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

Ahmed, Alma - Major: Psychology, University of Colorado Denver
Mentor: Dr, Jason Watson, Research, Department of Psychology
Title: *Affective Impact based on Perceptual Characteristic: Evaluating Natural and Urban Images through Perceptual and Psychological Factors*
Abstract: This study explores how visual features, specifically luminance, relate to emotional and attentional responses to natural and urban images. Building on prior research in environmental psychology and attention restoration theory (ART), we examined 120 images (60 nature, 60 urban), each separated as high or low in visual mystery. Participants rated each image on affective and attentional dimensions such engagements. Luminance was objectively measured using a calibrated luxometer under standardized viewing conditions. Results showed that while both image categories had luminance values primarily between 40 and 50 lux, urban scenes were marginally but significantly brighter and displayed greater variability, including minor outliers. In contrast, nature images had more consistent luminance centered around 40 lux. These findings suggest that visual consistency in nature scenes may contribute to a calming, engaging experience, potentially supporting attentional restoration. The study underscores the value of combining subjective ratings with measurable perceptual features to better understand how different environments impact emotional well-being and cognitive functioning.

Al-Janabi, Bashar - Major: Political Science: Pre- Law; Philosophical Ethics, University of North Carolina at Greensboro
Mentor: Dr. Michele Lemonius, Professor , Department of Peace and Conflict Studies
Title: *In God's Name: Christianity's Role In Shaping American Society*
Abstract: This research explores how Christianity has contributed to the normalization and establishment of patriarchal structures in the United States. Motivated by ongoing gender inequity and the role of religion in shaping cultural norms, this project examines Christianity's influence on American civic identity, legal systems, and gender roles. The central issue addressed is how scriptural interpretation and religious authority have justified and perpetuated gender-based oppression under the guise of divine law. Using a qualitative approach, I analyzed 20 academic sources and conducted 11 interviews with churchgoers. The results revealed three dominant patterns: Christianity's reinforcement of male authority as divine order, its influence in shaping public institutions and policies (e.g., government chaplains, court rituals), and the burden it places on marginalized communities, especially through intersectional lenses. Authors like Mary Daly, Malory Nye, and the Harvard Law Review provided key insights on theology, race, and religious exemptions. These findings suggest that without critical theological reflection and policy reform, patriarchal systems will remain embedded in American society. Further research should assess more churchgoer perspectives and how younger generations and other religious traditions navigate these structures.

Arce, Aliyah - Major: Psychology, Eastern Kentucky University

Mentor: Dr. Jonathon Gore, Associate Professor, Department of Psychology
Title: *Framing the Conflict: Ingroup Bias and the Good Guy/Bad Guy Fallacy in Moral Judgement*
Abstract: The purpose of this experiment was to examine the prevalence of the Good Guy/Bad Guy (GG/BG) Fallacy thinking in a school setting. The GG/BG Fallacy refers to when there is conflict between two sides, and additional negative or positive information is given, and the individual will assume the opposing side is more positive. We have three hypotheses, as follows: 1. The Good Guy/Bad Guy fallacy is more likely to occur when the known information is negative than when it is positive. 2. The Good Guy/Bad Guy fallacy is more likely to occur towards an outgroup member than for an ingroup member. 3. Good Guy/Bad Guy fallacy is strongest for an outgroup member when revealed information about them is negative. A total of 120 college students were randomly assigned to one of four conditions, in which either a student or professor involved in a conflict was framed positively or negatively. Participants then rated both individuals on a series of moral character traits. Results supported all three hypotheses: the strongest GG/BG effects occurred when the professor (outgroup) was framed negatively, leading to more favorable ratings of the student (ingroup). Positive framing did not produce the same contrast. These findings suggest that the GG/BG Fallacy is more likely to occur in response to negatively framed outgroup members in conflict scenarios.

Balyeat, Jon - Major: Biomedical Engineering, University of Connecticut
Mentor: Dr. Kazunori Hoshino, Associate Professor, Department of Biomedical Engineering
Title: *Modeling Mock Human Mouth Device for In Vitro Dental Treatments Assessments*
Abstract: Dental caries and periodontitis continue to threaten global oral health; ethical and anatomical constraints limit early stage evaluation of restorative biomaterials and antimicrobial strategies. A benchtop device that recreates key intra oral physicochemical and microbiological conditions is being constructed for in vitro assessment of dental treatments. The chamber and jaw assembly were designed in CAD and additively manufactured from polylactic acid (PLA) polymer. Integrated heaters, an air pump–driven valve CO_2 circuit, and an embedded heat sensor provide closed loop control of temperature and gas composition, while a removable well plate permits high throughput testing for bacteria. Iterative prototyping yielded anatomically accurate mandibular and maxillary tooth models that can be detached individually for site specific assays. PLA teeth will be colonized with Lactobacillus casei as a proxy oral microbe; time lapse culture will compare growth on surfaces and across fluoride gradients to determine bactericidal thresholds. Sensor logs confirmed uniform environmental conditions and reliable switching of power based off conditions. Initial bacteria cultures, however, failed due to contamination and must be repeated. Planned validation will introduce Streptococcus mutans, hydrogel dental pulp stem cell implants, hydroxyapatite doped PLA teeth, and decellularized spinach leaf scaffolds on titanium or cobalt chromium implants, alongside added humidity, pH and fluoride sensors along with a camera to enhance physiological fidelity.

