Schedule of Events

April 16, 2026

Nebraskan Student Union Ponderosa Rooms

Thursday, April 16, 2026

7:30 am – 9:00 am ..... Poster set up (Session 1)

9:00 am - 11:00 am ..... Session 1: Natural & Physical Sciences Poster Presentation & Judging

11:00 am - 11:30 am ..... Poster Removal (Session 1) and set up (Sessions 2a & 2b)

11:30 am – 1:30 pm ..... Session 2a: Behavioral & Social Sciences Poster Presentation & Judging
Session 2b: Fine Arts & Humanities Poster Presentation & Judging

1:30 pm – 2:00 pm..... Poster Removal (Sessions 2a & 2b) and set up (Session 3)

2:00 pm – 3:30 pm ..... Session 3: Professional & Applied Studies Poster Presentation & Judging

3:30 pm – 5:00 pm..... Poster Removal (Session 3)

10:00 am – 2:15 pm ..... Oral Presentations

4:30 pm ..... Presentation of Awards

Oral Presentations Schedule

Session 5 (Ponderosa C)

10:00-10:15	Caleb Rother (Communication)
10:15-10:30	Richard Brown (English)
10:30-10:45	Tim Ledesma (Psychology)
10:45-11:00	Tyler Wong (Psychology)
11:00-11:15	Marcus Utecht (Teacher Education)

Session 6 (Ponderosa D)

10:00-10:15	Dylan Seitz (History)
10:15-10:30	Dylan McCoy (Teacher Education)
10:30-10:45	Miho Nakane (English)
10:45-11:00	Persephony Tobin (English)
11:00-11:15	Abby Trantham (English)

Session 7 (Ponderosa C)

11:30-11:45	Arielle Lawrence (Political Science)
11:45-12:00	Chayton Kumpost (Biology)
12:00-12:15	Joseph Roeder (Biology)
12:15-12:30	Maddie Wocicki (Biology)
12:30-12:45	Peggy Huss (Biology)

Session 8 (Ponderosa D)

11:30-11:45	Amelia Rodgers (English)
11:45-12:00	Liz Eberspacher (English)
12:00-12:15	Connie Gassaway (Political Science)
12:15-12:30	Kennadi Ureste (Political Science)
12:30-12:45	Brooks Glanzer (Political Science)

Session 9 (Ponderosa C)

1:00-1:15	Darynee Palser (Biology)
1:15-1:30	Joe Paysen (Biology)
1:30-1:45	Brianna Carroll (Kin. & Sports Sci.)
1:45-2:00	Lily Seibert (Comm. Disorders)
2:00-2:15	Jaden Longfellow (Political Science)

Session 10 (Ponderosa D)

1:00-1:15	Ella Ferguson (Political Science)
1:15-1:30	Agustina Abdo (Political Science)
1:30-1:45	Yuki Goto (Political Science)
1:45-2:00	Gabby Roche (Political Science)

Oral Presentations

Room: Ponderosa C

Session 5

10:00 am **Caleb Rother:** *Those Who Did Not Die": A UNK Student Short Film*
(Mentor – Jacob Rosdail)

10:15 am **Richard Brown:** *My Sister Would Call Me*
(Mentor – Brad Modlin)

10:30 am **Tim Ledesma:** *The Influence of Myricetin on Zebrafish Circadian Rhythm*
(Mentor – Evan Hill)

10:45 am **Tyler Wong:** *Click for a Chance to Win! Visual Attention in Gambling*
(Mentor – Katherine Moen)

11:00 am **Marcus Utecht:** *Exploring Mental Health Effects on Elementary Student Learning*
(Mentor – Dena Harshbarger)

Room: Ponderosa D

Session 6

10:00 am **Dylan Seitz:** *The Breakdown of Identity, Community, and Culture – A Case Study on the Legacy of the Closure of Saint Mary's Catholic Church on its Former Members*
(Mentor – Amber Alexander)

10:15 am **Dylan McCoy**: *The History and Culture of Tattooing: A Study in Curriculum Development*
(Mentor - Naheed Abdulrahim)

10:30 am **Miho Nakane:** *Cognitive Transfer in L2 Phonological Processing: Investigating the Interference of Romaji Knowledge on English Pronunciation Prediction*
(Mentor – Megan Hartman)

10:45 am **Persephony Tobin:** *The Failure of the Percy Jackson Films and Its Effects on YA Culture*
(Mentor – Seth Long)

11:00 am **Abby Trantham:** *Narrative Video Game Writing Project*
(Mentor – William Burns)

Room: Ponderosa C

Session 7

11:30 am **Arielle Lawrence:** *Nebraska: The Good Life*
(Mentor – William Aviles)

11:45 am **Chayton Kumpost:** *Investigations into Benzyl Isothiocyanate as a potential alternative to Fluoride*
(Mentor – Austin Nuxoll)

12:00 pm **Joseph Roeder:** *Examining how vaping impacts the response of B cells to peanut*
(Mentor – Joseph Dolence)

12:15 pm **Maddie Wocicki:** *Elucidating how vaping impacts the response of macrophages and T cells to peanut*
(Mentor – Joseph Dolence)

12:30 pm **Peggy Huss:** *Comparative genomics reveals patterns of cryptic speciation in* Piranga flava *in the Neotropics*
(Mentor – Jacob C. Cooper)

Room: Ponderosa D

Session 8

11:30 am **Amelia Rodgers:** *Shaping the Detective Reader: T.S. Eliot and Dorothy L. Sayers on Reader Formation*
(Mentor – Annarose Steinke)

11:45 am **Liz Eberspacher:** *Form and Experimentation In Krazy Kat and Calvin and Hobbes*
(Mentor – Susan Honeyman)

12:00 pm **Connie Gassaway:** *The Impacts of Lobbying on US and Foreign Policy*
(Mentor – Chuck Rowling)

12:15 pm **Kennadi Uresti:** *Dehumanization and Political Communication: Analyzing the Trump Administration's Rhetoric Toward Immigrant Populations*
(Mentor – Chuck Rowling)

12:30 pm **Brooks Glanzer:** *Farmers and the Land: An Overview of the Relationship*
(Mentor – Peter Longo)

Room: Ponderosa C

Session 9

1:00 pm **Darynee Palser:** *Seed banks of restored wetlands from central Nebraska (Mentor – Letty Reichart)*

1:15 pm **Joe Paysen:** *Lizard abundance and habitat affinities in upland grasslands in the Nebraska Sandhills (Mentor – Keith Geluso)*

1:30 pm **Brianna Carroll:** *Battle Blocks (Mentor – JP Rech)*

1:45 pm **Lily Seibert:** *Accuracy of Self-Reported Hearing Loss in Nebraska Agricultural Workers (Mentor – Jan Moore)*

Room: Ponderosa D

Session 10

1:00 pm **Ella Ferguson:** *Politics and the Freedom of Educators: A View from Nebraska Public Schools (Mentor – Satoshi Machida)*

1:15 pm **Agustina Abdo:** *Corruption and Violence Limiting Economic Development in Ecuador (Mentor – William Aviles)*

1:30 pm **Yuki Goto:** Regional differences in the U.S. student perceptions of China *(Mentor – William Aviles)*

1:45 pm **Gabby Roche:** *Why Women Run: Factors Influencing Female Candidate Recruitment in State Legislatures (Mentor – Diane Duffin)*

2:00 pm **Jaden Longfellow:** *Identifying Warning Signs of Autocratization : Process-Tracing Analysis of Autocratizing Populist Right-Wing Regimes in Hungary and the United States (Mentor – William Aviles)*

Undergraduate Oral Presentation Abstracts

Behavioral & Social Sciences

Political Science

Ella Ferguson
Mentor: Satoshi Machida
Title: *Politics and the Freedom of Educators: A View from Nebraska Public Schools*

In recent years, rising political partisanship has been observed in various fields. For public educators on the national scale, studies have found that they experience politics as a job-related stressor on a higher scale than the average adult (Woo et al, 2022). However, further research is needed on the specifics of how politics affects educators' freedoms on a state-by-state basis. This study examines the impact of politics on educators' freedoms among K-12 Nebraska public school teachers in and out of the classroom (curriculum, student/parent interaction, ability to use social media, administrator involvement, and ability to teach subjects such as race when relevant). To address this question, the present research conducted an online survey among K-12 public school teachers in Nebraska. The statistical analysis relying on the survey data reveals that political pressure reduces educators' sense of freedom in some fields such as social media use. These significant results are seemingly driven by elementary (K-6) teachers. This implies that Nebraska public elementary school teachers feel more restricted in their ability to engage in free speech outside of the classroom, indicating that politics do play a role in how they perceive their everyday freedoms as teachers.

Brooks Glanzer
Mentor: Peter Longo
Title: *Farmers and the Land: An Overview of the Relationship*

Farmers have a lot to provide for those wanting to protect and care for the environment, whether that be through policy or their own hands-on work. It should be the goal of every American to always think about the environment around them, as this world is the only one we have. In South Central Nebraska, this is more than evident. One of the easier ways to care for the environment that farmers implement is how they work the land. Planting some sort of cover, such as the cover crop rye, can aid in the prevention of soil erosion (Lockeretz 1978, 562). A vast majority of farmers now use this as commonplace, especially in South Central Nebraska. Another method being added into the techniques used by farmers to protect the environment comes in the form of mitigating nitrates in groundwater, something that a lot of farmers are conscious seen through the fact that the state of the soil is the largest determining factor for the application of fertilizer (Bosch, Cook & Fuglie 1995, 18). This further shows that farmers can, and often are, the biggest promoters of the environment. As our available technology becomes more advanced and scientific knowledge is expanded, the environment can be best served and protected by listening to the individuals who are actively working and living off the land today.

Agustina Abdo
Mentor: William Aviles
Title: *Corruption and Violence Limiting Economic Development in Ecuador*

This paper discusses how corruption and violence constrain economic development in Ecuador. It argues that these illicit power structures generate persistent underdevelopment, which in turn reinforces them, creating a detrimental cycle. Therefore, the study outlines ways to overcome this self-reinforcing loop and achieve genuine state-grounded public security and socioeconomic progress. Information from previously published articles, policy papers, and governmental reports is used to understand the political accountability, social security concerns, and state-gangs conditions shaping national outcomes. Moreover, explanations alongside a timeline are presented on how organized crime groups have become economic enterprises and political actors, playing a major role in the security crisis. They direct not only violent events in prisons and attacks on politicians, but also the transformation of low-income communities, where the government has lost its monopoly of coercion, and society in general into dangerous areas and recruiting places for young people. Hence, the reasons for the decline in investment, human capital development, revenue, and trust in the government become evident. Moreover, securing peace through government-

gangs' comprehensive negotiations is not a definitive solution because it is detrimental for society in the long-term. The importance of this research is highlighted as democracy and the rule of law are undermined, and Ecuadorian's daily life is significantly disrupted. Additionally, this is a global issue since instability directly affects the international supply chain of its legal commodities, and drug trafficking and crime ripple across borders as several nation-states get involved in the production, processing, transit, reception, and consumption of illegal drugs.

Connie Gassaway
Mentor: Chuck Rowling
Title: *The Impacts of Lobbying on US and Foreign Policy*

The topic I would like to pursue for an undergraduate research project is "The Impact of Lobbying on US and Foreign Policy Making." The research question: How do Lobbyist have a direct impact on Policies around the world and domestically? Specifically, my research question will focus on the impacts made by lobbyists in supreme court cases domestically and their impact on environmental and healthcare rights in other countries. I believe that the knowledge that most people have about lobbyists is domestic such as the impact they have on legislation surrounding Big Oil companies and their advocating strategies to change regulations. This project includes a very in-depth research of the impacts surrounding Lobbyist by going through scholar papers, looking into the impacts on other countries, and looking into changed legislation because of a lobbyist firm.

Gabby Roche
Mentor: Diane Duffin
Title: *Why Women Run: Factors Influencing Female Candidate Recruitment in State Legislatures*

Despite a century of advancement in American women's political power, it remains that women comprise only a third of the representatives elected to state houses. Political science scholarship attributes female underrepresentation to several factors: 1) gender differentials in career pathways to political office, 2) disparate efforts by party leaders to recruit women, and 3) differences in the ways men and women approach the decision to run for office. Carroll and Sanbonmatsu's (2013) landmark study of gender pathways to state legislatures uncovers a relationally-embedded model of candidate recruitment, in which women are more likely to seek election if they are encouraged by others. These authors find that women tend to downplay their achievements and qualifications while men exaggerate theirs. Thus, women often need to be convinced. Carroll and Sanbonmatsu last collected their data on female candidate recruitment in 2008, calling into question their pertinency today. This study aims to discover how well

the former patterns behind female recruitment to state legislatures still apply. To this end, I examine candidate recruitment to the Nebraska Unicameral, deriving hypotheses about women's decisions to run from existing literature in political science and testing them against the recent experience of women who served in the Unicameral.

