Analyzing Analog Signals To Be Received By Inverter

Abstract: The electric grid is experiencing a substantial increase in renewable energy, specifically solar power. Currently, the grid relies on grid-following inverters to convert the Direct Current (DC) electricity from solar panels into Alternating Current (AC) electricity used by the grid. However, during a blackout, these inverters cannot restart themselves without an external power grid already active. This poses a major risk as renewables become the primary energy source in the United States. To solve this

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potential problem, grid-forming inverters paired with an energy storage source are necessary to restore power without the need of a traditional generator. This project focuses on preparing the analog signal representing solar power, into a signal the inverter can process. This was accomplished by implementing a digital signal processor (DSP), a signal conditioning circuit, and a level shifter. To simulate the solar panel input, a 3.3V signal from a function generator was fed into the signal conditioning circuit, which filtered out noise to clarify the signal. The level shifter was then able to successfully scale the voltage from 3.3V to 11.50V, approaching the 12V target to meet the inverter's high voltage input requirements. Ultimately, this system demonstrates how low-voltage analog signals from renewable sources can be modified and scaled for processing by grid forming inverters.

Guadarrama, Gabriela - Major: Interdisciplinary Studies with EC-6 Bilingual and ESL Certification, Our Lady of the Lake University

Mentor: Dr. Cindy Peña, English Chair, National Autonomous University of Mexico at San Antonio

Title: Latina Mothers' Experiences Learning English

Abstract: This qualitative study explores how first-generation Latina immigrant mothers' experiences learning English influence the educational messages and expectations they communicate to their children. While existing research has examined immigrant mothers' language learning and educational involvement, limited research has specifically on how these experiences shape the educational messages and expectations mothers communicate to their children regarding education, motivation, discipline, and bilingualism. The main research question guiding this study is: "How do first-generation Latina immigrant mothers experience learning English in the United States?" The sub-questions are: 'How do mothers describe their experiences learning English across different contexts (e.g., school, work, and daily life)?', 'How do these English learning experiences shape mothers' beliefs about education, bilingualism, and academic success?' and 'How do mothers describe the educational messages and expectations they communicate to their children?' Guided by a testimonio-informed lens, this study employs semi-structured narrative interviews with first-generation Latina immigrant mothers residing in Texas who have children enrolled in K-12 education. Data will be analyzed using thematic analysis to identify shared patterns and lived experiences across participant narratives. This study seeks to contribute to research on immigrant families, bilingualism, and educational experiences by centering the voices and perspectives of Latina immigrant mothers.

Hamel, Rebecca - Major: Biochemistry, University of New Mexico

Mentor: Dr. Michelle A. Ozbun, Distinguished Professor and The Maralyn S. Budke Endowed Professor of Viral Oncology, Department of Molecular Genetics and Microbiology

Title: A Novel Treatment Strategy for Human Papillomavirus-Associated Cervical Cancer

Abstract: Persistent infections with oncogenic human papillomaviruses (HPVs) are responsible for nearly all cervical cancer (CxCa) cases, which is the fourth leading

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cause of cancer-related illness and death among women globally. Many women are diagnosed with locally advanced CxCa for which the current standard treatment is cisplatin chemotherapy and radiation. However, a substantial proportion of these patients develop persistent or recurrent disease. This highlights the urgent need for new treatment strategies aimed at overcoming treatment resistance and improving treatment outcomes. This work investigates whether an emerging class of therapeutic drugs called c-Jun N-terminal Kinase (JNK) inhibitors can disrupt a key cellular communication pathway that supports expression of the HPV oncogenic proteins E6 and E7, which are necessary for cervical precancer development and cancer progression. We expect that treating HPV-positive CxCa cells with JNK inhibitors will result in decreased E6 and E7 gene and protein expression and hypothesize that this could make cells more susceptible to standard treatments. Future studies will evaluate whether this approach improves chemotherapy and radiation outcomes in HPV-positive CxCa cell lines that have been pretreated with these drugs. These findings could provide evidence supporting the clinical evaluation of JNK inhibitors for HPV-associated CxCa.

Hammond, Chloe - Major: Energy Systems Engineering, California State Polytechnic University, Humboldt

Mentor: Dr. Pascal Biwole, Professor, Department of Engineering

Title: Hygrothermal and Energy Performance Study of Hempcrete

Abstract: Hempcrete is a bio-based alternative building material that is being looked into for its hygrothermal properties. The goal of this study was to evaluate the hygrothermal performance of a multi-layered hempcrete wall in a temperate oceanic climate (California, United States). An experimental study was conducted on three samples of a hempcrete mixture to determine the sorption isotherm and moisture buffer value of the material. Numerical models were developed in WUFI in order to assess the heat and moisture transfer through the wall. The models were validated through data collected from a hempcrete house in Eureka, CA, and experimental results from the literature. Results, including the drying rate, mold growth, condensation risk, time lag, and decrement factor are pending and will be presented during the poster presentation.