The platform will mimic oral temperature, CO_2 and geometry while enabling rapid, low cost screening of antimicrobial agents and regenerative constructs. By reducing the need for animal or early human trials with a controllable ex vivo surrogate, it can accelerate translational dental research and improve the success rate of treatments.

****2 Presenteers--Barnett, Tara** - Major: Computer Science, AND, **Bishop, Ivan** - Major: Information Technology, Grand Valley State University
Mentor: Dr. Ira Woodring, Professor, Computer Science Department
Title: *Accessibility in Video Games: A Framework for Developers*
Abstract: The video game industry is an ever-growing form of entertainment and social connection, but despite this rapid growth, accessibility remains an overlooked aspect of game design. Accessibility is a crucial need in today's digital media landscape. This research will address the lack of accessibility in the gaming industry. We are reviewing extensive research articles and are creating a survey to gauge those with disabilities who require these accessibility settings and features. Our goal is to create a functional, developer-friendly framework that can guide a more inclusive design process across a variety of gaming platforms including more traditional forms of gaming, such as consoles and more immersive technologies such as virtual reality. The research aims to spread awareness for the lack of accessibility features and settings in video games, and help build more accessible video games.

Blaising, Brooklyn - Major: Psychology , University of Cincinnati
Mentor: Dr. Pankhuri Aggarwal, Assistant Professor, Department of Psychology
Title: *The psychometric properties of the CES-D scale and its relevance for assessing depression among young adults in India*
Abstract: In India (the most populous country), more than 30% of youth aged 15 - 24, have a diagnosis of depression (United Nations, 2025). Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) is a globally used measure to assess four aspects: depressed affect, somatic symptoms, positive affect, and interpersonal problems. While this measure has been validated among populations across the globe, empirical research on its validity in non-Western groups, particularly in low- and middle-income countries (LMICs), is limited. Assessing CES-D's reliability in culturally diverse populations, like South Asian groups, is essential due to cross cultural differences in depressive symptoms. Western cultures often emphasize cognitive symptoms (e.g., sadness), while South Asian cultures express more interpersonal (e.g., conflict), academic (e.g., disengagement), and somatic symptoms (e.g., pain). Thus, one risks the chance of misdiagnosing, even when using standard measurement tools. Scholars have highlighted the need for adaptation of the CES-D, particularly for minorities in LMICs (Losada et al., 2013, Yu et al., 2025). While the CES-D has recently been used to assess depression among youth in India (Aggarwal & Raval, 2024), no study has examined the factorial structure of CES-D in this population.
This study examines the factor structure of CES-D using Confirmatory Factor Analysis (CFA) among young adults in India. 548 participants (aged 19 - 25) from India filled the CES-D survey online. Our results indicate that CES-D is a reliable tool for assessing

depression among youth in India. However, revisions improved model fit, emphasizing the importance of identity and culture.

Bright, Anthony - Major: Mechanical Engineering Technology, Concord University
Mentor: Dr. Rod Klein, Director of McNair Scholars Program, Psychology
Title: *Bright S.W.E.E.P. (Satellite Waste Extraction and Environmental Projection)*
Abstract: To solve a problem hidden away from the world, one must first look around the world and then look up. Low Earth Orbit is no longer a vast, empty frontier. It is now crowded with debris: defunct satellites, discarded rocket stages, and thousands of high velocity fragments from past collisions. This growing swarm of orbital waste poses a critical threat not only to current satellite infrastructure but to the future of all space operations. The danger is captured by the Kessler Syndrome: a runaway cascade of collisions that could make entire regions of orbit inaccessible for generations. Despite widespread recognition of the risk, meaningful, deployable solutions have remained frustratingly out of reach.
Bright S.W.E.E.P. rises as a focused, tactical response to this escalating crisis. It is a singular autonomous satellite engineered to detect, locate, and retrieve space debris using a robust net capture system. Designed with built in redundancy, the net ensures operational reliability under extreme orbital conditions and during complex retrieval maneuvers. Guided by onboard artificial intelligence and precision thrusters, Bright S.W.E.E.P. turns debris mitigation from a conceptual challenge into a physical, hands-on solution.
This is not a passive observer, it is an active defender of the orbital commons. As humanity grows more reliant on space for communication, navigation, climate monitoring, and exploration, the cost of inaction becomes unacceptable. Bright S.W.E.E.P. marks a critical shift from theory to execution, from delay to duty. If we fail to clean up Low Earth Orbit now, we may lose it, not for years, but forever.