Kennadi Ureste
Mentor: Chuck Rowling
Title: *Dehumanization and Political Communication: Analyzing the Trump Administration's Rhetoric Toward Immigrant Populations*

Political communication is often combined with psychological tactics to generate a more desirable response from those that are delivering a message. This research investigates how the Trump Administration has invoked the dehumanization of immigrants, specifically those from Mexico, through political speech. A discourse analysis of rally speeches, social media posts, and statements made on various media outlets shows that the Trump Administration uses certain rhetoric that could resonate well with MAGA loyalists to reinforce their policy objectives. This administration has intertwined the culture of the MAGA community with the psychological components of political communication, and the result has been an "us versus them" mentality. This project contributes to the knowledge of how political leaders can achieve the goals of their administrations, even when they go outside of traditional norms. Tactics for successful political communication are much more complex than simply sharing messages with the broader population, with psychology playing a large role in how leaders can embed their views into the communities that they represent. By referring to illegal immigrants as nonhuman organisms such as aliens or animals, the Trump Administration has made it easier to influence their supporters' views on immigration policy in the United States. This research further develops the idea that political communication isn't just a strategy for advancing policy goals, but also a mechanism for psychological construction among intended audiences.

Yuki Goto
Mentor: William Aviles
Title: *Regional differences in the U.S. student perceptions of China*

I will research how Nebraska students perceive China. The survey will mainly target undergraduate students at different campuses of the University of Nebraska (UNK, UNL, and UNO) and assesses whether they perceive China as a competitor, enemy, or partner, and whether there are any differences between them and the national average. In addition, how to explain whether they are interested in national affairs. I hypothesize that perceptions of China vary by multiple factors, like which party they

support and where they get their news, contact with Chinese people, and perceived economic or military threat. I will send a questionnaire to them by email, conduct a survey, and compare the results against Pew Research Center data. After reviewing, I will analyze the survey data quantitatively based on the data and carry out the analysis. I aim for more than 500 responses. I expect that most of them have apathy toward China, primarily view China as a competitor, and while viewing China as a partner, primarily in economic domains I would say the specific students who support the Republican Party and often watch Fox News are more likely to view China as an enemy. The national survey performed by Pew Research can't explain the differences between the states, but we can deepen our understanding of national affairs and foreign policy from a micro perspective.

Arielle Lawrence
Mentor: William Aviles
Title: *Nebraska: The Good Life*

Nebraska has been living in a time capsule for decades on many fronts; however, the most pressing issue it faces is its stance in the ongoing War on Drugs. Since President Nixon declared that the United States is under constant threat from the surge of opioids, narcotics, and marijuana, Nebraska has upheld a prohibitionist position throughout these years. In contrast, neighboring states like Colorado, South Dakota, and Minnesota have made significant strides away from the tight grip the United States has had on various drug policies, particularly those regarding marijuana. Nebraska's neighbors are steadily moving away from the harsh regulations on marijuana within their borders, but why has the Cornhusker State remained steadfast in its opposition to cannabis? I will address this question by examining various pieces of legislation introduced in the Nebraska Unicameral for and against the legalization of marijuana, as well as specific referendum drives between 2015 and 2025. Additionally, I will examine the transcripts of legislative hearings and floor debates, the political rhetoric employed by Nebraskan state senators and governors, and the influence of outside actors on various policymaking decisions. While there are several potential explanations for this continuity in policy, including policy diffusion, I anticipate that the Interest Group model offers a clearer understanding of why Nebraska has maintained this prohibitionist stance in both the region and the nation. The Interest Group Model emphasizes key pillars, such as the Kinship order and the Economic order, which are highly relevant to Nebraska's prohibitionist paradigm. Navigating through political rhetoric, the introduction of legislation, and various political models is crucial in deciphering this ongoing puzzle within Nebraskan borders. Furthermore, my research project will illuminate the plight of this deep red state locked in an endless struggle against the current era.

Jaden Longfellow
Mentor: William Aviles
Title: *Identifying Warning Signs of Autocratization : Process-Tracing Analysis of Autocratizing Populist Right-Wing Regimes in Hungary and the United States*

In this paper I examine the process of democratic backsliding in the United States and Hungary, and the process by which the Republican and Fidesz parties went from right-wing parties accepting liberal-democratic norms into illiberal right-wing populist parties. I use process-tracing to compare the roles played by political polarization (specifically asymmetric elite polarization), the rise of populist leaders, constitutional hardball, a shifting media ecosystem, and the biases of existing electoral institutions. I examine these cases by tracing the chain of events through the process of populist radicalization and into the process of democratic backsliding. In both cases parties with relatively higher levels of illiberalism responded to historic left-wing victories by embracing populist tactics or movements. Dissatisfaction with a moderating opposition provides useful leverage for the illiberal populists to win elections, and the influence of biases within electoral institutions allow illiberal populists an advantage.

Psychology

Tyler Wong
Mentor: Katherine Moen
Title: *Click for a Chance to Win! Visual Attention in Gambling*

The goal of the current study was to examine the risk-taking behaviors associated with gambling from a cognitive perspective. Due to frequent changes in gambling formats and the proliferation of online gambling, understanding and regulation lag behind innovation. This project aimed to examine the gambler's fallacy alongside cognitive offloading to better understand their effects on risk-taking. The gambler's fallacy refers to the incorrect belief that past outcomes influence future independent events, leading individuals to persist in losing choices under the assumption that a win is imminent. Cognitive offloading involves reducing mental effort by relying on external aids, thereby minimizing cognitive limitations. Although cognitive offloading can simplify decision-making, its effects on risky decisions are mixed and do not reliably improve risk-related choices. Participants completed several runs of a gambling task, where they were asked to use tokens to spin a virtual slot machine. Participants completed several runs of a gambling task in which they used tokens to spin a virtual slot machine. Each participant received 50 tokens and could play until choosing to stop or running out of tokens. Unused tokens were converted into raffle tickets to incentivize stopping. At each decision point, participants could either spin the slot machine or stop and convert

remaining tokens. Participants always saw their remaining token count, total winnings, and both choice buttons. Participants were randomly assigned to one of four conditions that varied by odds stability (stable vs. variable) and odds visibility (visible vs. not visible). Eye movements were tracked throughout the task to assess how odds variability and visibility influenced visual attention and reliance on the gambler's fallacy.

Tim Ledesma
Mentor: Evan Hill
Title: *The Influence of Myricetin on Zebrafish Circadian Rhythm*

Myricetin is a naturally occurring flavonoid with antioxidant and neuroactive properties found in commonly consumed foods. It has been shown experimentally to inhibit arylalkylamine N-acetyltransferase (AANAT), the rate-limiting enzyme in melatonin synthesis. Because melatonin is a key hormonal output of the circadian system that conveys biological day-night and regulates sleep-wake behavior, pharmacological disruption of melatonin synthesis may alter circadian regulated behavioral rhythms. However, the behavioral consequences of myricetin exposure on sleep-wake cycle regulation remain poorly understood. To investigate the behavioral changes associated with altered melatonin levels due to myricetin, we utilized zebrafish, which provide a powerful model for studying circadian regulation of sleep behavior due to conserved molecular clock mechanisms that are directly light-entrainable during embryonic development. We hypothesized that myricetin would increasingly alter locomotor activity patterns and sleep at greater concentrations, reflecting interactions between internal circadian-regulated melatonin synthesis and external observed behavioral sleep changes. In this study, zebrafish larvae were placed under a 14:10 h light-dark cycle. At 4-5 dpf, larvae were randomly assigned to control (DMSO) or myricetin treatment groups (1 μM, 10 μM, or 50 μM; separate groups per dose). Locomotor activity was continuously recorded for approximately 36 hours using automated video tracking. Sleep-like behavior was defined as sustained periods of immobility that is generally established as criterion for zebrafish sleep. Data from a series of experiments conducted under these parameters will be presented. The findings aim to clarify how myricetin may modulate circadian-related behavior while also furthering the study on zebrafish as a model organism for studying sleep–wake regulation. This work may also have translational implications for future research on neurologically active food compounds and their effects on circadian-related mood disorders such as seasonal affective disorder.

Fine Arts & Humanities

Communication

Caleb Rother
Mentor: Jacob Rosdail
Title: *Those Who Did Not Die: A UNK Student Short Film*

Those Who Did Not Die is a narrative short film written, directed, and edited by Caleb Rother. Originally developed as a capstone style production, this project aimed to bring a professional and collaborative set to the University of Nebraska at Kearney using existing campus and community resources. The production integrates faculty support, student crew leadership, and interdisciplinary problem-solving across all stages of the production. Filming occurred in multiple locations throughout UNK and the greater Kearney community, demonstrating how a small production can still maintain industry standard workflows within scheduling, set safety, performance direction, and editorial planning. The crew includes more than fifteen on-set personnel (excluding extras), creating a production structure that mirrors professional roles and responsibilities to provide practice training opportunities for students.

From a narrative standpoint, Those Who Did Not Die follows two college freshmen through a relationship shaped by intimacy, conflict, and sudden loss. Rather than treating grief as a spectacle or performance, the film explores how people process trauma and loss differently, and how shared hardship can create closeness between those who struggled together. This film examines the conflict between memories and moving forward from the past through a nonlinear timeline and performance-heavy capture, emphasizing that healing is not one moment, but a slow progression. As both a creative work and a campus-wide collaboration, the film contributes to conversations about student-led projects, community partnerships, and emotional storytelling.

English

Miho Nakane
Mentor: Megan Hartman
Title*: Cognitive Transfer in L2 Phonological Processing: Investigating the Interference of Romaji Knowledge on English Pronunciation Prediction*

This study investigates the influence of prior literacy experiences on the English phonological processing of Japanese L2 learners, specifically focusing on the transfer of Romaji Grapheme-Phoneme Correspondence (GPC) rules. While previous research has explored general L2 pronunciation difficulties, there is a lack of specific data regarding the predictable misinterpretations that arise when learners apply Japanese consonant-vowel (CV) structures and orthographic mapping to English words. The primary objective of this research is to refine my understanding of the influence of existing phonetic knowledge on L2 phonological processing. The study employs a comparative experimental design involving two groups: Japanese L2 learners with prior Romaji knowledge and a control group of native English speakers. Data collection involves comparing the performance of Japanese ESL learners and native English speakers through production and identification tasks. These tasks are designed to isolate the influence of Romaji knowledge from vocabulary familiarity and to measure the consistency of phonological interference across different cognitive demands. The findings may inform pedagogical decisions regarding phonics instruction for Japanese L2 learners. The findings are expected to reveal specific patterns of negative transfer, which will inform the development of targeted pedagogical interventions. Depending on the results, these may include a contrastive phonics approach that explicitly addresses the differences between Romaji and English GPC rules or early-stage training focused on deconstructing Japanese CV syllable structures in English contexts. By identifying the systematic nature of these errors, this study aims to provide a foundation for pronunciation instruction that preemptively corrects predictable L1 interference, ultimately leading to more effective phonetics curricula for Japanese learners.

Persephony Tobin
Mentor: Seth Long
Title*: The Failure of the Percy Jackson Films and Its Effects on YA Culture*

In the 2000's, a robust Young Adult (YA) reading culture led to a bump in youth and young adult reading. As reported in a 2009 survey conducted by the National Endowment for the Arts ("Reading on the Rise: A New Chapter in American Literacy"), long-term declines in reading habits either reversed or plateaued from 1992 to 2008, a period corresponding to the *Harry Potter* craze and other YA-based cultural

phenomenon. The National Assessment of Educational Progress (NAEP), in its "National Report Card," likewise shows that surveys of 9-year-olds' reading habits remained roughly constant through 2012, before they began their fast decline to today. Part of the robust YA culture that reversed a decline in youth and young adult reading (or at least stopped the decline's speed for a while) were faithful film adaptations of YA novels, adaptations that drew in readers and created a sense of continuity with current readers of the series being produced. The *Harry Potter* books and film adaptations provide an example of the positive feedback loop between film and novel that helped create new readers. In contrast, both movie adaptations of Rick Riordan's *Percy Jackson* series were box office bombs that, in the 2010s, failed to continue or add new energy to the YA culture of the previous decades, and may have actively turned off potential readers.

In my paper, I will explore three ways that the *Percy Jackson* adaptations failed to translate the novels to the screen: their treatment of Percy's character, their treatment of the familial relationships between Percy and his mother and brother, and their treatment of secondary characters, particularly female secondary characters. The commercial and critical failure of these adaptations reflect their failure to meet their obligations to the YA community as well as to potential new readers.