Israel, Gilanah - Major: History, Northeastern Illinois University

Mentor: Dr. Wendy Adèle-Marie, Distinguished Professor of History

Coordinator, Jewish Studies

Oakton College, Department of History

Title: Stolen Childhoods: The Nazi Weaponization of German Boys in Literature and Film

Abstract: Propaganda is a tool frequently used by people in power to ensure those around them adhere to their desired plan. This can be innocuous as part of marketing campaigns or more nefarious when used to gain and keep political power. During the entirety of the Nazi Regime (1933-1945), propaganda was an essential tactical element for the regime to control German citizens and advance their political agenda.

Propaganda galvanized the population into adopting, and ultimately accepting, Nazi ideology which included racial hatred, antisemitism, a superior 'Aryan' race, and a Volksgemeinschaft. While propaganda at large was the driving factor, German youth,

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both boys and girls, became a primary target audience for this propaganda to ensure the longevity of the regime. The Reich Propaganda Ministry and Reich Youth Leadership intentionally created and disseminated films and literature through Hitler Youth meetings and school curricula to indoctrinate them into accepting Nazi ideology. Prior research has documented the Nazi emphasis on youth and the propaganda machine as a whole, but less is known about the psychological and social impact on individual German boys of the period, leading to a normalization racial hatred by German boys. The focus of my research will be to examine examples of Nazi youth literature and films to identify the psychological and social messages promoted in these works. This analysis will demonstrate specific mechanisms of indoctrination that were utilized to target German boys and normalize racial hatred among them in ways that benefited the goals of Nazi regime.

Jerome, Ashley - Major: Cognitive Science, University of Connecticut
Mentor: Dr. John Salamone, Director and Professor of Behavioral Neuroscience,
Department of Psychological Sciences

Title: Assessing the Behavioral and Neurochemical Effects of the Atypical Dopamine Transport Inhibitor Vanoxerine (GBR12909) in Male and Female Rats

Abstract: Dopamine (DA) is an essential neurotransmitter for the regulation of behavioral activation and effort-related decision-making. Disruptions in DA transmission contributes to motivational impairments for individuals with major depressive disorder, schizophrenia, and Parkinson's disease. Standard first-line antidepressants, such as selective serotonin reuptake inhibitors (SSRIs), are limited in their ability to treat symptoms of motivational dysfunction and may further exacerbate symptoms. The current study aims to assess the effectiveness of the atypical dopamine transport inhibitor vanoxerine (GBR12909) as a potential treatment for motivational dysfunction. Behaviorally, male and female rats are trained to lever press 5 times for a preferred reinforcement or consume the freely available, less preferred standard laboratory chow. To model motivational dysfunction, the VMAT-2 inhibitor tetrabenazine (TBZ) is used to induce a low effort bias, characterized by a reduction in lever pressing and increase in chow intake. GBR12909 is co-administered alongside TBZ to assess its ability to shift responding back toward the high effort lever pressing. Neurochemically, microdialysis and high-performance liquid chromatography were used to analyze the extracellular content of dopamine and its metabolites DOPAC, and HVA with administration of GBR12909. It is hypothesized that GBR12909 will increase high effort responding via increases in dopamine concentration. Results suggest GBR12909 reverse the effects of TBZ behaviorally in a sex-specific and dose-dependent manner. Preliminary neurochemical results suggest GBR12909 also increases extracellular dopamine content while decreasing DOPAC and HVA. Future research should investigate the therapeutic potential of combining vanoxerine with SSRIs as a treatment for depression to improve both serotonin-related and dopamine-related symptoms.

Kreutzer, Olivia - Major: Microbiology and Infectious Disease, Colorado State University

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Mentor: Erin McNulty, Dr. Candace Mathiason, Research Associate, Professor, Department of Microbiology, Immunology and Pathology

Title: Detection of prions in the ovaries of muntjac fawns born to pre-clinical Chronic wasting disease infected dams