Carter, Beau - Major: Optical Sciences and Engineering , University of Arizona
Mentor: Dr. Dalziel Wilson, Associate Professor of Optical Sciences , Department of Optical Sciences
Title: *Feedback Cooling of a Torsional Oscillator using an Optical Lever*
Abstract: Torsional oscillators are a powerful tool for sensing weak forces, enabling fundamental tests of phenomena such as radiation pressure and gravity. A key requirement for these tests is to cool the torsional oscillator to its motional ground state. We explore ground-state cooling of a torsion oscillator by leveraging two advances: ultrahigh mechanical quality factor (Q) via a strained Si3N4 nanosuspension, and measurement-based feedback using a quantum noise-limited optical lever. By employing a balanced photodetector, the optical lever is immune to classical laser intensity noise, enabling the high measurement efficiency necessary for effective feedback cooling. An intensity-modulated radiation pressure force from an auxiliary laser serves as the actuator. With these components, we evaluate the requirements to cool a torsional oscillator to near 1000 phonons. As an initial demonstration, we cool the 70 kHz torsion mode of a Q~10^8 Si3N4 nanoribbon to 4 K (~10^6) phonons using

a 1 mW optical lever.

Cota , Lazaro - Major: Biology with biomedical emphasis , University of Arizona
Mentor: Dr. David Margolis , Associate Professor with Tenure , Department of Orthopedic Surgery
Title: *Continuous monitoring of fracture healing using wireless sensors*
Abstract: Bone fractures remain a significant clinical burden worldwide, affecting millions of individuals annually and leading to substantial economic costs. Despite advancements in imaging technology, accurately tracking the healing process of bone fractures in real time remains a challenge. This gap leads us to the research question: Can implantable bone strain gauges be used to continuously monitor bone healing in a sheep model? We hypothesized that for this study implantable bone strain (mechanical deformity) gauges can provide an accurate quantitative assessment of bone healing in sheep compared to radiographs. Sheep underwent sterile surgical preparation and implantation of calcium-coated strain gauge sensors onto femur fracture sites. Sensor function was verified with weekly strain data collection and compared against radiographic imaging. As healing progressed from the soft callus phase to the remodeling stage, a corresponding decrease in strain was observed. There was an overall decrease of 75 percent when comparing the averages from week 4 to week 11, this is correlated to the healing of the bone throughout the weeks. These results suggest that calcium-coated strain gauge sensors offer a promising solution to existing gaps in bone healing research. Ultimately, this work advances the development of continuous monitoring techniques that enhance our understanding of fracture repair and support more effective clinical interventions.

David-Egbo, Victoria - Major: Psychology, University of North Carolina at Greensboro
Mentor: Dr. Jessica Caporaso, A.P. Assistant Professor and Head of Advising, Department of Psychology
Title: *Pretending and Protagonist: The Effect of Pretense on Children's Emotion Reactivity*
Abstract: The Batman Effect occurs when children roleplay a character and get an immediate boost in their executive functioning. The current study aims to find which children are more likely to benefit from The Batman Effect. Participants will begin with a temperament assessment. Next, the participants will be split into two groups to do an executive function task: An experimental group where the participants role play a character and a control group where participants do not roleplay. Results of the study could potentially give insight into the effects of psychological distancing on emotion reactivity and spark speculation about its other possible relations to temperament.

Fisher, Sam - Major: Psychology, Sociology & Dance , Grand Valley State University
Mentor: Dr. Bradford Dykes & Dr. Jamie Owen-DeSchryver , Dr. Dykes: Associate Professor & Dr. Owen-DeSchryver: Professor , Dr. Dykes: Department of Statistics & Dr. Owen-DeSchryver: Department of Psychology
Title: *Perspectives of autistic college students on supports and services that address*

their mental health needs
Abstract: As higher education settings begin to develop more inclusive frameworks for students with disabilities, autistic populations are beginning to pursue post-secondary education at higher rates. In response, universities have started integrating a variety of supports and services to promote the overall well-being of autistic students. However, recent research has shown that while a variety of academic and social supports are available, there may be a need for additional resources to address ongoing mental health concerns. This is an issue worthy of significant concern, being that autistic students are at high risk of experiencing mental health concerns, including anxiety, depression, and suicidal thoughts and behaviors. The current study explores the gap in knowledge concerning mental health-specific supports and services for autistic college students. Through a cross-sectional survey, we asked autistic college students to share their first-hand experiences with mental health concerns, support service usage, and barriers to accessing supports. Our survey was distributed to more than 300 universities in the Midwestern United States and measured the experiences of over 65 students. The research findings can be used to inform how colleges and universities implement neurodiversity-affirming mental health supports and services for autistic student populations.