Abby Trantham
Mentor: William Burns
Title: *Narrative Video Game Writing Project*

This Undergraduate Research Fellows project examines video games as an increasingly significant medium for narrative storytelling through the development of an original, choice-based horror game set in a fictional small Nebraska town. The project investigates how interactivity, player agency, and branching narrative structures reshape traditional concepts of plot, character, and suspense. Rather than centering combat or mechanics, the game foregrounds atmosphere, character-based storytelling, and player-driven decision-making as primary narrative engines. My creative process has begun with narrative design: mapping the geography and history of the town (inspired by the history and lived experience of my hometown, Beatrice), constructing detailed non-playable characters (NPCs), and outlining major and minor plot arcs. I then begin using a program like Twine to create branching lines in the narrative and the options the player will face. The resulting digital text will be fully playable, allowing users to navigate a mystery shaped by their decisions. While what I plan on completing will be a demo without visuals, it will be left open to incorporate visual mechanics if I choose to continue with this project. This project is in conversation with contemporary indie horror titles such as No, I'm Not a Human, the Fears to Fathom series, and Killer Frequency, which utilize rural communities and choice-based narratives to create

tension and suspense. By situating my work alongside these games, I argue for video games as a dynamic literary form that invites audiences to participate in, rather than passively consume, narrative. The Student Research Day oral presentation will outline the project's theoretical framework and development process before concluding with a live demonstration of the game in progress, placing the audience and their collective decisions as the "player".

History

Dylan Seitz
Mentor: Amber Alexander
Title: *The Breakdown of Identity, Community, and Culture - A Case Study on the Legacy of the Closure of Saint Mary's Catholic Church on its Former Members*

The decline of rural churches marks a significant cultural shift on the American Plains. As settlers arrived, they brought their culture, customs, and religions, and constructed churches that tethered them to this unknown land. The churches became anchors for distinct community identities, separate from wider American secular culture. Yet, the rapid closure of these churches has left former members without a tether, breaking down this unique identity. Scholarly research into this phenomenon is sparce. This project examines the closure of the German and Austrian immigrant-serving Saint Mary's Catholic Church, formerly located in Prairie Center, Buffalo County, Nebraska. Through oral history interviews with former church members and engagement with current historiography on identity and memory, this project documents how the separate identity, community and culture fostered by the church has been lost since its closure twenty-two years ago. The analysis of the interviews, in accordance with the current historiography, has confirmed that with the church's closure, former members, dispersed after its closure, have lost the separate identity, community, and culture created and maintained by the church. These findings underscore the need for further research into the effects of rural church closures on community identity and their wider implications within historical scholarship. They also demonstrate the necessity of preserving and interpreting these tenants of rural churches, which this project now aims to do, for the future generations of their former members and for the wider historical community.

Natural & Physical Sciences

Biology

Maddie Wocicki
Mentor: Joseph Dolence
Co-Authors: Joseph Roeder, Marissa Hoover, & Zane Carlson
Title: *Elucidating how vaping impacts the response of macrophages and T cells to peanuts*

The impact of vaping on allergic immune responses, specifically those that stem from lungs, remains unresolved. We have data that shows vaping negatively regulates the ability of B cells to respond to peanut (PN). In this study, we investigated whether vaping also alters macrophage and T cell responses to PN. We exposed mice to PBS, PN, electronic conditioned media (ECM) containing 6 mg/mL nicotine alone, or PN in ECM in two inhalation mouse models. ECM was made by bubbling vapor into media used to expose the mice to PN and this allowed us to address whether vapor itself alters allergic responses. Flow cytometric analysis was used to assess the response of these cells. On day 3, interstitial and alveolar lung macrophages exhibited markedly reduced responses to PN due to exposure to ECM. On day 14, T follicular helper (Tfh), but not T helper 2 (Th2), cells displayed reduced reactivity to PN because of ECM. The reduced ability to mount an immune response to PN indicates that vaping may similarly compromise host defenses against common respiratory pathogens. Further studies are needed to fully elucidate the mechanisms by which vaping alters immune responses in the lung.

Chayton Kumpost
Mentor: Austin Nuxoll
Title: *Investigations into Benzyl Isothiocyanate as a potential alternative to Fluoride*

Fluoride is the standard of care for preventing cavities, but concerns regarding its potential toxicity have driven the search for safer, natural alternatives. Benzyl isothiocyanate (BITC), a compound found in cruciferous vegetables like broccoli and kale, is known for its antibacterial properties, yet its ability to fight cavity-causing oral bacteria remains largely untested. This study evaluated BITC as a potential alternative to fluoride by testing its ability to kill oral pathogens, *Staphylococcus aureus*, *Streptococcus mutans*, *S. sobrinus*, and *S. oralis*, disrupt biofilms, and interact with commonly prescribed antibiotics. Our results demonstrate that BITC is a potent

antimicrobial, effectively inhibiting bacterial growth at concentrations of 125–250 *μ*g/mL. Crucially, BITC outperformed fluoride in biofilm assays. While fluoride failed to significantly disrupt established biofilms, BITC significantly broke down the biofilms of both *S. aureus* and *S. mutans*. In antibiotic interaction tests, BITC showed no negative interference with chlorhexidine or fluoride, however, it displayed strong antagonism when combined with beta-lactam antibiotics suggesting it may interfere with bacterial cell wall synthesis. These findings suggest that BITC is a promising, more effective alternative to fluoride for biofilm disruption, though its use alongside penicillin-based drugs requires caution. Future work will assess the safety of BITC on human gum cells to further validate its clinical potential.

Joseph Roeder
Mentor: Joseph Dolence
Co-Authors: Maddie Wocicki, Marissa Hoover, & Zane Carlson
Title: *Examining how vaping impacts the response of B cells to peanut*

The health effects of vaping remain unclear, especially how it impacts immune responses that originate in the lung. In this study, we investigated whether vaping alters the immune system's ability to mount allergic responses to peanut (PN) using an inhalation model. First, we demonstrated that mice sensitized with PN solution containing vape juice exhibited reduced PN-specific IgE responses and milder anaphylaxis. Next, to model vapor exposure more directly, we sensitized mice using electronic conditioned media (ECM) containing 6 mg/mL nicotine. To make ECM, we bubble vapor into media used to expose the mice to PN and ask whether vapor itself alters allergic responses. Mice sensitized with PN solution made with ECM displayed markedly reduced PN-specific antibody production compared to mice sensitized with PN alone. To further examine the impact of ECM on B cell responses, we used a 14-day inhalation exposure model. Germinal center B cell reactions to PN were severely inhibited due to exposure to ECM. Overall, our findings suggest vaping suppresses PN-specific immune responses by preventing the development of antigen-specific B cell responses. This knowledge is important because failure to mount response against inhaled PN suggests vaping may inhibit immune responses against common respiratory infections. Further studies are needed to define the mechanisms by which vaping alters immune responses to inhaled antigens.

Peggy Huss
Mentor: Jacob C. Cooper
Co-Authors: Johnathan Hruska
Title: *Comparative genomics reveals patterns of cryptic speciation in* Piranga flava *in the Neotropics*

The Neotropics are an extremely biodiverse region that are shaped by their numerous biogeographic breaks. One of many species diversifying across these classically recognized biogeographic barriers is the Hepatic Tanager (*Piranga flava*). There are currently fifteen subspecies of *P. flava* recognized that are grouped into three major clades: *P. flava* [*hepatica* Group] includes five subspecies with individuals that span as far north as southwest United States down to the highlands of west Guatemala, Honduras, El Salvador, and Nicaragua; *P. flava [lutea* Group] includes six subspecies which span from the highlands of Costa Rica to the Andes of Colombia; and *P. flava* [*flava* Group] including three subspecies which span from southern Guyana to southeast Bolivia, Paraguay, Argentina, and Uruguay. These have been considered specifically distinct by some authors, but data to support this split are lacking. However, vocal data show evidence for a cryptic, previously overlooked fourth clade within *P. flava*. To this end, we analyzed the phylogeography of *P. flava* from across their broad range to identify relationships within and between the clades to determine the status of our novel vocal group. UCEs were extracted from individuals to analyze phylogeographic relationships using multiple methods. We found there are four species-level taxa within this group, including our heretofore unrecognized new vocal group.

Joe Paysen
Mentor: Keith Geluso
Title: *Lizard abundance and habitat affinities in upland grasslands in the Nebraska Sandhills*

Morphological adaptations often tie lizard species to specific habitat structure. Due to low mobility for many species, vegetative structure strongly influences occurrence and abundance of lizards. We examined relative abundance and habitat affinities of lizards in three grassland pastures in the Nebraska Sandhills. Surveys were conducted on pastures of low, moderate, and high grazing disturbance. The low disturbance pasture had mostly sodded grassland with little open sandy habitat, the moderate disturbance pasture had many distinctive small sandy blowouts within sodded grassland, and the high disturbance pasture had limited vegetation with mostly open blowing sand. Transect based surveys documented three lizard species with Common Earless Lizards (Holbrookia maculata) and Prairie Lizards (Sceloporus consobrinus) more abundant than Six-lined Racerunners (Aspidoscelis sexlineatus). Abundance was

significantly different among pastures with the moderate disturbance pasture having the most lizards followed by the high and low disturbance pastures. Common Earless Lizards appeared to be tied to flatter, less shrubby habitats relative to Prairie Lizards with both frequently observed in blowouts and associated with bare ground. The high abundance of lizards in the moderately disturbed pasture suggests heterogenous habitat is optimal for these lizards in the Nebraska Sandhills. The reduction of blowouts and homogenization of vegetative structure in more recent times present threats to lizards whereas large-scale disturbances that create open sandy habitats, such as long-term drought, may not be detrimental for these species.

Darynee Palser
Mentor: Jayne Jonas-Bratten
Co-Author: Letty Reichart
Title: *Seed banks of restored wetlands from central Nebraska*

Nebraska has many wetlands that migrating birds use as stopover sites during migration to acquire food resources to continue migration and for breeding. In recent years, sediment has filled in vital wetlands areas, possibly reducing food resources for these birds. In this study, we focused on seed banks of three wetlands in central Nebraska that have been restored. Wetlands can be restored in different ways. We sampled soils from the newer process of deeper excavation, the standard shallow excavation depth, and non-restored areas at each wetland site. We grew the seeds out of the soil samples in a laboratory setting to identify and count the plants to examine the effects of wetland restoration on plant species that remain. We expect to see that both restoration methodologies will maintain the native wetland plants for migrating birds better than nonrestored areas. Determining the best restoration practices to maintain plants used by migrating birds in wetlands will inform regional land managers that will benefit future wetland restorations.

Professional & Applied Studies

Communication Disorders

Lily Seibert
Mentor: Jan Moore
Title: *Accuracy of Self-Reported Hearing Loss in Nebraska Agricultural Workers*

This project investigated the accuracy of Nebraska farmers and ranchers' self-perceived hearing loss and objectively measured hearing sensitivity. Agricultural professionals experience exposure to high levels of noise, placing them at risk for noise-induced hearing loss. Which is often underestimated or unrecognized. Sixty-eight participants over the age of 60 completed a pre-assessment survey documenting noise exposure, hearing protection use, and perceived hearing loss severity. These were compared with results from comprehensive audiological evaluations conducted by a licensed audiologist. A super high frequency pure-tone average (frequencies 2000, 4000, 6000 Hz) of the poorer ear was used to classify the severity of hearing loss. The participants were asked to rate their hearing loss among the following options: no hearing loss, mild, moderate, severe, or profound. Using a permutation chi-square test comparing audiological hearing loss to self-reported hearing loss chi-square = 28.6, permutation p-value=0.001. The tables show statistically significant asymmetry (marginal heterogeneity) with a chi-square of 26.4 ($p<0.0001$), meaning there is a directional effect to the lack of agreement between self-reported hearing loss and audiology testing results. Participants frequently underestimated their hearing loss, many who reported mild loss when tested as moderate loss ($p=0.005$), many who reported normal or mild hearing loss tested as moderate or severe loss ($p<0.0001$), and those reporting moderate loss tested as severe loss ($p=0.002$). There are many reasons why farmers underestimate their hearing loss. Their hearing loss typically shows normal or mild hearing loss in low frequencies with moderate to severe hearing loss in high frequencies. This is part of the reason why they underestimate their hearing loss. Many participants do underestimate their own hearing loss but also reported communication difficulties and had never undergone prior testing. These findings highlight the need for hearing health education and audiologic screening within agricultural populations to promote earlier identification and intervention.

Kinesiology & Sports Science

Brianna Carroll
Mentor: JP Rech
Title: *Battle Blocks*

This project develops and evaluates a secondary physical education learning experience, Battle Blocks, designed through the Teaching Games for Understanding (TGfU) model. The activity blends invasion and target game structures in which teams advance the ball through passing, spacing, and tactical movement to create safe scoring opportunities that knock down an opposing "fortress." Rather than emphasizing isolated skill drills, the lesson sequence prioritizes tactical awareness, decision-making, and team work so students first understand why skills are used before refining how they are executed.

The instructional design is grounded in constructivist and social learning theory. Using Vygotsky's framework, students actively construct understanding through guided discovery, peer communication, and reflection. Teacher scaffolding is initially provided through visual spacing markers, defensive zones, and tactical questioning prompts, then gradually removed as competence increases. Social interaction is intentionally structured through freeze-and-discuss moments where teams analyze successful and unsuccessful plays. Bandura's social learning principles further support learning as students observe modeled strategies, imitate effective techniques, and repeat behaviors reinforced by successful outcomes and positive feedback.
Differentiation is built into the activity through scalable modifications. The game can be simplified by enlarging targets, reducing defenders, allowing additional movement with the ball, and providing visual supports. Complexity increases by shrinking scoring zones, increasing pass requirements, adding defenders, introducing time pressure, and requiring varied shot types.