Abstract: Chronic wasting disease (CWD) is a fatal neurodegenerative disease affecting captive and free-ranging cervids (deer, elk, moose) that has been identified in 37 U.S. states, 5 Canadian Provinces, South Korea, and Scandinavia. We have recently demonstrated CWD in utero mother-to-offspring transmission (i.e. vertical transmission) in free-ranging white-tailed deer populations in the southeastern U.S. We also have demonstrated vertical transmission in utero in captive Reeve's muntjac. Yet, little is known about the role that ovaries may play in vertical transmission of CWD. This is primarily due to limited studies focused on reproductive tissues within transmission of CWD. We have conducted a study to assess the presence of prion proteins within ovary tissue harvested from captive laboratory muntjac fawns and fetuses (n=9) from both infected and uninfected dams. Tissue samples harvested from the fawns/fetuses were assessed for the presence of prions using the amyloid amplification assays Protein Misfolding Cyclic Amplification (PMCA) and Real-Time Quaking Induced Conversion (RT-QuIC). Additionally, fixed ovary tissue samples underwent Amplified Immunohistochemistry (AMP-IHC). We found that (4/7) fawn ovaries from infected positively inoculated dams were positive and (0/2) fawn ovaries from CWD negative non-infected dams were positive. Prion accumulation within reproductive tissues such as the ovaries may provide evidence to support a possible germline route of transmission. Findings from this study will continue to improve our understanding of prion load within ovaries, the correlation between pregnancy timelines and infection timelines, how low prion burden dams may still be capable of vertically transmitting disease.

LaDuke, Jarin - Major: Cellular and Molecular Biology, University of Minnesota Duluth
Mentor: Dr. Benjamin Clarke, Professor, Department of Biomedical Sciences, University of Minnesota Medical School

Title: Impact of N-Acetyl Glucosamine and Polyamines on the Proliferation of *Borrelia burgdorferi*

Abstract: *Borrelia burgdorferi*, the causative agent of Lyme disease, exhibits a morphological malleability, transitioning from helical spirochetes to round-bodied L-forms under environmental stress. Because *B. burgdorferi* lacks the metabolic machinery for synthesis of N-acetyl glucosamine (GlcNac), it relies entirely on its environment to maintain its peptidoglycan cell wall. However, the exact biochemical threshold of GlcNac required to maintain classic spirochete morphology versus triggering L-form transformation remains poorly defined. This study aimed to identify the precise minimum concentration of GlcNac across a range of biologically relevant temperatures (i.e., 25°C, 33°C, 37°C, and 40°C). To evaluate this boundary, *B. burgdorferi* cultures were subjected to a 3-fold serial dilution gradient of GlcNac, starting at 10mM, in RPMI media and incubated in the specified temperatures. Morphological shifts and structural alterations were quantitatively and qualitatively analyzed using a dual-approach methodology of confocal microscopy and flow cytometry. Our preliminary

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results show that the corkscrew shape of *B. burgdorferi* is maintained through standard thresholds of GlcNac, but, as the concentration of environmental GlcNac approaches lower concentrations and the temperature increases, the morphology of the spirochete begins to change. These findings set-up a nutritional threshold for the integrity of the cell wall of *B. burgdorferi* and how the microenvironments within the host influence the persistence of the pathogen.

Leonard, Tully - Major: Computer Science and Physical Science, California State Polytechnic University, Humboldt

Mentor: Dr. Charles Hoyle, Professor, Department of Physics and Astronomy

Title: Novel Tests of Gravity Below 50 microns

Abstract: Undergraduate researchers and faculty at Cal Poly Humboldt are using an experiment to measure gravitational interactions over distances of less than 50 microns to search for possible deviations in the Weak Equivalence Principle (WEP) and/or Inverse-Square Law (ISL) of gravity. Violations of either the WEP or ISL could indicate the unification of the Standard Model and General Relativity. Experimental tests of gravity at short length scales are technically challenging because of the weakness of the gravitational interaction relative to other fundamental forces. To account for this, the experiment uses a torsion pendulum with equal masses of two different materials arranged as a composition dipole. The twist of the torsion pendulum is measured as an attractor mass in a parallel-plate configuration is oscillated nearby, generating a time-dependent torque on the pendulum. The magnitude of this torque at this heretofore untested scale will demonstrate either physical deviations from the WEP/ISL or further restrict proposed Quantum Gravity theories that require small-scale violations of these principles. Current efforts are focused on characterizing the magnetic moment of the pendulum to ensure that there are no magnetic false effects present and improving our python-based data analysis code.

Lopez, Matthew - Major: Finance and Economics, University of Colorado Denver

Mentor: Dr. James Reeves, Assistant Professor, Department of Economics

Title: Medicaid Expansion and Educational Outcomes

Abstract: The Affordable Care Act (ACA), enacted in 2010, expanded access to health insurance nationwide, although states could choose whether to adopt Medicaid expansion (U.S. Department of Health and Human Services, 2022). This study examines whether Medicaid expansion affected educational outcomes specifically high school and college graduation by comparing Colorado and adding other states, which expanded Medicaid in 2014, that did not expand. Using a difference-in-differences design supported by an event-study specification, I test whether graduation outcomes in Colorado diverged from those in non-expansion states following implementation. Results are still in progress; preliminary evidence on school enrollment among low-income children is inconclusive. The analysis contributes to the growing literature linking public health insurance access to education outcomes.