Flores, Michael - Major: Mechanical Engineering , University of Connecticut
Mentor: Dr. SeungYeon Kang, Assistant Professor, Department of Mechanical Engineering
Title: *Finite Element Stress Analysis of Laser-Patterned Graphite Electrodes for Next-Generation Battery Applications*
Abstract: Climate change is accelerating due to continued reliance on fossil fuels, making the development of renewable energy solutions critical. Piezoelectrochemical (PEC) batteries present a promising approach by harvesting energy from mechanical stress or vibrations, such as wave motion along coastlines. Improving charge rates and battery lifespan is key to advancing this technology. One enhancement method is laser patterning, which uses a laser to etch patterns into electrodes. Prior studies show that patterned electrodes can improve both power density and battery lifespan.
Our project aimed to identify which electrode pattern offers the best structural integrity under compression. We simulated three designs—Line, Hole, and Grid—using Finite Element Analysis in ANSYS. Factor of Safety results revealed that the Grid pattern was most structurally stable, followed by the Line, then the Hole pattern. The selected patterns and their mass loss values were based on previous literature and provided a strong foundation for comparing geometric performance.
Real-world testing is expected to validate the simulations. Evaluating cell performance will help identify the optimal mass loss values for each pattern. Improved simulation accuracy will allow us to continue to accurately test additional designs more efficiently. This work supports the broader goal of developing high-performance, structurally sound PEC batteries that can be deployed in diverse environments. Through accurate simulation followed by experimental testing, our research aims to optimize next-generation battery technologies for a more sustainable future.

Gaulzetti, Adriana - Major: Majors: Criminal Justice, Police Studies, Eastern Kentucky University
Mentor: Brian Simpkins, Ph.D., Ed.D., Associate Professor, Homeland Security Program
Title:*Psychological Patterns in Lone-Wolf Terrorism: Analyzing the Unabomber, Oklahoma City Bomber, and Boston Marathon Bombers*
Abstract: The purpose of the study is to explore the psychological traits that contribute to the radicalization of lone-wolf terrorists through a comparative analysis of Ted Kaczynski, Timothy McVeigh, and the Tsarnaev brothers. The research utilizes qualitative methods, including a review of academic literature and content analysis of personal writings and manifestos. Behavioral indicators, ideological influences, and mental health factors were examined across case studies to identify patterns in radicalization. The findings reveal consistent psychological traits such as social isolation, cognitive rigidity, and personal grievances, often reinforced by ideological narratives and online propaganda. These patterns suggest that psychological vulnerabilities, more than ideology alone, play a significant role in lone-actor terrorism. The study concludes that early intervention strategies must address both mental health and ideological exposure to prevent future incidents of lone-wolf terrorism effectively.
Keywords: terrorism, lone-wolf, radicalization, psychological traits, ideology, intervention, propaganda, manifesto

Gonzalez, Sophia - Major: Biochemistry, Loyola Marymount University
Mentor: Dr. Stephen Heller, Associate Professor of Chemistry & Biochemistry, Department of Chemistry and Biochemistry
Title: *Towards the Synthesis of Albicidin*
Abstract: Antibiotic resistance has become a growing public health issue with some bacteria being found to be resistant to all currently available antibiotics. There is a need for new antibiotics to combat this antibiotic resistance. Isolated from Xanthomonas albilineans, albicidin is strongly bactericidal against a range of gram-positive and gram-negative bacteria and has the potential to be a novel clinical antibiotic. Albicidin consists of five major aromatic fragments and an asparagine residue bonded together through five amide bonds. Previous procedures for the chemical synthesis of albicidin require that each of its hydroxyl groups be protected and involve long stepwise linear sequences that reduce overall yields. We aim to bypass protecting groups and shorten these sequences by using chemoselective amidation reactions. Though we aim to synthesis albicidin in its entirety, to date the western half of the compound has been synthesized in two large fragments, an alpha methyl 4-hydroxycinnamic acid bonded to aryl p-aminobenzoate and a tert-Butoxy carbonyl amino cyanopropanoic acid bonded to tertbutyl p-aminobenzoate. Tactics for the construction of the eastern fragment, that two amino dimethoxy benzoic acids bonded together, are under investigation. This poster will discuss the efforts used to synthesis the western half and the amide bonds between them.

Poster Presentation Abstracts Listed by Session #1
Thursday, September 4, 2025 - Location: SUB Bottom Floor Atrium

Goodman, Hazel - Major: Psychology, Concord University
Mentor: Dr. Karen Griffee, Distinguished Professor of Psychology, Psychology
Title: *The Role of Adverse Childhood Experiences on Stress Response in Traditional College Students*
Abstract: Adverse childhood experiences (ACEs) are linked to reduced quality of life for people entering adulthood primarily due to stress, among other contributing factors. Early intervention is vital in supporting ACE survivors. Because of the early exposure to trauma, these individuals are often found to exhibit a heightened stress response, regardless of the stressor's severity, inducing toxic stress. With that in mind, this study will assess traditional college students' stress response levels through a self-reported scale before and after a neutral or mildly stressful video stimulus is shown. Finally, participants' adverse childhood experiences will be scored using the ACE questionnaire. It is hypothesized that those with higher ACE scores will exhibit greater changes in stress levels after the stimulus. Traditional college students were chosen as the target population because college represents a pivotal developmental stage as students enter adulthood. This transition introduces responsibility and independence alongside a new world of possible stressors, increasing emotional vulnerability. This study aims to raise awareness about the impact of adverse childhood experiences, which are often overlooked in areas such as rural West Virginia due to a lack of resources and understanding.