The final component of this project will include an oral presentation explaining the purpose, structure, and instructional design of the game. Additionally, the activity will be piloted with lower-class college students to observe gameplay flow, engagement, and learning outcomes. Reflective practices and observational notes will be used after the pilot to make necessary adjustments to rules, difficulty, and scaffolding supports, ensuring the game is developmentally appropriate and instructionally effective before implementation in a secondary PE setting.

Teacher Education

Marcus Utecht
Mentor: Dena Harshbarger
Title: *Exploring Mental Health Effects on Elementary Student Learning*

As awareness of adverse childhood experiences (ACEs) and childhood trauma continues to grow in education, teachers are increasingly expected to support students' emotional and behavioral needs alongside academic instruction. Research shows that many students experience trauma that significantly impacts learning, behavior, and school engagement (Centers for Disease Control and Prevention [CDC], 2024). While schools often serve as the first place where trauma-related needs are identified, teachers frequently report limited preparation for responding to trauma in the classroom. This gap is further highlighted by limited access to school-based mental health supports, as national (376:1) and Nebraska (332:1) student-to-school-counselor ratios remain well above the recommended 250:1 (American School Counselor Association, 2025). Literature on trauma-informed education emphasizes frameworks such as the Four R's—realize, recognize, respond, and resist re-traumatization—and highlights the importance of safety, trust, connection, and empowerment within learning environments (Overstreet & Chafouleas, 2016). However, research indicates that trauma-informed training for both in-service and pre-service teachers is inconsistent and often embedded within professional development that competes with existing instructional responsibilities (Ernest et al., 2022; Liphardt, 2025). As a result, educators may recognize the value of trauma-informed practices but lack confidence in implementing them effectively.

This study addresses the research question: Which research-based methods, strategies, or programs best support educators in teaching students who have experienced trauma? Interviews will be conducted with school counselors across schools of varying sizes and districts, as well as mental health professionals and individuals working in clinical and counseling-related roles. Interviews will explore current trauma-informed practices, classroom strategies, and perceived gaps in teacher preparation. Findings aim to inform teachers, schools, and undergraduate educators by identifying practical, research-based approaches educators can realistically implement to support students who have experienced trauma.

Dylan McCoy

Mentor: Naheed Abulqasim Ali Akbar Abdulrahim
Title: *The History and Culture of Tattooing: A Study in Curriculum Development*

This research project focuses on exploring the fundamental question: What are the main components that make a college course's curriculum worth being taught? The project is important because the quality and relevance of curriculum directly influence student engagement, learning outcomes, and the overall value of higher education. In an era of evolving educational needs, ensuring that courses are engaging and intellectually stimulating is essential for maintaining academic integrity and rigor. The findings of this project aim to provide a practical framework for designing course components, moving beyond simple content delivery to focus on pedagogical holistically.

The research will be carried out using a two-part methodology that blends literature review with practical application. The initial phase involves a brief literature analysis focusing on core themes in higher education curriculum theory. This analysis will address what curriculum theorists consider as the essential elements of an effective college course. This includes the design and development of course content that utilizes an interdisciplinary approach. This foundational research will hopefully yield a defined set of principles for quality course design in this respective content area. In the second phase, these derived principles will be immediately applied to construct a complete rigorous academic course. The proposed required course text is Painted People by Matt Lodder. This subject offers a well of multi-disciplinary material drawing on history, art, sociology, and anthropology. Sub-questions, such as what is the reason for the rise in popularity of individuals having tattoos in the modern world and how is the art of tattoo and symbolism intertwined?

In conclusion, this research proposal will utilize a two-stage approach involving two literature reviews and the development of a model course from syllabus to final exam. The ultimate outcome is a resource that can inform future curriculum development across various disciplines.

Graduate
Oral Presentation Abstracts

Fine Arts & Humanities

English

Richard Brown
Mentor: Brad Modlin
Title*: "My Sister Would Call Me"*

As a genre, creative non-fiction allows creators to explore highly personal experiences in unique ways. Spanning elements of memoir, speculative nonfiction, recorded audio conversations, reflective journaling, and video scraps, My Sister Would Call Me attempts to construct a visual and auditory document of my sister's life. Saddled with a variety of psychological challenges, she navigated life as best she could, dragging the rest of the family down as we attempted to assist her—and yet live our own lives. Drawing on the work of Canadian filmmaker Tess Girard, My Sister Would Call Me incorporates elements of conventional recorded phone conversations, voice mail recordings, original ambient music, narration, along with manipulated audio and video images to mirror the often confusing conversations my sister initiated in the final 18 months of her life while addicted to pain killers, cigarettes, marijuana, Pepsi—while living with her Chihuahua, Dakota. My Sister Would Call Me approaches her life with respect and humor, two of the final weapons in my arsenal after a lifetime of coping and boundary setting. The final product, a 6-minute video, invites viewers into a world of blame, fear, introspection, accusation, and, ultimately, a universe of sympathy, understanding, and acceptance. I created this video under the guidance of Dr. Brad Modlin during the spring semester 2025, in English 825, Creative Non-fiction

Amelia Rodgers
Mentor: Annarose Steinke
Title*: Shaping the Detective Reader: T.S. Eliot and Dorothy L. Sayers on Reader Formation*

Critical discussions of detective fiction from the 1920s and 30s ask two main questions: what is detective fiction and what is it for? T.S. Eliot and Dorothy L. Sayers both wrote extensively on detective fiction throughout the interwar period as part of this larger literary effort to understand the nature, purpose, and influence of detective fiction. Scholars examining their detective criticism rightly detect the importance of their shared emphasis on lifelike characters — or what Eliot called "the intangible human element." However, comparatively little scholarship explores how Eliot and Sayers's focus on "real" characters reflects their wider concerns about the representation of reality in popular fiction. In this paper, I read Eliot's "Religion and Literature" alongside Sayers's "Towards A Christian Aesthetic" to examine how readers are formed by the texts we read for pleasure, with a particular focus on how representations of material and immaterial reality in those texts shape us as whole human beings. I consider how detective fiction invites readers to recognize the deeper motivations which prompt the behaviors of the characters in the text and, to a degree, the actions of the real people with whom we interact every day. Using Sayers's proposed artistic aesthetic as a starting point, I show how detective fiction that depicts these real human desires invites readers to creatively consider third-way approaches to reconciling conflicting moral values.

Liz Eberspacher
Mentor: Susan Honeyman
Title*: Form and Experimentation In Krazy Kat and Calvin and Hobbes*

When George Herriman created Krazy Kat in the early twentieth century, he could not have anticipated the degree to which his formally eccentric and playful comic strip would shape the future of the medium. Nor could Bill Watterson, when he launched Calvin and Hobbes more than fifty years later, have fully foreseen that his own strip would come to be recognized not only as a serious artistic achievement, but also popular success. Although these two works appear dissimilar in tone, setting, and cultural context, this paper argues that Calvin and Hobbes owes a significant and underappreciated debt to Krazy Kat. Through close formal analysis, this essay traces similar strategies of anthropomorphism, surreal landscapes, experimental panel construction, meta-narrative awareness, and resistance to commercialization. By studying how Watterson builds upon Herriman's innovations, particularly in the expressive possibilities of animal characters, the cinematic shifts in perspective, and

the manipulation of time and space within the frame, this paper demonstrate how both artists elevate the comic strip beyond a simplistic gag into a form capable of serious philosophical reflection and artistic depth. Examined together, Krazy Kat and Calvin and Hobbes reveal an ongoing vision of comics as poetic, subversive, and deeply personal works of art.

Professional & Applied Studies

Communication Disorders

Moriah Gilman (Online Presentation)
Mentor: Ladan Ghazi Saidi
Co-Authors: Noelle Abels, Kinley Helmer, Dawson Helmer, & Preston Ramaekers
Title: *Boosting Brainpower: Effects of Exercise and Reading Interventions on Cognitive Performance in Older Adults*

The risk of cognitive decline increases with age, highlighting the need for effective non-pharmacological interventions to support cognitive health in older adulthood. This ongoing study examines the effects of reading, language learning, and exercise interventions on cognitive functioning in adults aged 60–80. Participants are recruited through flyers and social media and complete pre- and post-intervention cognitive assessments measuring executive function, memory, processing speed, and global cognitive status. Following baseline assessment, participants engage in either a reading, language learning, or exercise intervention for four months, completing at least 60 minutes per day, five days per week. Adherence is monitored throughout the intervention period. Post intervention, participants undergo identical assessments using the same cognitive measures. To date, 83 participants have completed the interventions. Upon completion of the intervention, data was collected on the accessibility and participant satisfaction of the interventions administered. I will be presenting qualitative and quantitative results, comparing the outcome for these three interventions.

Undergraduate Posters

Behavioral & Social Sciences

Political Science

Poster 57 - Ashley Scott
Mentor: Chuck Rowling
Title: *Supporting Student Parents*

Students who have dependent children are not supported in the higher academic world. It is important to ensure every student has the support they need to succeed. Using preliminary research and local data collection surveys, there is a need for colleges and universities to increase understanding and support systems in higher education. 20% of college students have children, and out of that 25%, most will experience a lack of affordable childcare, child-friendly spaces on campus, and a sense of belonging on campus. 70% of students with children will eventually un-enroll from higher education due to the lack of support from the college or university. For the Kearney community, parents enrolled in universities or colleges experience a lack of flexibility and understanding from professors. For example, a student who wishes to remain anonymous was pregnant and about to begin labor. She had spoken to her professors about completing assignments early, so she could focus on being with her newborn for the last month or two of classes. Her professor informed her that was not a valid excuse. Research further shows that providing direct support for students experiencing adversity will ensure that each student succeeds. This implies that there is a direct need for ensuring that clear, concise legislation is created state-wide to ensure every student is being accounted for, and that each university should enact a policy that mandates these supports.

Poster 58 - Harmony Mathes-Riensche
Mentor: Chuck Rowling
Title: *From Complicity to Continuity: The Evolution of Fascism*

This research examines how identifiable patterns of fascist politics re-emerge within contemporary democratic societies by applying established scholarly frameworks to modern rhetoric, institutional behavior, and modes of political mobilization. Drawing on typologies developed by Umberto Eco, Robert Paxton, Stanley Payne, Roger Griffin, and Jason Stanley, the study identifies recurring features such as mythic-national narratives, selective populism, scapegoating, anti-pluralism, and the strategic erosion of democratic norms, emphasizing how these elements function as political techniques rather than as labels for specific actors or regimes. Through comparative analysis, this project explores how fascist political styles adapt to twenty-first-century conditions, including digital media ecosystems, polarized informational environments, and evolving forms of mass participation, while also considering how appeals to cultural grievance, conspiracy narratives, and hierarchical social ordering can be deployed to consolidate power and weaken institutional safeguards. By situating contemporary developments within a broader historical and theoretical context, the research highlights both the continuities and transformations of fascist political logic, demonstrating how these patterns can manifest in democratic settings without culminating in fully realized fascist governance. Ultimately, the project contributes to ongoing debates about democratic backsliding by offering a structured, historically grounded method for identifying and interpreting fascist tendencies in modern politics, providing a conceptual toolkit for recognizing early warning signs embedded in political discourse, institutional change, and the shifting dynamics of public life.

Poster 59 - Abigail Reyes
Mentor: Diane Duffin
Title: *MLK Jr. and Malcolm X: The Transformative Power of Social Capital in the Civil Rights Movement*

Although many groups comprised the American Civil Rights Movement of the 1950s and 1960s, the Southern Christian Leadership Conference, the Nation of Islam, and the Organization of Afro-American Unity, led by Martin Luther King, Jr. and Malcom X, respectively, stand out for utilizing the power of social capital to organize and develop ordinary individuals into prepared and informed trailblazers. The purpose of this project is to learn whether and how the disparate organizing techniques these groups employed affected their capacity to gain a following, mobilize members, and influence politics. Toward these ends, the project compares and contrasts the internal dynamics of each organization, such as member characteristics, group cohesiveness, organizational structures, and the effects of these qualities on members. The Civil

Rights movement in the United States was a groundbreaking success story for African Americans. Understanding the effort that went into amassing support will allow us to understand further how the movement evolved and overcame segregation and inequality.