Loya, Melodie - Major: Psychology, University at Buffalo

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Mentor: Linda Knol PhD, RDN, LDN, Department of Human Nutrition, Hospitality and Sports Management, Department of Human Nutrition, Hospitality and Sports Management, University of Alabama

Title: Prescription to Plate: Early Outcomes Across Preliminary Food is Medicine Research

Abstract: Prescription to Plate: Early Outcomes Across Preliminary Food is Medicine Research

Food insecurity is a massive problem in the United States, and throughout the world, affecting many low-income individuals and households, as they have less access to food and experience higher variability in eating occasions. Research indicates low-income populations have a considerably higher likelihood of experiencing food insecurity.

To address this, Food as Medicine programs have emerged as interventions designed to provide direct access to fresh, nutritious foods through partnerships between healthcare providers, community organizations, and local food systems. Galvanized by the September 2022 White House Conference on Hunger, Nutrition & Health, the Food as Medicine movement now treats clinically tailored foods, such as produce prescriptions and medically tailored meals as reimbursable, evidence-based tools for ending hunger and diet-related disease by 2030. These programs commonly utilize voucher-based systems redeemable at farmers' markets or grocery stores, or home-delivered fresh produce boxes.

Because factors such as transportation, convenience, and sustained engagement can make or break these interventions, a systematic, side-by-side evaluation of voucher versus home-delivery models is critical to reveal which approach most effectively improves diet quality, enhances food security, and ultimately advances health among at-risk populations.

Martinez, Ethan - Major: Ecosystem Science and Sustainability, Colorado State University

Mentor: Dr. Jeremy K.C. Rugenstein, Associate Professor, Department of Geosciences

Title: Trends in Precipitation and Groundwater d-excess Across the Colorado Front Range: Variability and Comparisons to $\delta^{18}\text{O}$

Abstract: Stable isotope measurements such as $\delta^2\text{H}$ and $\delta^{18}\text{O}$ have a long history of use as hydrological indicators. D-excess is a second-order stable isotope parameter that can be used as a tracer for water movement, as well as an indicator for the influence of various controls on the water cycle, including point-source relative humidity, regional moisture recycling, and evaporative influence. To examine the sources of precipitation and groundwater along the Front Range, we conduct an analysis of d-excess values in precipitation, groundwater, and stream waters across the Front Range.

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We utilize a water isotope dataset spanning from late 2021 to present, generated by a combination of samplers maintained by us as well as collaboration with citizen scientists from up and down the front range. Using this dataset, we analyze data across 14 collection sites that include both precipitation and groundwater samples. We find that d-excess in groundwater exhibits a greater degree of variability than $\delta^{18}\text{O}$, and that there is a tight correlation between the d-excess value of groundwater and elevation of the well head. A similar, but less constrained correlation is also observable in groundwater $\delta^{18}\text{O}$ values. We also find that precipitation exhibits a unique signature in d-excess on the Front Range in which seasonal peaks take place in early Summer and early Fall, with a sharp drop to an annual minimum in the middle of Summer and another minimum occurring in the winter. These findings indicate that d-excess likely has a greater sensitivity to certain environmental/climatological influences than $\delta^{18}\text{O}$.

McCreery, Lee - Major: Social Work, Colorado State University Pueblo

Mentor: DR. Tony Bobadilla, Associate Professor, Social Work

Title: Veteran Theory: Reintegration as a Cultural Process Grounded in Lived Experience

Abstract: Veteran Theory reframes military-to-civilian reintegration as a cultural transition shaped by identity, environment, trauma exposure, and institutional navigation rather than a brief period of individual adjustment (Demers, 2011). Instead of viewing reintegration as a return to a prior civilian identity, the theory positions it as an ongoing negotiation between military and civilian cultural systems, each with distinct norms, communication patterns, and expectations (Smith & True, 2022). Qualitative responses from 23 veterans reinforce this perspective, revealing shared experiences of cultural dissonance, loss of structure, communication mismatch, stress signatures, and adaptive coping strategies developed in the absence of culturally responsive support.

Veteran Theory organizes these lived experiences into four interconnected processes, Return, Navigate, Align, and Advance, which describe how veterans interpret cultural differences, rebuild identity, and create new pathways after service. This culturally grounded framing aligns with prior research emphasizing reintegration as a complex, nonlinear transition (Elnitsky et al., 2019). The framework also outlines culturally aligned mechanisms of action, including low-pressure engagement, predictable structure, cultural translation, movement-optional environments, and strength-forward framing, which support safer and more effective engagement in clinical, community, educational, and carceral settings (Davis et al., 2020).

As an emerging conceptual model grounded in lived experience, Veteran Theory provides a foundation for future empirical research and offers culturally responsive guidance for practitioners and institutions working with veterans (Hoge, 2020; Monteith et al., 2020).