Larremore, Bailey - Major: History, Sul Ross State University
Mentor: Dr. Bryon Schroeder, Assistant Professor, Director of the Center for Big Bend Studies, Department of Anthropology
Title: *Animals of the Past: Faunal Analysis of Surprise Rockshelter*
Abstract: The analysis of animal bones (faunal analysis) from human occupation sites helps deepen our understanding of the past and is a well-established method within archaeology. This poster will present the preliminary results of a faunal analysis at Surprise Rockshelter, located in the Sierra Vieja Mountains of West Texas. This research is among the first zooarchaeological analysis in the Big Bend region of Texas. It will provide essential data on how Indigenous people interacted with animal populations from roughly AD 1000 – 1800. Compared to other rockshelters from the same region and occupational history, Surprise shelter has a very low count of faunal elements at only 165 in total. By understanding the faunal components of the site, I can better understand the site's usage and people's past diet. This poster presents preliminary results from the faunal analysis, Number of Individual Specimens Present (NISP) and the Minimum Number of Individuals (MNI) which are the foundation for addressing larger questions of past human use in the understudied Big Bend Region.

Liang, Edmund - Major: Biological Sciences, University of Connecticut
Mentor: Dr. Andrew Wiemer, Professor, Department of Pharmacy
Title: *Isoform Variation Analysis of Cancer Immunology-Related Proteins Using PCR, Nanopore Sequencing, and Bioinformatics*
Abstract: This project explores isoform diversity in six key immune checkpoint genes,

CD96, TIGIT, DNAM, PVR, PVRIG, and PVRL2, using long-read sequencing. Full-length transcripts were amplified via PCR from pooled peripheral blood mononuclear cells (PBMCs) and cancer cell lines (U2OS, Hep-G2, OVCAR-8) for PVR. Amplicons were confirmed by gel electrophoresis, extracted, and sequenced using Oxford Nanopore technology. FASTQ files were filtered (QUAL ≥ 15), aligned to the human genome with minimap2, and visualized using Integrative Genomic Viewer (IGV) to assess coverage and splicing patterns. Isoforms were identified and quantified using the FLAIR pipeline, which corrects alignment errors, collapses redundant transcripts, and reports expression levels. Variant calling was also performed to detect SNPs and indels within each gene.This project reveals both known and novel isoforms, offering insight into alternative splicing and sequence variation in immune genes. Further implications can help give an understanding to immune regulation in health and disease.

Mobley, Ka'Nysha - Major: Special Education, University of North Carolina at Greensboro
Mentor: Julie Bost , Clinical Associate Professor, Department of Specialized Education Services
Title: *Navigating the Margins : How Race, Language, and Ability Shape Access to Mental Health Services -- and the Role of Educators*
Abstract: This study dives into the intersectional impacts of race, language, and ability on individuals' comfort and access to mental health services, with a particular focus on the role of educators in promoting equitable support. The research identifies recurring barriers such as language inaccessibility, cultural stigma, and lack of awareness of disabilities. Findings from this literature review suggest that educators can serve as powerful allies in reducing these disparities when equipped with appropriate training and resources. Recommendations include integrating cultural humility, emotional safety, and inclusive practices in educational environments to enhance student well-being and mental health awareness.

Nechnach, Malak - Major: Physiology and Neurobiology, University of Connecticut
Mentor: Dr. Natale Sciolino, Assistant Professor, Department of Physiology and Neurobiology
Title: *High-fat diet enhances negative affective behaviors and dysregulates stress-responsive activity of locus coeruleus and other medullary catecholaminergic neurons*
Abstract: Obesity is a growing global health concern often comorbid with stress-related neuropsychiatric disorders such as anxiety and depression. Stress activates norepinephrine (NE)-producing neurons in the locus coeruleus (LC), subcoeruleus (SubCD), C1/A1, and C2/A2 nuclei. However, how obesity influences this response remains unclear. This study investigates how high-fat diet (HFD) affects stress induced NE neuron activity and affective behaviors in mice. Mice expressing tdTomato in noradrenergic neurons (DbhFlpo; RC::FLTG) were fed HFD or standard diet (SD) for 10 weeks, then exposed to acute restraint stress or no stress. Neuronal activity was assessed using Fos expression. Stress increased NE neuronal activity across all nuclei examined in both diet groups. Notably, HFD mice showed elevated LC activity at

baseline and post-stress, with similar trends in the SubCD, but not in C1/A1 or C2/A2. To assess baseline anxiety-like behavior, mice were tested in the open field and elevated zero maze. HFD mice showed increased avoidance of aversive areas, indicating heightened anxiety-like behavior. Depressive-like behaviors were evaluated using sucrose preference, tail suspension, and forced swim tests, but no significant HFD effects were observed. To examine threat avoidance, mice were exposed to a looming visual stimulus, designed to mimic the shadow of an approaching predator, in an arena with a shelter. HFD mice spent more time in the shelter, suggesting increased avoidance to a visual threat. Taken together, these findings suggest that HFD sensitizes stress-responsive NE neurons, particularly in the LC, and promotes anxiety-like and threat-avoidant behaviors.