Poster 60 - Aaron Pardinas
Mentor: Peter Longo
Title: *The Evolution of Civil Rights: Views from the Warren and Roberts Courts*

The Supreme Court has long determined the scope of civil rights in the United States, and its interpretation of those rights has shifted significantly over time. The Warren Court (1953–1969) was especially active in extending civil rights to minority populations and expanding constitutional protections. Landmark cases such as Brown v. Board of Education (1954), Gideon v. Wainwright (1963), and Loving v. Virginia (1967) illustrate the Court's willingness to use judicial authority to dismantle segregation, guarantee fundamental rights, and promote equal protection under the law. In contrast, the current Roberts Court (2005–present) has produced landmark civil rights decisions that stand in notable contrast to the Warren Court's approach. Cases such as Shelby County v. Holder (2013), Noem v. Vasquez Perdomo, and Students for Fair Admissions v. Harvard/UNC (2023) demonstrate a more restrained or conservative judicial philosophy. This research aims to analyze the contrast between the Warren Court and the Roberts Court in their treatment of civil rights. It will: (1) analyze the landmark civil rights cases of the Warren Court; (2) analyze the landmark civil rights cases of the Roberts Court; (3) evaluate the impact of judicial decisions from both eras; and (4) offer pathways to address civil rights justice moving forward.

Poster 61 - Alexis Gill
Mentor: Peter Longo
Title: *Nebraska's Blue Dot: A Constitutional and Political Analysis of the Electoral College*

The electoral system in the United States is rooted in representative democracy, with presidential elections determined through the United States Electoral College. Rather than voting directly for a presidential candidate, citizens vote for electors pledged to a candidate or party. These electors then formally cast votes for president and vice president. While designed to balance popular will with state representation, the system has long been debated for how it translates individual votes into electoral outcomes. In my previous research, I examined election results in Nebraska, which uses a distinct winner-take-all model, Nebraska awards two electoral votes to the statewide winner and one vote to the winner of each congressional district. My focus was on the "Blue Dot," Nebraska's 2nd Congressional District centered in Omaha, which has

demonstrated more competitive and occasionally Democratic-leaning voting patterns. In close national elections, even a single district-level electoral vote can carry significant weight. To expand my analysis on these voting behaviors and people's understanding of them, I will compare Nebraska's outcomes with six additional states: Colorado, Georgia, Michigan, Nevada, Pennsylvania, and Wisconsin. These states represent diverse regions and political dynamics, including major urban "hot spots" that heavily influence statewide results. By comparing district-level and statewide voting behaviors across these states, my research seeks to better understand how electoral structures shape representation and how individual votes contribute to national outcomes.

Poster 62 - Carly Gaedeke
Mentor: Peter Longo
Title: *The Role of Social Media in Shaping Political Opinions*

This research examines the impact of social media on voting behavior and election outcomes in democratic systems. Platforms such as X, Facebook, TikTok, and Instagram have become prime sources of political information. These apps are reshaping how voters learn about candidates, engage with political issues, and make electoral decisions. Unlike traditional media, social media allows for rapid information sharing, personalized content, and direct interaction between political actors and the public. The findings of this research suggest that exposure to political content on social media can significantly influence voter preferences, especially among individuals who identify as moderate, undecided, or less politically engaged. Algorithm-driven content often amplifies emotionally charged or highly partisan messages, which can shape perceptions of candidates and policy issues. At the same time, social media contributes to political polarization by creating echo chambers, where users are primarily exposed to viewpoints that reinforce their existing beliefs while limiting exposure to opposing perspectives. However, social media is not solely a polarizing force. It also plays a meaningful role in increasing political participation and voter mobilization. By making political discussions more accessible, immediate, and interactive, social media platforms encourage users, particularly younger voters, to engage with political content, register to vote, and participate in elections. Political advertising, influencers, and online activists further shape campaign narratives and public opinion, often blurring the line between entertainment and political messaging. Overall, this research suggests that social media has become a powerful and multifaceted force in modern elections. While it can influence voter behavior and intensify polarization, it also has the potential to enhance democratic participation and civic engagement when used responsibly.

Poster 63 - Gavyn Brauer

Mentor: Peter Longo
Title: *Federal Land Retention and the "Duty to Dispose": Statutory Policy and Constitutional Tension Under the Property Clause*

This project examines the historical development of federal land retention policy in the United States. It traces the shift from early federal land disposal practices to the modern retention framework codified in statutes such as the Federal Land Policy and Management Act of 1976 and relevant judicial precedents such as Kleppe v. New Mexico and Light v. United States. The study analyzes how the federal land policy landscape has continued to evolve in recent years, focusing on developments since 2024, including administrative actions such as the Bureau of Land Management's Conservation and Landscape Health Rule, Executive Order 14153, as well as the pending SCOTUS case Utah v. United States and renewed debates over housing pressures and proposals for public land sales under the "duty to dispose" theory.

Using qualitative legal and discourse analysis, this project evaluates competing interpretations of federal land policy by examining statutory frameworks, relevant case law, and contemporary political and policy arguments. Particular emphasis is placed on the "duty to dispose" theory and its constitutional grounding under the Property Clause. The project also considers alternative arguments including those rooted in state enabling acts and economic justifications for land transfers or retention. By comparing these competing frameworks, the study seeks to clarify whether the Constitution imposes meaningful limits on federal land retention or instead permits broad congressional discretion.

Poster 64 - Isabel Zaruba
Mentor: Peter Longo
Title: *The Rural Health Transformation Program and Its Implications for Rural Nebraskan Healthcare*

On July 4, 2025, the One Big Beautiful Bill Act was signed into law by President Donald Trump, intended to reduce federal spending by $1 trillion to fund tax reductions. Included in the bill was the Rural Health Transformation Program, allocating $50 billion to improve rural healthcare over five years as compensation for cuts to Medicaid made in the OBBBA. This analysis of healthcare delivery in rural Nebraska, a state known for its dependence on Medicaid funding for rural access, assesses the impact of the RHTP on the state. Despite the funding, the Rural Health Transformation Program does not sufficiently offset the projected financial and access-related consequences of the bill in rural Nebraska. According to KFF, national Medicaid spending in rural areas is estimated to decline by $137 billion, leaving an $87 billion deficit unaddressed by the RHTP (Saunders et al., 2025). The deficit could lead

to long-term instability beyond the program's end in five years, failing to fully address the persisting effects of the Medicaid cuts. These cuts could heighten preexisting systemic fragility related to inadequate staffing, delayed care rates, high Medicaid reliance, and hospitals' operating losses, all of which will likely increase following the cuts. These structural pressures heighten uncompensated care, worsen financial strain, increase hospital closure risks, and cause economic loss. This analysis finds that federal-state fiscal substitution, while necessary, is circumscribed, that temporary grant-based mitigation has limits, and that structural instability in rural health financing persists.

Poster 65 - Isabella Neuhaus
Mentor: Peter Longo
Title: *Under The Same Sky*

There is a gap between policymakers, the public, and the lived realities of individuals experiencing homelessness in urban environments, a gap that reflects not only policy failure but a deeper moral disconnection. This continuation of my undergraduate research project, Under the Same Sky, builds upon my earlier work examining environmental fragility through photography by extending its normative framework to human vulnerability within Omaha, Nebraska. Guided by a politics of love, rooted in philia and agape, understood as the virtue of neighborly care, responsibility, and unconditional love and recognition, this project uses documentary photography and policy analysis to examine how homelessness is shaped by city policies, public perception, and environmental exposure. My photography functions as a tool to translate abstract policy decisions into visible human consequences and inviting viewers to see unhoused individuals not as problems to be managed, but as neighbors within a shared community. By documenting homelessness in parks, streets, and other public spaces, this research emphasizes that all people exist under the same sky, exposed to the same environment and bound by a shared moral obligation. Just as environmental neglect reveals failures in stewardship, homelessness reveals failures in collective care. Through visual storytelling grounded in a politics of love, this project seeks to reframe homelessness policy as a matter of justice, dignity, and belonging, encouraging public engagement that recognizes compassion not as separate from governance, but as an essential key to effective policy making.

Poster 66 - Jodean Chesley
Mentor: Peter Longo
Title: *The Power of Presidential Precedent*

Presidential power has always been a topic of considerable importance. The dimensions of modern presidential powers and responsibilities have been foundationalized on precedents set by former administrations, Courts, and legislative checks and allowances on the office of the United States President. United States Founders, lawmakers, and theorists have long analyzed the factors which dictate and provide explanation for actions taken by the President. The evaluation of the Presidential Power takes on multiple variables. In this research project I will focus on a selected set of Presidents and their respective assertions of power in foreign affairs. This project has four major aspects: First, a brief analysis of the Presidential Power from the Founding Era will be considered as a framework for enduring consideration. Second, an overview of significant historical presidential precedents will be offered. Emphasis will be on post-World War II era. Third, vignettes will address the international relation powers asserted by a sampling of Presidents from Franklin D. Roosevelt to Trump. Fourth, conclusions will be offered to better evaluate the current state of Presidential power, constitutional checks on power, and Presidential power as related to international affairs.

Poster 67 - Layla Sugden
Mentor: Peter Longo
Title: *"Nature vs. Nurture in Relation to Political Party Affiliation"*

The purpose of this research is to examine whether political party affiliation and political beleifs are shaped more by nature or nurture. Through further research, it has been found that the answer is not direct, but instead is affected by both. It is not nature vs nurture, but rather how these two work together to influence how people think, feel, and act. These are not two opposing forces, which this research further examines by establishing how genetics, environment, and political engagement work together to influence political beliefs. Specifically, genes do not directly influence our political beliefs, but they influence things like sensitivity, which then plays a role in which way one may lean politically.

This research also addresses the consequences of political engagement as it can affect one's mental and physical health, along with their personal relationships. Different environmental influences like family, social surroundings, and political engagement can play a significant role in how the biological traits manifest. This helps to prove that political attitudes are not only formed by biology but can be determined by

the living situations one may find themselves in. Overall, genes can play a factor in traits like sensitivity and emotional responsiveness, but environmental factors help to determine how these traits manifest politically.

In total, this research supports the idea that political attitudes and political party affiliation can form from the combined influence of genetic predispositions and environmental factors. Biology and genes provide the foundation for personality traits, but environmental factors help to determine how these genes manifest, especially in political climates.

Poster 68 - Sam Schroeder
Mentor: Peter Longo
Title: *Nebraska v. Colorado: The fight for water rights under the South Platte River Compact*

On July 16, 2025, Nebraska Attorney General Mike Hilgers filed a Bill of Complaint against the State of Colorado in the Supreme Court of the United States in regard to a breach of the 1923 South Platte River Compact. The South Platte River Compact is an interstate agreement between Nebraska and Colorado, entitling Nebraska to 120 cubic feet of water per second from the South Platte River from April to mid-October and the rights to build a canal on the border. Nebraska contends that Colorado breached the Compact and that its actions in doing so threaten Nebraskans' access to water from the South Platte River, harming agricultural communities and threatening water security for major population centers.
This project will analyze the arguments set forth by the State of Nebraska, relevant case law, precedent, law review articles, and statements set forth by elected officials. The project will attempt to understand the legal arguments and how the law applies to Colorado's supposed violation of the 1923 Compact. By examining statements from public officials such as Nebraska Governor Jim Pillen, Nebraska Attorney General Mike Hilgers, Colorado Governor Jared Polis, and Colorado Attorney General Phil Weiser, one can compare and examine how state water disputes are politicized.

Poster 69 - Caleb Bremer
Mentor: Satoshi Machida
Title: *Japanese Citizens' Perceptions of the United States*

Public opinion among foreign citizens on political tensions in the United States is an important perspective to consider for its impact on business relations. This research first examined how political tensions in the United States have affected Japanese citizens' perceptions of various issues. This research first used a survey to examine

Japanese citizens' views of the United States on democracy, global partnership, and economic ties, and how these views might influence the direction their companies might take. The survey was written in Japanese and conducted on Japanese citizens who currently live in Japan. While this survey was carried out previously, it was important to not rely only on quantitative data, but also look into expert opinions to provide in-depth details. Looking at think tanks, such as CSIS and the Hudson Institute, which specialize in studying the relationship between Japan and the U.S., is important as they provide background knowledge and greater information. While my previous survey didn't provide a strong enough correlation between political tention and how it affects business relations, it did hint of potential negative effects of political tentions hurting business relations. The Hudson Institute held a conference that included four companies in different sectors and how they are approaching business relations with the U.S. as of November 2025. In general, these four companies emphasized that they have historically invested in the United States, which leads me to believe that political tensions in the U.S. don't affect businesses as much if they have historically invested in the U.S. More research is needed to differentiate the opinions of companies that have historically invested versus those that haven't invested or have only minimally invested.

Poster 70 - Hidaya Mohamed
Mentor: Satoshi Machida
Title: *Economic Inequality in the United States*

Economic inequality has developed to become one of the leading challenges facing the United States in the twenty-first century; however, its identification has been characterized by the increasing level of wealth and income held by a small portion of the population. The purpose of this research is to analyze the major causes of economic inequality in the United States; however, unlike many emerging discourses on income levels, this research delves deeper into understanding the underlying causes for such disparities by analyzing advanced level comprehensive issues associated with them. The research emphasizes the role of tax policies, wage stagnation levels, decreased levels of unionization, and disparities in education and health care in determining the level of economic inequality through the application of a mixed research methodology that includes the use of economic data analysis, evaluation of policies, and the use of theory bases to explore possible variables contributing to the problem and determining the variables that play a major role in developing disparities and inequalities in the United States today and their role in determining advanced issues facing the nation today. By understanding the major causes of economic inequality, the research deduces ways of reducing the challenges facing the nation by creating strategies to reduce inequality in order to create a more equitable society for Americans. These economic disparities are further reinforced by

racial inequalities that shape access to education, healthcare, employment, and wealth accumulation.