McLaughlin, Robyn - Major: Computer Science, University of Minnesota Duluth

Mentor: Dr. Sophia Knight, Associate Professor, Computer Science Department

Title: Toward a Formal Model of Byzantine Agents in Social Networks

Abstract: Social media has become an important way that people can connect. With its rising popularity, it has greater real-world impact. As such, it is important to understand

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the ways that opinions can form in a social network. Each person in a typical update model will alter their beliefs in each 'round' of updating as a function of how much others influence an individual, regardless of a person's preferences. In an attempt to address this, we describe a model where a person will update their beliefs strategically to maximize their expected utility, or the measure of an individual's preference toward a specific outcome. This model also has the caveat that each person will hold some private belief which they will always be drawn to. Each person will have a common goal of consensus, but a private desire that affects what value the final consensus becomes. To create such a model, we used the AKV Model of Polarization under Confirmation Bias (Alvim et al. 2023) and added two features: a static private belief for each individual agent and a utility function that measures how an action will move an agent towards their preference. We will run simulations of this model using a Python script to measure polarization under different network shapes. We hypothesize that a person will need to be substantially more influential than they are influenced to reach their preferred consensus, but that consensus will generally occur in most networks.

Morales-Makescoldweather, Jacob - Major: Throughout history, resource allocation has shaped relationships among populations, environments, and systems of power, often influencing ecological sustainability and social equity. Correcting these imbalances is important for ensuring equitable access to resources and long-term environmental health. This study investigates whether game theory and vignette-based simulations can reveal and reduce implicit biases that influence environmental justice, resource allocation, and collective decision-making. Historical processes such as bison eradication, land dispossession, and scientific racism have contributed to environmental inequality and continue to shape perceptions of property, identity, and stewardship. Participants will engage with ecological scenarios based on historical or realistic fictional events through interactive, choose-your-own-adventure style simulations. As participants make decisions, new information will be introduced, allowing the scenario to evolve and highlighting the consequences of different choices. Following the simulation, participants will reflect on their decisions and whether additional knowledge would have altered their actions. Using an IRB-compliant mixed-methods design, the study will combine game-based vignettes, tabletop or digital simulations, pictographic reaction measures, surveys, and qualitative storytelling to examine decision-making and implicit attitudes. By employing narrative distancing and a circular economy perspective, the research seeks to encourage engagement with complex environmental and social dilemmas without the defensiveness often associated with political or cultural labels. The study aims to determine whether interactive narrative design can identify hidden biases, promote cooperative approaches to environmental justice, and support educational initiatives that encourage sustainable and equitable resource management., Northeastern Illinois University

Mentor: Erica Krueger, MA, Senior Instructor and HRD Undergraduate Student Advisor
Certified Mental Health First Aider, Human Resource Development Program

Title: Human Resource Development Program

Abstract: Throughout history, resource allocation has shaped relationships among populations, environments, and systems of power, influencing ecological sustainability

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and social equity. Correcting these imbalances is important for ensuring equitable access to resources and long-term environmental health.

This study investigates whether game theory and vignette-based simulations can reveal and reduce implicit biases that influence environmental justice, resource allocation, and collective decision-making. Historical processes such as bison eradication, land dispossession, and scientific racism have contributed to environmental inequality and continue to shape perceptions of property, identity, and stewardship.

Participants will engage with ecological scenarios based on historical or realistic fictional events through interactive, choose-your-own-adventure-style simulations. As participants make decisions, new information will be introduced, allowing scenarios to evolve and highlighting the consequences of different choices. Following the simulation, participants will reflect on their decisions and whether additional knowledge would have altered their actions.

Using an IRB-compliant mixed-methods design, the study combines game-based vignettes, tabletop or digital simulations, surveys, pictographic reaction measures, and qualitative storytelling to examine decision-making and implicit attitudes. By employing narrative distancing and a circular economy perspective, the research seeks to encourage engagement with complex environmental and social dilemmas without the defensiveness often associated with political or cultural labels.

The study aims to determine whether interactive narrative design can identify hidden biases, promote cooperative approaches to environmental justice, and support educational initiatives that encourage sustainable and equitable resource management.

Palmer, Lilly - Major: Sociology, Concord University

Mentor: Dr. Kathryn Nutter-Pridgen, Dr. Kathryn Nutter-Pridgen, Department of Sociology and Social Work

Title: Poverty In Rural Areas of WV

Abstract: Poverty is a socially constructed term shaped by societal norms, values, and policies. In acts of poverty, individuals are viewed in head-turning ways, such as the term, lazy. This study shows the details of poverty, specifically in West Virginia. Amongst individuals living in West Virginia, it heavily impacts the Black community and others that work on minimum wage income. West Virginia faces great poverty than any other in the United States. Many communities that once relied on coal industries for their work, now closed and forced to find other jobs without warning. Families and children in more affected areas have resulted in low-income, limited access to education, healthcare, and infrastructure issues. This study consisted of the quantitative method. This method compared the individuals in the state of the year 2023. In the time the study was compared, at least 1.7 million citizens lived in the state of West Virginia.