Parsons, Abraham - Major: Geology & Evolutionary Biology, Grand Valley State University
Mentor: Dr. Figen Mekik, Professor, Department of Physics, Climate Science
Title: *Biological Processes Influence Shell Formation in Planktonic Foraminifera - Is This a Climate Proxy Issue?*
Abstract: Tests, or shells, of millimeter-scale planktic foraminifera (forams) accumulate in open ocean sediments, forming a fossil record from their origin (~500 mya) to modern day. Calcium carbonate forms the mineral walls of foram tests, and various elements become incorporated into the mineral structure based on the physical conditions of the ocean at that time. This makes the study of forams in ocean sediments valuable for studying climate history. Paleoclimate findings based on foraminifera are modestly constrained, and confidence in this proxy supports studies of Earth's climate systems. In this paper, we examine both the biology of foram cells and the geochemistry of their tests. We ask whether biological control of elements at the boundary of cell and mineral wall undercuts the use of forams as precise indicators of oceanic conditions alone. Laser ablation imaging shows that magnesium concentration varies along the axis of mineral growth. This results in variation for paleo-climate estimates derived from analyzing the minerals from these tests. Through literature review, we will examine the origin of this variation and how climate proxies can interpret and account for this variability in foram samples.

Patel, Garv - Major: Neuroscience / Pre-Medicine, University of Cincinnati
Mentor: Dr. Brady Williamson, PhD; Research Assistant Professor, Department of Radiology
Title: *Differential White Matter Correlates of Screen Time and Dialogic Reading in Children Born Extremely Preterm*
Abstract: Children born extremely preterm (EPT) are at risk for altered white matter development, affecting language and cognitive outcomes. This study examined the differential effects of screen time and dialogic reading on white matter connectivity in 4–6-year-old EPT and term-born control (CTL) children (n=15 per group). Language and cognitive assessments included EVT-2, PPVT-4, CELF-P, and WNV. Demographics were reduced using Factorial Analysis of Mixed Data (FAMD) and

clustered to control for group variability. Diffusion MRI data were acquired on a 3T scanner and analyzed using q-space diffeomorphic reconstruction and diffusion connectometry. Results revealed greater white matter connectivity in frontal tracts in EPT children, while CTL children showed greater connectivity in posterior, motor, and language tracts. These patterns may reflect delayed motor and language development in EPT children and distinct neural effects of environmental exposures. This study highlights the utility of connectometry in detecting white matter differences and supports the need for larger, longitudinal studies to explore the impact of screen time and early interventions like dialogic reading.

Rivera III, Raul - Major: Psychology, Loyola Marymount University
Mentor: Dr. Timothy Williamson, Assistant Professor, Department of Psychology
Title: *The Relationship Between Chronotype and Circadian Phase on Memory Consolidation*
Abstract: Memory consolidation involves the transfer of newly learned information from the hippocampus to long-term storage in the cortex, a process that occurs during both wakefulness and deep sleep, particularly slow wave sleep (SWS). Circadian rhythms likely influence this process as cognitive performance has been shown to improve when task participation aligns with a person's chronotype (an individual's natural inclination for when they are most alert or energetic). This study examines whether memory consolidation is enhanced during an individual's self-defined chronotype. Sixteen participants (aged 18-35) completed the Reduced Morningness-Eveningness Questionnaire (rMEQ) to determine chronotype. They then performed a word-pair memory task under four counterbalanced conditions varying in either the morning or evening. Each session included 40 loosely associated noun pairs with recall tested after a delay. We hypothesized that participants would display greater memory consolidation in sessions aligned with their chronotype. Findings may offer insight into how circadian alignment influences memory, with potential applications in educational and clinical contexts.

Spencer, Zachary - Major: Psychology, Grand Valley State University
Mentor: Dr. Benjamin Walsh, Professor, Management
Title: *Toxic Work Climates: How Helpful Are They For Understanding Experiences of Workplace Sexual Harassment*
Abstract: Our study investigates the extent to which three dimensions of a toxic work climate - organizational tolerance for sexual harassment (OTSH), abusive supervision climate (ASC) and workgroup incivility climate (WIC) - predict women's experiences of workplace sexual harassment. We recognize three distinct categories of sexual harassment: gender harassment (e.g., degrading and misogynistic comments), unwanted sexual attention (e.g., sexual advances imposed without consent), and sexual coercion (e.g., sexual bribes or threats related to workplace pressures). OTSH is recognized as the single best predictor of workplace sexual harassment. But in addition to OTSH, we sought to understand how ASC and WIC relate to sexual harassment, because supervisors play a critical role in sexual harassment given the

power differential between supervisors and employees, and workgroup incivility climate may also be important to consider because coworkers shape norms for (dis)respect in the workplace. We anticipate that all three climate dimensions will explain significant variance in women's sexual harassment experiences. Data were collected from N = 92 working women who completed validated measures of each construct. Regression analyses showed that ASC explained the most variance in sexual harassment experiences; abusive supervisors increased risk for sexual harassment. Implications and future research directions will be presented.