Poster 71 - Lillian Wagoner
Mentor: Satoshi Machida
Title: *How has the United States' shift toward a more isolationist policy under the Trump administration influenced international perceptions of the "China threat"?*

This project investigates how U.S. isolationism under the Trump administration is affecting global perceptions of China. Specifically, it will study these perceptions in Japan, a critical pillar of the United States' foreign policy relations due to its close military and political ties to the United States, its proximity to China, and historical tensions with Beijing. The study will utilize an academic survey distributed to approximately 300 Japanese citizens to assess public perceptions of China and its influence in light of dramatic U.S. foreign policy changes. By analyzing their responses, this project aims to deepen the understanding of how American isolationism is influencing allied nations' acceptance of China's evolving influence on the world stage.

Poster 72 - Brayan Cazares-Enriquez
Mentor: William Aviles
Title: *Comparison of the Organizations of Mothers for the Disappeared in Argentina, Mexico, and Central America*

The focus of my project will be to compare the organizations of mothers looking for their disappeared loved ones in Argentina, Mexico, and Central American countries. These countries have gone through historical periods where hundreds of people have disappeared due to political or criminal violence. In Argentina, the military regime was responsible for the disappearances of thousands of Argentinians during the late 1970s and early 1980s in a period that was called the “Dirty War”. In Mexico and Central America, during the last decade, many people have disappeared in large numbers due to the power of drug cartels, criminal organizations, and weak state institutions. The connection between these two periods is the outcry from mothers and grandmothers who have protested in the hopes of finding out what has happened to their loved ones. They conducted protests, raised public awareness, and pressured governments into action. I plan on analyzing these cases and determining similarities and differences to better understand the greater success of the Mothers of the Plaza de Mayo relative to the mothers of Central America and Mexico. I intend to carry out my project through extensive research by reading books, articles, and other forms of media that have examined these organizations. I will also draw on knowledge I gained from a study abroad in Argentina in the summer of 2025. I hope to develop an understanding on the

formation of these organizations as well as what their missions are and what they have completed and why one movement was more successful than the other.

Poster 73 - Olivia Beauchamp
Mentor: William Aviles
Title: *Women's Rights in Latin America*

My undergraduate research project for this semester has focused on women's rights in Latin America. More specifically, the focus has been on abortion policies on the neighboring countries of Argentina and Chile. Argentina and Chile are very similar countries when it comes to governmental systems, but Argentina's abortion policies have reformed and given women more rights while Chile is still strictly against abortion, and only just decriminalized it in recent years. The start of my project focused on why Chile is so far behind Argentina with women's rights, then shifted (I do not understand what you mean by "then shifted" they made progress on women's rights?). Through my research, I discovered that there are many factors, such as the power of the Catholic Church and women's movements that have played a part in the differing policies in these neighboring countries. Now that I have a better understanding of this, my next steps include the writing of a literature review and adding my own hypothesis to this issue. Recently, both have moved further right, which may have a major impact on women's rights and the direction of my project. Argentina's citizens have shown that they will protest for what is right, as they have very active political movements. I will theorize what the effects of these protests will have on future policy changes, and how Chilean citizens will act under the conservative government that will soon come to power.

Psychology

Poster 74 – Dannie Brian
Mentor: Bryanna Scheuler
Co-Authors: Haven Zimmerman, Hannah Schneider, & Elliana Eichner
Title: *Implications of Assessments for Cancer Related Cognitive Decline*

Individuals who have been diagnosed with cancer often experience deficits in cognitive ability. This impairment is known as cancer-related cognitive decline (CRCD). CRCD has a wide variety of presentations, including difficulties related to memory, concentration, planning, retaining new information, and problem-solving. The primary domains impacted by CRCD are executive function, attention, and working memory. Additional domains can experience dysfunction, including verbal memory and processing speed. A variety of techniques have been utilized to measure these

domains of CRCD, including neuroimaging, biomarker tracing, subjective self-reports, and objective neuropsychological assessments. However, this wide range of assessments creates concerns of inconsistencies when studying CRCD. For example, across a sample of 34 articles, 61 different assessments were used to measure cognition, all meant to measure the same construct of CRCD. Other concerns with current measurements of CRCD include differences in the time between treatment and assessment, as well as inconsistent results evaluating which biomarkers contribute to CRCD. Overall, a wide variety of domains and assessments result in a lack of cohesion in conceptualizing and understanding CRCD. To address these inconsistencies, our team is compiling CRCD assessments in a database of articles. By performing a comprehensive literature review, we aim to find and report commonalities and overlapping constructs across CRCD assessments.

Poster 75 – Haven Zimmerman
Mentor: Emily Bartholomay
Title: *Eating Habits and Athletic Involvement in First Year Undergraduate Students*

Most first-year college students experience some degree of weight gain, and many of these student's report experiencing high levels of anxiety, depression, and stress (Hamzah et. al 2019; Lloyd-Richardson et al., 2009). In a study of first-year students, over 65% of participants were concerned about gaining weight (Graham, Jones, 2010). Dufresne et al. (2019) found that adolescents with eating disorders had traits such as negative affectivity, detachment, and conscientiousness. Kinder (2021) found that student athletes have higher levels of anxiety in general compared to non-athletes. The goal of this study is to examine whether involvement in athletics influences the relationship between fear and conscientiousness with restrictive eating. The sample included 51 1st year students, 55% female, 98% White, 46% current student athletes. Students completed a demographics questionnaire, the EDFQ (Levinson et al., 2019), BFI-10-R (Stone et al., 2022), and TFEQ (Karlsson et. al. 2000).
The overall model predicting restrictive eating was statistically significant, F (5, 31) = 5.17, p = .002, R^2 = .45. Eating disorder fear significantly predicted restrictive eating, b = 0.06, SE = 0.03, p = .026, indicating that greater fear of eating disorder was related to more restrictive eating. However, athletic involvement and the interaction between athletic involvement and eating disorder fear were non-significant, ps ≥ .263, suggesting that involvement in athletics was not related to restrictive eating. The second model was not statistically significant, F (5, 31) = 1.37, p = .277, R^2 = .18. Conscientiousness, athletic involvement, and the interaction between conscientiousness and athletic involvement did not significantly predict restrictive eating, ps ≥ .277.

We found that eating disorder fear was related to restrictive eating, which could be due to fear of gaining weight. Although our study did not find anything else significant, this could be due to the small sample size.

Poster 76 – Skyler Summers
Mentor: Emily Bartholomay
Title: *Does mental health moderate the relationship between stress and sleep?*

College students commonly experience sleep problems and poor sleep quality (Bolden et al, 2019; Kenney et al., 2012). Poor-quality sleep has been associated with greater prevalence of psychological problems in college students (Kelly, 2004). Students with higher evening stress tend to have shorter sleep duration, and shorter sleep duration is related to higher next-day stress (Yap et al., 2020). The aim of the current study is to examine whether mental health moderates the relationship between stress and sleep.

Participants were 57 college students, Mage = 19.14, SD = 1.16, 68.42% female, 75.44% White. Participants reported mental health diagnoses, completed the Perceived Stress Scale (PSS; Cohen et al., 1983), the Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006), and the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). Participants wore an actigraph for two days and rated their stress at 10:00 a.m. and 8:00 p.m. each day. The current study measured average evening stress and average sleep efficiency (SE).

The first model, testing mental health diagnosis as a moderating variable, was not statistically significant, $p = .561$, $R2 = .05$. Stress and mental health diagnosis were not significant predictors of SE, and the interaction was non-significant ps >.232. The second model, testing anxiety and depression scores as moderators, was not statistically significant, $p = .498$, $R2 = .15$. Evening stress showed a trend toward predicting SE, $p = .079$. Anxiety and depression were not significant predictors, ps > .459. The interaction between evening stress and depression trended towards significance, $p = .052$. Other interactions were non-significant, ps >.447.

Findings suggest that evening stress may relate to sleep, but neither mental health diagnoses nor anxiety and depression symptoms influence this relationship. The results indicate that sleep changes as depression levels change, though larger studies are needed.

Poster 77 – JJ Hamburger-Wademan
Mentor: Katherine Moen
Title: *Rock-Climbing Visual Attention in Climbers vs. Non-Climbers*

Previous research suggests that cognitive abilities such as visual attention, memory, and movement simulation play critical roles in rock climbing performance. Skilled climbers use advanced visual strategies to "read" routes prior to ascent, allowing them to preview holds and plan movement sequences. Expert climbers also demonstrate superior memory for movement patterns, likely due to their deeper technical knowledge and experience. Despite these findings, little is known about how kinesthetic stimuli specifically affects climbers' memory for hold placement. Understanding this relationship remains an important gap in the literature. By examining attention and memory processes related to kinesthetic input in a controlled laboratory setting, future research may identify more efficient and accurate training methods for novice climbers. Such insights could inform the development of evidence-based strategies to enhance learning, route planning, and overall climbing performance. The goal of the current study was to determine how experience with rock-climbing impacts visual search for rock climbing holds. We are specifically interested in comparing participants with no rock-climbing experience to participants with extensive experience. Participants completed a visual search task with rock-climbing holds while their eye-movements were tracked. Participants were shown a greyscale image of a climbing hold (the plastic rock-like structures bolted to the wall that are meant to be points of contact on the climbing wall). Then the image of the hold was removed, and the participants were shown a colored image of a climbing route (i.e., a full rock-climbing wall with holds). The participants then searched for the hold shown in the original image. After they found the correct hold, they selected it on the screen. Participants completed this task several times.

Poster 78 – Logan Muirhead
Mentor: Krista Forrest
Title: *Individual differences and their influences on problem-solving*

The Air Force Academy trains officers to "advance beyond traditional problem solving" by providing historical, economic, and weapons preparations through education, another way to determine an officer's aptitude for the military decision-making process (MDMP) and troop leadership is by assessing both individual and team courses of action (COA) during wargaming (Teo, et al., 2021). The goal of this project is to collect pilot data on participants' psychological characteristics and determine the extent to which they contribute to decision making within a law enforcement scenario. This

scenario is comparable to a dilemma an officer may face when responding to an escalating event.

Participants from Prolific (n = 175) will complete demographic items, measures of individualism/ collectivism (D'Amico & Scrima, 2015), risk acceptance/ aversion (Driedger, 2023; Huang et al., 2010), analytical/ holistic thinking (Choi et al., 2007), and social dominance orientation (Ho et al., 2015) before reading a scenario describing a law enforcement scenario which requires a solution. Participants then choose from a list of predetermined solutions which have already been scored for quality by United Nations Law Enforcement Training Experts.

We will also vary the decision-making process in two ways. First, we will manipulate the time allotted to making the decision (timed, unlimited) and second, we will manipulate the context of the decision (individual, collective). Participants randomly assigned to the "collective" are led to believe that their decision will be averaged with another participant. Previous studies on social identity theory and the minimal group paradigm suggest that this reference to an "artificial" group membership is enough to create the in-group out-group effect (Tajfel et al., 1971; Tajfel & Turner, 1986). As a result, participants should believe they will discuss their response with another. Dependent measures will include decision quality and confidence in their solution. Implications for military training are discussed.

Poster 79 – Riley Rose
Mentor: Krista Forrest
Title: *Mock Jurors' Evaluations of Police Interrogation*

Prior studies show that graphic visual evidence can shape legal decisions, often increasing emotional reactions and harsher judgments (e.g., Bright & Goodman-Delahunty, 2006; Salerno, 2017). Research on interrogations also suggests that laypeople may underestimate how coercive some tactics are compared with expert ratings (Blandón-Gitlin et al., 2011; Kaplan et al., 2020). Little research, however, examines how mock jurors perceive coerciveness when officers use long wait times and graphic victim photos. We build on previous work by testing whether victim photo exposure and pre-interview wait time change how coercive an interview tactic appears. We use a 3x2 between-subjects design with U.S. adults recruited on Prolific (target N = 175). Participants view a standardized interrogation clip that varies only by photo condition (no photo/control, living victim photo, or living victim photo plus deceased victim photo) and pre-interview wait time (5 minutes vs. 30 minutes). After viewing the clip, participants rate how coercive the tactics are. We predict a main effect of photo condition, with the highest coerciveness ratings in the living victim photo plus deceased victim photo condition. We also predict a main effect of wait time such that the 30-

minute pre-interview wait time will be rated as more coercive than the 5-minute wait time. Finally, we predict an interaction between photo condition and wait time: participants should give the highest coerciveness ratings in the 30-minute wait condition when the suspect is shown both the living and deceased victim photos. By isolating photo exposure and wait time while keeping the rest of the interview constant, this study tests two practical factors that investigators can control. Findings can inform interview training, policy, and expert testimony about coercive risk in police questioning.