This data was conducted by the U.S.Census and the West Virginia Legislature. Results indicated that most individuals in the state work a minimum wage job. To reach the goals) for most individuals will have to work seventy plus hours, and Black citizens

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suffer the most with poverty and other care needs, especially Black women. In the rural areas of West Virginia, the root of the problem of poverty are socioeconomic impacts, economic decline, the lack of essential resources, and demographic shifts. Another cause of poverty in state is generational.

Perez, Yezenia - Major: Kinesiology- Exercise Science concentration, Our Lady of the Lake University

Mentor: Dr. Emily Sauers, Associate Professor, Department of Kinesiology

Title: Active Aging: The Role of Exercise in Self-Esteem and Meaning in Life

Abstract: As the older adult population continues to grow, promoting healthy aging and psychological well-being has become increasingly important. While the physical benefits of exercise are well established, less is known about how exercise frequency influences self-esteem, meaning in life, and overall well-being. The purpose of this study is to examine the relationship between physical activity frequency and psychological well-being among adults aged 65 years and older.

Participants completed a cross-sectional assessment that includes the Physical Activity Scale for the Elderly (PASE), the Rosenberg Self-Esteem Scale (RSE), the Meaning in Life Questionnaire (MLQ), and the Satisfaction with Life Scale (SWLS). Additional measures include a brief medical history questionnaire, body mass index (BMI), and hand grip strength.

It is hypothesized that older adults who engage in more frequent physical activity will report higher levels of self-esteem, greater meaning in life, and greater life satisfaction than those who are less physically active. This research aims to expand current knowledge of the psychological benefits of exercise and may help inform future community-based programs that promote healthy aging and improve quality of life for older adults.

Rodriguez, Marco - Major: Computer Science, Colorado State University

Mentor: Dr. Carlos Ortiz Marrero, Assistant Professor, Department of Natural Sciences

Title: Reducing a Real Sensor Hamiltonian to a Measurable Form

Abstract: Ferrous objects such as buried steel drums, abandoned well casings, underground storage tanks, and metallic debris produce localized magnetic-field anomalies that can be detected using quantum magnetometry. However, the full Hamiltonian of a realistic quantum sensor includes multiple energy levels and interactions that are not immediately compatible with the Error-Corrected Quantum Sensing and Parameter Estimation, or EQSP, framework. In this work, we develop a systematic process for reducing the nitrogen-vacancy center Hamiltonian into an effective two-level form suitable for EQSP-based ferrous-object detection. We begin with the spin-1 NV-center Hamiltonian, which includes zero-field splitting, magnetic-field coupling, and transverse perturbations. A known bias field is introduced to define the sensing axis, and the plus-one and minus-one spin states are selected as a double-quantum sensing subspace. Using secular and two-level approximations, the full Hamiltonian is reduced to an effective model containing a signal-dependent phase term and a transverse error term. The phase term represents the magnetic anomaly produced by the ferrous target, while the transverse term captures unwanted dynamics

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that can generate detectable error syndromes. This reduced Hamiltonian allows EQSP to retain both phase-readout and syndrome information, creating a pathway for estimating properties such as the target's magnetic-moment magnitude while accounting for sensor errors.

Soler, Dominick - Major: Pathobiology, University of Connecticut
Mentor: Dr. Jianzhong Yu, Associate Professor, Department of Physiology & Neurobiology

Title: Elucidating 3' UTR regulation of hdc stop codon readthrough

Abstract: Stop codon readthrough is a translational mechanism in which the ribosome bypasses the stop codon to produce an extended protein isoform with a different biological function. In *Drosophila melanogaster*, the headcase (hdc) gene undergoes stop codon readthrough, producing the canonical hdc70 protein and the extended isoform hdc120, which is enriched in the developing central nervous system. While studies have shown hdc120 may play a role in neural development, the molecular mechanisms regulating hdc stop codon readthrough have not been fully explored. We hypothesize that neuronal-specific hdc stop codon readthrough is regulated by the 3' untranslated region (3' UTR) lengthening. Candidate regulatory regions within the hdc 3' UTR were selected for functional analysis via RNA interference (RNAi). Double-stranded RNA targeting selected regions were designed to induce region-specific knockdown in *Drosophila* S2R+ cells, and changes in Hdc70/Hdc120 are evaluated via Western Blot analysis. To verify results, CRISPR/Cas9 genome editing is used to generate targeted mutations with candidate regions for future functional studies in vivo.