Sunlin, Kayla - Major: Psychology, The Chicago School of Professional Psychology
Mentor: Dr. Felice Mayes, Teaching Faculty, BA Psychology
Title: *The Psychological Impact of Childhood Trauma on Substance Addiction in Adulthood*
Abstract: My research looks at how childhood trauma can play a significant role in the development of substance abuse later in life. A lot of people who struggle with addiction have gone through a lot of trauma, such as neglect, abuse, or growing up in a toxic environment. These early experiences can change how the brain handles stress, decision-making, and overall emotions, which can then lead someone to turn to drugs or alcohol to cope. I'm using both surveys and interviews to get a better understanding of this connection. The people in this study are adults who have been succumbed to trauma as children and have also had a history with substance abuse. I want to hear their stories, and learn how their past trauma might have shaped their life and their struggles with addiction. By combining personal stories with data from tools such as ACEs questionnaire and addiction assessments, I hope that I can show how strong the link truly is. The goal of this project is to raise awareness and hope to shift the perspective on how people view addiction. I want people to understand how addiction is not always people just making poor decisions or having lack of willpower, but can be about pain that was never addressed.

Tadesse, Esate - Major: Biology, Northeastern illinois
Mentor: Dr.Campbell, Dr.Campbell, Biology
Title: *MOSS BIOBAGS AS AN AFFORDABLE & ACCESSIBLE BIOINDICATOR OF AIR POLLUTION*
Abstract: Sphagnum moss, a genus that consists of a variety of species, has been utilized throughout history for various medical uses for its absorbent properties. Presently, Sphagnum is used worldwide in studies as a bioindicator to track pollution as a more affordable alternative to expensive electronic equipment. Our current study is a continuation of work using Sphagnum to detect airborne pollution and particulate matter. Previously, our group had found indications of relatively higher amounts of airborne metals detected using Sphagnum biobags placed outside of a local scrap metal recycling facility. In this study, we aimed to verify that work, as well as detect the pollution spread from this central point. The biobags are constructed of one gram of dried Sphagnum placed in a small breathable fabric bag. We hypothesized that the highest concentration of metals will be found at the scrap metal facility, and as we

move outward in concentric _ mile rings in each cardinal direction, the amount of metals detected will decrease. The bags were tested after being placed over one week and four week periods. Samples were analyzed with a Bruker pXRF machine to detect the spectra and relative concentration of target metals present. The results are still being analyzed and may also reflect weather events, such as rain, that occurred over the duration of the bags exposure. We anticipate our findings to show that Sphagnum biobags coupled with pXRF can be a low cost and effective way to detect air contaminants.

Valle, Roman - Major: Physics, University of Arizona
Mentor: Dr. Tai Kong, Assistant Professor, Department of Physics
Title: *Crystal Structure and Magnetic Properties of Transition Metal (Ta, Cr, V; Mo, Fe) Based Inorganic Compounds for Magnetic Applications*
Abstract: The increasing global demand for magnetic materials has highlighted the vulnerability of supply chains that rely on rare earth elements (REE). Many of these are considered ‘critical materials’ due to their scarcity, cost, environmental and geopolitical sourcing risks. This project explores alternatives in the form of REE-free and REE-lean compounds that exhibit magnetic properties comparable to REE materials. Specifically, our focus is on two families of compounds: (1) transition metal phosphides of the form Ta–Cr–P and Ta–V–P, and (2) ternary intermetallic systems of the form Mo-Fe-Si. These family compounds were selected due to their structural tunability, underexplored physical behavior, and compatibility with commonly available synthesis and analysis techniques. This research is guided by an exploratory, data-informed methodology centered on experimental materials synthesis and structural characterization. This research aims to fill a gap in the current understanding of how specific element substitutions (such as replacing Cr with V) may influence phase stability, crystal structure, and potential magnetic behavior. To date, synthesis and X-ray diffraction analysis have confirmed the successful formation of the Ta-Cr-P target phase, that being TiNiSi-type structure at room temperature. Physical property measurements were conducted; Nonmagnetic first order phase transition was found in TaCrP at around 250K. Further trials are ongoing for Mo-Fe-Si and Ta-V-P. Once structural confirmation is achieved, physical properties such as temperature-dependent magnetic susceptibility and thermodynamic behavior will be measured. This project contributes to the growing effort to identify REE-free alternatives by categorizing the ternary systems that may support future magnetic applications.