Poster 80 – Kajetan Hubl
Mentor: Megan Strain
Title: *Development of Scale to Assess Parental Dependency*

Academic entitlement is a growing problem among students. Academic entitlement, simply put, refers to a student's expectation that they will receive good grades for a minimal amount of work (Greenberger et al., 2008). Past research has discovered positive relationships between academic entitlement and many aspects of a person's life: locus of control (Bertl et al., 2019; Fromuth et al., 2019), extrinsic motivation, and achievement anxiety (Greenberger et al., 2008; Fromuth et al., 2019). Additionally, factors that are related to an external locus of control, such as intensity of family expectations (Bertl et al., 2019) and overparenting (i.e., parents having psychological control over their child; Fletcher et al., 2020; Turner & McCormick, 2018) are also predictive of academic entitlement. These overlapping connections suggest a larger theme at hand in the realm of academic entitlement and parental influence. One missing construct in the existing body of literature is parental dependency: the degree to which a person relies on their parents for support in academic, personal, and professional areas. Research on parental dependency is limited, but it may be related to academic entitlement, as a function of external locus of control. Students who are accustomed to more parental guidance or input may experience and view college interactions differently than those who are less reliant on their parents. The goal of the current study was to develop a reliable measure of parental dependency in young adults to better examine these relationships. In phase one, we administered a preliminary set of items to participants for factor analysis. This analysis will establish categories for the most reliable items. In phase two, we will confirm the validity of the selected items and compare them to other related measures. Upon validating the scale, future research will be able to examine the relationship between academic entitlement and parental dependency.

Poster 81 – Blaine Tewahade
Mentor: Rachael Turner
Title: *Caregiver Well-being and Self-Efficacy related to Support Groups*

Support for caregivers of persons with dementia (PWD) is crucial for the mental and physical well-being of caregivers and their care recipients. While some research has focused on support for caregivers (Gaynell et al., 2017), supplementary research is needed to examine how support groups and complex support networks can impact caregivers' wellbeing. Barriers in this area have occurred regarding caregivers' limited access, knowledge, and varying needs for support. Prior research examining some of these variables found that higher support group attendance was related to better emotional well-being within caregivers (Okolie & Menne, 2025). These results suggest that knowledge and access to support services may impact attendance, and subsequently their emotional well-being. The current study will explore the role of knowledge, access, and attendance at support services relating to self-efficacy and well-being. The participants, caregivers of PWD, will report on perceptions of stress, depression, well-being, and self-efficacy. Through semi-structured interviews, caregivers will report their knowledge of support services, access to support, personal barriers, current informal and formal support networks, and attendance of caregivers' support groups. Thematic analysis will be used to identify themes related to the caregiving experience and support services. Multiple regression analysis will be conducted to examine predictors of self-efficacy and caregiver well-being. Caregivers who have more knowledge, access, and attendance related to caregiver support groups are expected to have better well-being and higher self-efficacy. The findings of this study would highlight that caregiver support is crucial for well-being, laying the foundation for future work creating interventions for caregivers.

Poster 82 – Miyu Abiko
Mentor: Evan Hill
Title: *Effects of Light Cycles on Zebrafish Behavior and Circadian Function*

The zebrafish is a useful model for a lot of studies, such as biochemistry, psychology, and neuroscience, particularly behavioral genetics, and neurodevelopmental. Zebrafish has a high breeding rate, and its genetics is similarity to humans. It tends to become more popular for the experiments. Zebrafish are great for testing lots of drugs and studying genes. This is because female zebrafish can lay a lot of eggs every week. Zebrafish are also special because their cells and tissues can feel light directly. This makes them perfect for learning about how light affects the way our bodies work. Some studies have already found that Cry1a and Per2 are genes that get turned on by light. These genes are important for helping zebrafish tell time inside their bodies. Zebrafish

have these things called circadian clock functions. These genes are necessary for that to start working. This study looks at how different lighting affects the development of larvae and their daily behavior. Zebrafish larvae do well when they have a regular day and night cycle with 14 hours of light and 10 hours of dark. When this happens, more of them hatch, especially when they are under white light. The zebrafish larvae are also more active when it is light outside, and they rest when it is dark. This lighting also helps them live longer and have fewer problems when they are growing. The zebrafish larval development is better when they have this LD cycle. In contrast, constant light (LL) conditions are associated with abnormal development, altered feeding schedules, flattened day–night activity rhythms, and increased but poorly organized movement. Constant darkness (DD) conditions lead to high larval mortality, reduced growth, and weakened circadian rhythms. Overall, controlled LD cycles, particularly 14L:10D, provide optimal conditions for zebrafish larval development and circadian regulation. We will present the data from a series of experiments that systematically changed. We conducted 13 experiments using an LD (light–dark) cycle, beginning with 24 hours of darkness, followed by 2 hours of light and 22 hours of darkness, progressing to 22 hours of light and 2 hours of darkness, and finally 24 hours of continuous light to investigate the effects of light exposure on the circadian clock.

Poster 83 – Allie Canas
Mentor: Katherine Moen
Title: *Focused or Fragmented? How Subtitles Affect ADHD*

Mind-wandering (MW) occurs when an individual is not focused on the current task, distracted, zoning out, or daydreaming. Our team conducted research last year on ADHD and mind-wandering to determine if MW and memory were impacted by adjusting video playback speed. The results suggested that faster video playback speeds decrease mind-wandering and may increase memory accuracy for individuals with ADHD. The current study aimed to examine how the presence or absence of subtitles in lecture videos and ADHD diagnosis status impact mind-wandering and memory performance. Previous research on subtitles and ADHD yields mixed results. Some research suggests that subtitles presence leads to better performance of recall and transfer for individuals with ADHD compared to neurotypical peers, (Lewis et al., 2015), but others suggest relatively poorer performance (Brown et al., 2020). It is possible that the subtitles may increase cognitive load, making it harder for participants to focus. However, this may impact individuals with and without ADHD differently; Lewis and Brown (2012) noted that subtitles appeared to cause participants without ADHD to experience cognitive overload as they processed the video and subtitles, which splits the attention. Another possibility is that subtitles may decrease mind-wandering via processing fluency. There are mixed results about how ADHD impacts

processing fluency, but results by Goth-Owens et al. (2010) suggest that these differences are moderated by the subtype of ADHD an individual has. To our knowledge, no research to date has explored the impact of subtitles on mind-wandering in ADHD. Participants with and without ADHD watched a lecture-style video either with or without subtitles, and they were asked about mind-wandering levels several times during the video. After the video, they completed a memory test.

Sociology

Poster 84 – Jose Guerrero Rodriguez
Mentor: Suzanne Maughan
Title: *How Does Peer Pressure Impact Full-Time Traditional Aged Undergraduate College Students' Sleeping Patterns?*

This study examined the impact of social pressure and sleep habits of undergraduate college aged students ranging in age from 18 to 25 years old at a university in the Midwest. Previous studies of 12- to 15-year-old teenagers indicated a positive relationship between sleep problems and susceptibility to peer influence (Semenza et al., 2022); however, research has not been conducted on traditional college aged students and the relationship between social pressure and sleep habits. With an expected convenience sample size ranging from 50-75 participants, this study used a quantitative approach to examine social pressure and sleep habits of traditional college aged students. The study focused on traditional aged undergraduate college aged students because this is a time of significant transition and stress in the lives of young adults. Flyers posted around campus notified potential participants of the study and encouraged them to scan the posted QR code to learn more about the study. Participants could only continue if they indicated their age was between 18 to 25 years; if they had read the informed consent; and if they clicked on the box to agree to participate in the study. Using Qualtrics, an online platform for survey administration, questions for participants included the participant's demographics, activities on campus, social and peer influence, sleep behaviors, and sleep patterns. SPSS software was used to analyze the results of the study with a focus on data distributions, means, and variability of the questions in the figures. The study also examined correlational relationships and showed differences in social pressure and sleep habits depending on the participants' characteristics.

Natural & Physical Sciences

Biology

Poster 1 – Carlos Hernandez
Mentor: Alexis Hobbs
Title: *Exploring Drosophila melanogaster as a Model for Peanut Allergy Research: Immune Pathway Responses and Gene Regulation Insights*

The use of *Drosophila melanogaster* for the study of peanut allergies is not common, although it is effective, and budget friendly. *D. melanogaster* is useful for human studies due to similarities between disease-related genes and immune response pathways. The objective of this study was to determine if the immune-regulated genes within the *D. melanogaster* genome were affected by the exposure to peanut. For this study, eight hundred female flies were collected and placed into cages, one hundred per cage. The flies were fed cornmeal-molasses food with water or 5% peanut on top, with water being the control. Every 72 hours, the dead flies were collected, and food was replaced. qRT-PCR was performed at three-day intervals across the lifespan of the flies. These results show a significant down-regulation of Dorsal and an up-regulation of Dif, Cactus, and Relish. This shows that the Toll pathway is potentially involved in allergic reactions, as well as the Immune Deficient (IMD) pathway. The experiment was repeated, and females were collected on days 0, 15, and 30 for Next Generation Sequence (NGS). The results show at day 15 an upregulation of the genes: Cp18 (Chorion protein 18), which is involved in chorion formation, and Jon25Bi (Jonah 25Bi), which enables serine hydrolase activity. Day 30 shows an upregulation of Npc2e (Niemann-Pick type C-2e), which is involved in immune signaling via LPS, lipid A, peptidoglycan, and lipoteichoic acid, and the IMD pathway, and a downregulation of the genes: Jon25Bii (Jonah 25Bii), which enables serine hydrolase activity, Gnmt (glycine N-methyltransferase), which encodes enzyme that catalyzes methylation of glycine to N-methylglycine (sarcosine), and rib (ribbon), which encodes a BTB-domain protein required for the development of salivary gland and trachea, also the potential for regulation of PIWI interacting RNAs (piRNAs; i.e., viral infection fighting). In toto, this data demonstrates that *D. melanogaster* provokes an immune response to peanut exposure and can potentially be used as a model for peanut allergy.

Poster 2 – Carter Cochran
Mentor: Austin Nuxoll
Co-Authors: Chip Clark, Kyle Schuelke, & Barry Cheung
Title: *Determining the efficacy of plasma activated antibiotics against antibiotic tolerant Staphylococcus aureus*

Staphylococcus aureus biofilms are notoriously challenging to treat and pose a large threat in healthcare. With challenges in eradication of these infections such as antibiotic resistance and antibiotic tolerance, it is crucial to search for alternatives to conventional antibiotic therapy. Plasma activation of solutions results in the generation of antimicrobial reactive hydrogen and nitrogen species. Based on this observation, we hypothesized plasma activation could enhance antibiotic effectiveness against S. aureus biofilms. Initially, biofilms were challenged with plasma activated water (PAW) in combination with antibiotics and synergism was found between a number of antibiotics and PAW. To determine whether plasma activating antibiotic solutions yielded high antimicrobial activity, antibiotics were subject to non-thermal plasma for 60 minutes and tested against S. aureus biofilms. Plasma activated antibiotics (PAAB) proved to be more effective than antibiotics mixed with PAW. Plasma activated vancomycin exhibited the highest efficacy by eradicating biofilms, whereas untreated vancomycin failed to reduce bacterial burden by more than 2 logs. To determine how PAAB disrupted biofilms, biofilms treated with vancomycin or plasma-activated vancomycin were analyzed for matrix components. Polysaccharides were stained with concanavalin A, eDNA with 4′,6-diamidino-2-phenylindole-DAPI, and proteins with SYPRO Ruby biofilm matrix stain. While no difference was observed with polysaccharides and proteins, eDNA was increased in plasma-activated vancomycin suggesting increased cell lysis. To determine whether these compounds are effective in treating *S. aureus* in vivo, *Zophobas morio* and *Galleria mellonella* infection models were utilized. These experiments are currently ongoing, and their results will be presented. Together, these findings reveal that plasma activation can enhance antibiotic efficacy against *S. aureus* biofilms, overcoming a limitation of conventional antibiotic therapy.