This ongoing research aims to identify the regulatory elements involved in hdc stop codon readthrough and to improve the understanding of post-transcriptional mechanisms that may regulate neuronal protein expression during development.

Ta, Benson - Major: Computer Science, Cleveland State University
Mentor: Dr. Hongkai Yu, Assistant Professor, Department of Electrical and Computer Engineering

Title: Agentic Reward Optimization for Autonomous Highway Driving

Abstract: Reinforcement learning (RL) relies on meticulously designed hand-written reward functions providing feedback to the agent. This is an iterative, time consuming, and error prone process that is a bottleneck of reinforcement learning. This study investigates the effectiveness of using Large Language Model (LLM)-based agents to autonomously design, rewrite, and optimize the reward function to improve autonomous driving behavior. We propose a closed-loop system where previous results are passed to a Claude Code (Fable 5) Agent which iteratively rewrites the reward function for a PPO policy inside a simulated highway environment (highway-env). Each candidate reward function is trained from scratch across 4 seeds. Each iteration is scored on the same fixed measures of real driving quality (crashes, off-road time, lane keeping, steering smoothness, and speed) and is screened by a safety check that rejects rewards that

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drives worse than any previous ones and reverts to the best-known reward. Over the 10 iterations averaged across 4 seeds, the LLM turned a poorly performing starting policy with high off-road rate (17.5%) with unsafe driving behavior, into a policy that only crashed in 7.5% of its episodes with greatly improved lane keeping

Thomas, Makayla - Major: Psychology, California State University, Monterey Bay

Mentor: Dr. Danielle Burchett, Professor, Department of Psychology

Title: A Systematic Literature Review of Stalking as a Precursor to Intimate Partner Violence

Abstract: Stalking is a pattern of repeated, unwanted behavior directed toward a specific individual that would cause a reasonable person to experience fear or distress. National data suggest 33% of stalking cases escalate to physical violence. Limited attention has been focused on its role as a potentially identifiable pathway behavior occurring before intimate partner violence (IPV) which threat management professionals could identify for intervention. This systematic literature review examined evidence of stalking as a warning behavior preceding IPV. We used Google Scholar to identify studies on stalking ahead of IPV, coding for study type (i.e., case studies, single group, multiple group) and whether there were trigger points (e.g., divorce, protective order) before violence. To reduce the risk of bias in study inclusion, relevant dissertations and theses were considered. After reviewing 113 studies and excluding 104 that did not meet inclusionary criteria, we narratively summarized 9 studies, organized by research design, and trigger points. We found zero single case examples, eight one-group case studies, and one two-group study, with many studies finding positive associations between stalking behavior and behavioral and mental health issues. In all nine studies, we found positive associations between in-person stalking behaviors and violence. Limitations included using only one search database. We believe the summarized results demonstrate an important association that can impact IPV-related law enforcement and threat management practices and policies. We hope these results may lead to a better identification of high-risk cases, leading to better detection and intervention strategies for potential victims and perpetrators.

Viorato Arambula, Joel - Major: Environmental Science, Technology, and Policy, California State University, Monterey Bay

Mentor: Dr. Jennifer Duggan, Professor, Department of Applied Environmental Science

Title: Testing the Efficacy of Fencing Types Commonly Used to Prevent Intrusion of Mice Into Salinas Valley Crop Fields

Abstract: This project tests the efficacy of multiple fencing types commonly used by local farmers in the Salinas Valley area in California to keep rodents out of crop fields. In this study, we built three enclosures at the UC Fort Ord Natural Reserve using different fencing types: plastic netting, silt fencing, and a wildlife exclusion fence created by ERTEC Environmental Systems. Each enclosure measured 1m long by 1m wide, with 1 m walls buried ~15 cm into soil. We placed mice in each enclosure, primarily deer mice (*Peromyscus gambelii*) and occasionally pinyon mice (*Peromyscus truei*), and recorded whether each individual escaped from the enclosure within 8 hours. We tested up to 5 mice per day until a total of 20 mice were tested in each enclosure. We hypothesized

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that more mice would escape the plastic netting and silt fencing enclosures than the much costlier wildlife exclusion fencing enclosure. We found that mice had a 100% escape rate from the plastic netting enclosure, a 97% escape rate from the silt fencing enclosure, and a 22% escape rate from the wildlife exclusion fencing. Understanding the escape rates of these mice allows us to assess the efficacy of locally common fencing types farmers use to prevent rodents from entering fields and spreading foodborne diseases, and to facilitate informed risk assessment of farming management practices.