Villalobos Acosta, Galilea - Major: Criminal Justice, University of Colorado at Denver
Mentor: Dr. Sasha Breger, Associate Professor, School of Public Affairs
Title: *Types of Liquor Laws and Their Effects on Violent Crime and Incarceration Rates*
Abstract: Drug usage is not a new concept, and alcohol is the most widely used drug in the world (Mukku et al., 2012). The consumption of alcohol is often linked to violent and aggressive behaviors (Boles et al., 2003) with at least 40% of the violent offenses committed becoming a result of physical violence of an intoxicated individual (Park et al., 2021). Violent crime may result because of intoxication and intimate partner

violence, sexual assault or rape, and homicide are the focus of my research. Liquor laws are important for the understanding of violent crime and whether or not the laws increase or decrease the likelihood of offending. I will examine whether the days alcohol is sold, the time, and the type of alcohol increase or decrease violent crime. To answer this, I will compile different statistics from various databases and analyze the crime rates and whether or not they increased or decreased as a result of liquor restrictions. I anticipate finding that the different factors for alcohol sales influences violent crime rates. Understanding the impact and influence that liquor laws have on violent crime may help inform policy and lead to more effective crime reduction strategies.

Walker-Gulley, Tori - Major: Urban Planning , University of Cincinnati
Mentor: Hayden Shelby, Professor , School of Planning
Title: *Diversity in Design: Integrating Community Development and Urban Planning for Inclusive Neighborhoods in Cincinnati*
Abstract: This study looks into how important urban design and community development strategies are for promoting social equity and reducing long-standing differences in Cincinnati's neighborhoods that don't obtain enough attention. This study looks at how the different histories, changing demographics, and current urban forms of Avondale and Carthage require different planning approaches. The paper looks at how different planning methods affect society, the economy, and the structure of communities. It does this by using quantitative data on population, race, income, and housing stock, as well as geospatial mapping. This method fills in a gap in the current literature by making a clear connection between the intentional design part of community resilience and the specific situations of these two neighborhoods. The main point is that combining ideas from urban planning with community-led development projects that are specific to the needs and histories of each neighborhood can bring about changes in social justice and economic growth, which will improve the quality of life in communities that don't have privilege. The expected results will lead to planning and community development designs for different urban areas that are more focused on people, take history into account, and promote fairness.

Wysong, Jessica - Major: Medicine (Basic Medical Sciences Emphasis), University of Arizona
Mentor: Dr. Ashley Snider, Professor, School of Nutritional Sciences and Wellness
Title: *Acid Ceramidase as a Therapeutic Target in Ulcerative Colitis*
Abstract: Inflammatory bowel disease (IBD) is a condition characterized by persistent mucosal inflammation, which can lead to the development of ulcerative colitis or Crohn's disease. Sphingolipids play a crucial role in the signaling pathways that influence inflammation in IBD. In particular, acid ceramidase (AC), a lysosomal enzyme involved in sphingolipid metabolism, may contribute to the recruitment of immune cells and the facilitation of pro-inflammatory responses. However, the mechanistic role of AC in chronic disease models remains unclear. Therefore, this study aims to investigate the impact of AC loss in myeloid cells on the function and migration of

macrophages. We hypothesized that the absence of AC would lead to decreased phagocytic activity and impaired migration to sites of inflammation. To test this, we isolated bone marrow-derived macrophages (BMDMs) from AC(fl/fl) and AC(MYE) mice and polarized the cells towards an M1 or M2 phenotype. We then assessed the BMDMs using flow cytometry and transwell migration assays to examine the mechanisms of immune cell function and recruitment. We found that AC deficiency reduced polarization of BMDMs to a pro-inflammatory M1 phenotype and decreased phagocytic activity of M2 macrophages. Furthermore, AC loss impaired macrophage recruitment to inflammatory sites. These findings suggest that AC plays a regulatory role in macrophage function during intestinal inflammation. Altogether, this study provides insight into the role of AC in colitis and may inform the development of sphingolipid-targeted therapies for IBD.

Zoulek, Angel - Major: Biochemistry, Grand Valley State Univeristy
Mentor: Dr. Agnieszka Szarecka, Professor, Cell and Molecular Biology
Title: *Investigating Binding Modes of an Experimental Allosteric Inhibitor, BIBR-1532, to Human Telomerase*
Abstract: Due to its ability to synthesize new telomeric repeats, telomerase (TERT) allows cells to proliferate beyond the Hayflick limit. A majority of cancer cells exploit this mechanism to continue dividing by overexpressing TERT. Thus, inhibiting TERT could be a part of anti-cancer therapies. To date, no allosteric inhibitor of human TERT (hTERT) has passed clinical trials, but an experimental compound, BIBR-1532, has been shown to inhibit hTERT in vitro. Its binding mode to hTERT has not been conclusively established. In this project we identified 43 cavities on the surface of all four subdomains of hTERT and the TPP1 regulatory protein bound to hTERT. We then used Attracting Cavities and Autodock Vina algorithms to dock BIBR-1532 to these pockets to predict the ligand's binding affinities and poses, and to identify the sites with the greatest inhibitory potential. Although the affinity scores depend on the box size, we identified three cavities with affinity scores ranging from -9 to -8 kcal/mol that are located at the interfaces between RBD and Thumb, RBD and Fingers, and TEN and TPP1, respectively.
Ultimately, we aim to use our docking results to inform a design of modifications to the BIBR structure which will improve the binding affinity and pharmacokinetic parameters.