Weston, Joshua - Major: Psychology & Cognitive Science, University of Minnesota Duluth

Mentor: Dr. Kyle Mann, Assistant Professor, Department of Psychology

Title: Clocking In Twice: A Cross-sectional Examination of Burnout and Job Satisfaction in Multiple Job Holders in the United States

Abstract: Multiple job holding (MJH) has become increasingly common in the United States, yet relatively little research has examined the psychological processes that may influence the well-being and workplace outcomes of multiple-job holders (MJHers). Existing research has primarily focused on motivations (e.g., financial reasons, professional experience, etc.), physical health (e.g., hypertension, eye strain, etc.), and perceptions of workload between multiple jobs. This raises important questions about the correlations among variables that may affect employees' well-being among MJHers. The study aims to examine whether variability in the demands and strategies one uses across multiple jobs to regulate one's emotions may explain the strains that MJHers experience. Using a cross-sectional correlational design, 303 adult participants who work multiple jobs were recruited via CloudResearch to complete validated surveys measuring emotional demand, emotion regulation (e.g., cognitive reappraisal, response modulation), burnout, and job satisfaction. We predict that: 1) as emotional demands increase in both jobs, burnout will increase and job satisfaction will decrease; 2) as both jobs increase in cognitive reappraisal use, burnout will decrease and job satisfaction will increase; 3) as both jobs increase in response modulation use, burnout will increase and job satisfaction will decrease. By examining the demands and strategies one uses to regulate emotions associated with MJH, this study seeks to extend the existing occupational health and organizational psychology literature and provide insight into factors that may promote employee well-being and effectiveness as the prevalence of holding multiple jobs grows in the United States.

Wolfe, Anthony - Major: Data Science and Mathematics, California State Polytechnic University, Humboldt

Mentor: Aran Nayebe, Assistant Professor, Machine Learning Department

Title: Tracing Internal Features Behind Introspective Self-Reports and Functional Emotion in Language Models

Abstract: Large language models sometimes report on internal states, but it remains unclear whether these reports depend on specific internal representations or learned self-reporting patterns. Building on recent introspective-awareness work in post-trained language models, this project develops a mechanistic pipeline for identifying sparse

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features for concept identification. Using Gemma 3-27B-IT and Gemma Scope 2, we extend concept-steering experiments from yes/no detection to forced identification. After injecting a target concept representation, we compare target-concept logits against distractor concepts, then causally trace the features responsible for this distinction. Our pipeline selects promising concept/layer/intervention configurations, localizes relevant components via patching, isolates sparse features with sparse autoencoder (SAE) and transcoder attribution, causally tests and semantically labels them, then visualizes them with attribution graphs. We apply this framework to emotional concepts, such as fear, addressing the possibility that language models may represent emotion words without emotion-like functional organization. Here, “functional emotion” does not imply subjective feeling, but refers to internal representations that causally reorganize downstream behavior, a criteria well-accepted in the affective psychology literature. We identify candidate emotional features with contrastive prompts and test them during generation or decision tasks without explicit emotion words. We then measure whether clamping or ablating these features changes attention toward threat-, norm-, or goal-relevant tokens. Overall, our work significantly sharpens introspective self-report with causal, feature-level evidence about whether internal concept representations influence downstream model behavior.

Zakaria, Latifa - Major: PreK-5 Education, Cleveland State University

Mentor: Dr. Grace Huang, Associate Professor, Department of Education

Title: Portraits of Practice: What Teachers Bring to Refugee Education

Abstract: Students from refugee backgrounds (SRBs) face multiple challenges during resettlement, including language barriers, cultural adjustment, unfamiliar school systems, limited formal education, and experiences of trauma. These experiences often influence both their academic achievement and social-emotional well-being. While schools play a critical role in supporting successful integration, many educators report feeling unprepared to meet the complex needs of SRBs. Existing research suggests that teacher preparation programs provide limited training related to refugee education, leaving teachers to develop their knowledge and approaches largely through experience and practice. To better understand how educators shape refugee students' learning experiences, the purpose of this study is to examine teacher portraits and identify thematic patterns that reveal how teachers' attitudes, identities, and relationships influence classroom practices that support SRBs. Drawing from 34 focus groups and interviews with 56 participants, including teachers, administrators, and nonprofit staff in a Midwest state. Using thematic analysis, six preliminary interrelated themes were identified: (1) Professional Mindsets and Beliefs, (2) Personal Dispositions, (3) Personality Traits, (4) Relational Orientation, (5) Responsive Practice, and (6) Teacher Background and Lived Experience. These preliminary themes illustrate how educators' identities, values, and experiences shape their approaches to refugee education. Preliminary findings highlight the importance of relationship-building, empathy, adaptability, and culturally responsive practices in supporting refugee students' social-emotional and academic development. The study underscores the need for professional learning opportunities that equip pre-service and in-service educators and nonprofit staff.