Poster 3 – Carter Moss
Mentor: Austin Nuxoll
Co-Authors: Emma Weis, Alexis Hobbs, & Kim Carlson
Title: *Characterization of Staphylococcus aureus Persister Survival in Macrophages*

Staphylococcus aureus is a component of the human microflora that commonly colonizes the skin and nasal cavities of approximately 30% of the population. Under

permissive conditions, however, *S. aureus* acts as a potent opportunistic pathogen responsible for numerous diseases and nosocomial infections. Despite extensive therapeutic efforts, *S. aureus* has evolved multiple mechanisms to evade both antibiotics and components of the innate immune system. Professional phagocytes, primarily macrophages and neutrophils, represent key innate immune cells that interact with *S. aureus*, functioning as a frontline defense to eliminate bacteria through phagocytosis. Notably, recent studies have demonstrated that *S. aureus* persisters, a metabolically quiescent subpopulation, exhibit enhanced survival against innate immune factors, particularly antimicrobial peptides. Based on these findings, we hypothesized that persisters may also display increased survival against other innate immune components, including macrophages. To test this, we utilized a wild-type *S. aureus* strain, *HG003*, and a high-persister strain, *fumC::NΣ*, to assess intracellular survival following macrophage phagocytosis. Additionally, we employed the persister marker *Pcap5A::dsRed* to determine whether cells with elevated persister-marker expression exhibit increased survival within macrophages. Elucidating how *S. aureus* subverts and exploits innate immune defenses is critical for advancing our understanding of host–pathogen interactions.

Poster 4 – Chip Clark
Mentor: Austin Nuxoll
Co-Authors: Carter Cochran, Kyle Schuelke, & Barry Cheung
Title: *Plasma-Activated Antibiotics Enhance Eradication of Staphylococcus aureus Biofilms*

Staphylococcus aureus causes a variety of infections ranging from mild skin infections to serious, and even life-threatening conditions. S. aureus is increasingly problematic because it rapidly develops resistance cells, causing it to surge in antibiotic tolerance. Biofilm formation is particularly infectious due to persister cells within its structure that exhibit a lack of essential ATP synthesis activity within the cells. New strides have been taken to disrupt the formation of S. aureus biofilms. Research has shown that using a combination of plasma-activated water and antibiotics has a higher rate of effectiveness on infectious pathogens. Plasma solutions exhibit antimicrobial properties by inducing reactive oxygen and nitrogen species. My research is focused on using plasma-activated antibiotics rather than plasma-activated water and antibiotics separately to strengthen the potency of antimicrobial treatments. To continue exploring this, we hypothesized that plasma-activated antibiotics would more effectively treat S. aureus biofilms. To test this hypothesis, biofilms formed by Methicillin-Susceptible *Staphylococcus aureus* (MSSA) and Methicillin-Resistant *Staphylococcus aureus* (MRSA) strains were formed for 24 hours in a 96-well plate at 37oC. Biofilms were treated for 24 hours with conventional antibiotics and plasma activated antibiotics. Plasma activated ciprofloxacin rifampicin, erythromycin and

chlortetracycline were the most effective and reduced bacterial viability within the biofilm by 6 logs within 3 hours. In summary, plasma activation significantly enhances the bactericidal activity of antibiotics against *S. aureus* biofilms, achieving rapid and substantial reductions in bacterial viability. These results highlight plasma-activated antibiotics as a promising tool for overcoming biofilm-associated tolerance and addressing the growing challenge of persistent and antibiotic-resistant *S. aureus* infections.

Poster 6 – Nikolas Schrock
Mentor: Austin Nuxoll
Co-Authors: Mariam Garcia Escobar & Jonah Paulsen
Title: *Characterizing High Persister Phenotypes in S. epidermidis Clinical Isolates*

Staphylococcus epidermidis is an opportunistic pathogen that is part of the normal skin microbiota. While typically harmless in healthy individuals, in immunocompromised individuals, infections are often associated with invasive medical devices, such as prosthetic joints and catheters. These infections are often characterized by biofilm formation— structured bacterial communities encased in protective layers of extracellular matrix that help shield the cell from antimicrobial agents and adhere it to different substances, making it difficult to eradicate. Another reason these infections are hard to treat is the persister cells, cells that have antibiotic tolerance due to their dormant-like nature, helping them survive stress and reproduce without passing on these traits once stress has been removed. Recent studies have shown that there is a correlation between tricarboxylic acid (TCA) cycle activity and persister cells. Since *Staphylococcus aureus*, a close relative to *S. epidermidis*, has demonstrated this association, we hypothesize a similar mechanism is responsible in *S. epidermidis* clinical isolates. To evaluate antibiotic tolerance, strains were exposed to vancomycin, a common antibiotic used to treat *S. epidermidis* infections. Bacterial survival was assessed by plating untreated controls (T0), challenging cultures with 100μg/mL vancomycin for 120 hours, and subsequently plating to enumerate surviving cells. To determine if strains exhibiting high tolerance to vancomycin had reduced metabolic activity, membrane potential was measured using flow cytometry. Clinical isolates were grown to late-exponential phase, stained with DIOC2(3), a membrane potential-sensitive dye, for 30 minutes before analysis. Carbonyl cyanide m-chlorophenylhydrazone (CCCP) was used as a depolarized control to establish gating parameters for cells with low membrane potential. These findings support a link between metabolic activity and S. epidermidis persister formation. Understanding how metabolic pathways influence tolerance may help explain why device-associated infections are so difficult to eradicate.

Poster 7 – Lydia Mekelburg
Mentor: Brian Peterson
Title: *Investigating Chronic Wasting Disease*

Chronic wasting disease (CWD) is a contagious, fatal prion disease found in cervids, specifically white-tailed and mule deer, resulting in physical and mental decline, and it is considered 100% fatal. During the 2023 Colorado deer rifle season within Game Management Units 98, 101, and 102 harvest data was collected including species, harvest locations and lower incisors, which were sent to a lab for age analysis via the cementum annuli (CA) method. Additionally, as part of Colorado Fish and Parks CWD Response Plan biologists collected tissue samples to confirm CWD status. Age data (determined by CA) was analyzed to determine patterns of CWD in relation to age structure and harvest unit location. Utilizing the mule deer teeth used for CA aging, we plan to develop protocols for extracting DNA from these teeth to look for specific alleles that may be associated with a longer incubation period for the CWD prion disease. It is hypothesized that the older deer that tested negative for CWD will have genetic alleles that show increased 'resistance' or delayed disease progression. If successful, these protocols may be applied to other regions while including white-tailed deer where CWD has become established, helping ensure the sustainability of these ecologically and economically important game species.

Poster 8 – Eri Watanabe
Mentor: Catherine Johnson
Title: *Effects of Androgen Receptor-Targeted Therapy on Osteoblasts in the Tumor Microenvironment*

Prostate cancer is the second most diagnosed cancer and the second leading cause of cancer-related death among men in the United States. Androgen receptor inhibitors such as enzalutamide and nilutamide are widely used to treat prostate cancer but are frequently associated with adverse skeletal outcomes. However, their direct effects on bone-forming osteoblasts remain unexplored. Moreover, patients with advanced prostate cancer often develop resistance to androgen receptor inhibitors within approximately six months. One potential mechanism involves androgen receptor-targeted therapy-induced changes in osteoblasts that modulate their interactions with prostate cancer cells. However, the complete molecular mechanisms of the therapy resistance remain to be elucidated. In this study, we examined the effects of enzalutamide on osteoblasts in vitro. Osteoblasts were treated with varying concentrations of enzalutamide, and cell growth and differentiation were assessed. Enzalutamide not only reduced osteoblast number in a concentration-dependent manner but also suppressed markers of osteoblast differentiation, including alkaline phosphatase activity and mineralization capacity. These findings suggest that, in

addition to targeting tumor cells, enzalutamide may negatively influence bone formation.

Poster 9 – Tanner Theis
Mentor: Catherine Johnson
Co-Authors: Eri Watanabe & Brooke Bryant
Title: *Effects of Androgen Receptor Inhibition on Osteoblast Viability and Differentiation*

Prostate cancer (PCa) is one of the most prevalent cancers among men. PCa is typically treated with androgen receptor (AR) inhibitors. Due to development of resistance to AR inhibitors and eventual metastasis of the cancer, bone metastatic PCa has a high mortality rate. Bone is the most frequent site of PCa metastasis, and interactions between cancer cells and the bone environment contribute to disease progression and therapy resistance. The effects of AR-targeted therapies on PCa cells have been well-studied; however, their effects on bone cells have not been. Osteoblasts were chosen for this study because they are the cells that form bone. Osteoblasts' reaction to AR inhibitors is important because it could explain patients' loss of bone. The changes that AR inhibitors cause in osteoblasts could also lead to formation of an environment that favors tumor progression. This study examined the effects of androgen AR inhibitors on osteoblast viability and differentiation using the murine osteoblast cell line MC3T3-E1 and the human osteoblast cell line hFOB1.19. We treated osteoblasts with differing concentrations of AR inhibitors and measured cell viability using Trypan blue. We measured differentiation using alkaline phosphatase activity and Alizarin Red staining. Our results showed that treatment with AR inhibitors decreased osteoblast cell number and impaired differentiation in murine cells. Ongoing experiments are testing if these same changes occur in human osteoblasts. Understanding the impact of AR inhibitors on osteoblasts is crucial for assessing bone-related side effects of this treatment and their role in metastatic PCa progression. Our findings may provide insight into the implications of using AR-targeted therapies on the bone environment and help to develop new strategies that reduce complications in PCa patients.

Poster 10 – Kaden Harens

Mentor: Haiwei Lu
Title: *Establishing Hairy Root Transformation in Multiple Populus Clones*

Hairy root transformation is a commonly used technique in plant research that allows scientists to study gene expression and function in a fast, reliable way. This method produces genetically modified, fast-growing roots that are useful for molecular analysis. The goal of this project is to evaluate hairy root transformation as a research tool and determine whether it can be successfully applied across multiple Populus clones. Four Populus clones—717-1B4 (P. tremula × P. alba), Nisqually-1 (P. trichocarpa), 6K10 (P. alba), and 353 (P. tremula × tremuloides)—were selected for this study due to their frequent use in genomic and molecular research and potential differences in transformation response. Comparing these clones should allow us to assess the variability in transformation efficiency, hairy root formation, and overall suitability for downstream molecular analysis. To help monitor transformation and identify transgenic roots, we have created a construct in which an eYGFPuv gene is driven by a constitutive 35S promoter. This project is in an early stage and emphasizes proof of concept rather than quantitative analysis. The general approach involves inducing hairy root development using Agrobacterium rhizogenes-mediated transformation, monitoring root development and growth, and visually screening for transgenic hairy roots based on eGFPuv expression. Once hairy roots are established and harvested, DNA and RNA will be extracted from them, and the polymerase chain reaction (PCR) will be used to confirm successful transformation and quantify gene expression. Overall, this project establishes a foundation for the use of hairy root transformation in Populus research. The results are expected to support future studies focused on gene expression and function, while also providing valuable research experience in plant molecular biology.

Poster 11 – Kianna Greene
Mentor: Haiwei Lu
Title: *Increasing Salicinoid Production in Poplar by Overexpressing the UGT71L1 Gene*

Salicinoids are phenolic glycosides. They are naturally synthesized by poplars and willows. These compounds are of high importance in modern pharmaceuticals. Besides their well-known application as the natural template for aspirin, studies have shown their efficacy in repressing adipogenesis in mouse cells and in fighting breast, throat, and ovarian cancer cells. Yet, chemical synthesis of these compounds has been inefficient due to their complex ring structures, limiting their application in clinical settings.

This study aims to increase salicinoid production in poplar clone 717-1B4 (P. tremula x P. alba) by overexpressing the gene UGT71L1, a uridine-diphosphate (UDP)-dependent glycosyltransferase-encoding gene that is actively responsible for salicinoid biosynthesis. Two binary constructs – XYA and GY255 – were the employed. XYA 717, which served as a control and provided a baseline for comparison, and GY255, an overexpression construct designed to enhance expression by elevating the transcription of UGT71L1.

The XYA (control) and GY255 (UGT71L1 overexpression) constructs were introduced into in vitro 717-1B4 poplar plants using Agrobacterium tumefaciens–mediated transformation. Poplar explants were propagated and with a sterilized hole puncher into leaf disc. The leaf disc was left to co-culture with Agrobacterium carrying the respective constructs, followed by selection on antibiotic-containing media, then callus induction media, shoot formation and root induction media.

For XYA, approximately 128 calluses formed, of which 109 subsequently regenerated into shoots. For GY255, approximately 104 calluses formed, of which 53 regenerated into shoots, indicating effective transformation for the constructs. In the future, we plan to conduct RNA extraction on our transgenic poplar lines to quantify UGT71L1 expression levels, while genomic DNA will be extracted for qRT-PCR analyses to confirm construct integration. These experiments will help us to evaluate whether the overexpression construct was successful in exhibiting higher gene expression and correlate this with salicinoid production.

Poster 12 – Lauren Campbell

Mentor: Haiwei Lu

Title: *Development of a Hairy Root Transformation System to Evaluate Transgene Expression and Genome Editing Efficiency in Populus*

Populus species (including poplars, aspens, and cottonwoods) have long been regarded as model tree species, with several genomes fully sequenced. However, most Populus species are not amenable to Agrobacterium tumefaciens–mediated genetic transformation, which has greatly hindered the functional characterization of genes. Even in species that are readily transformable, the transformation process is time-consuming and can exhibit transformation efficiency lower than 10%. To address this bottleneck, this project aims to develop a system for rapid evaluating transgene expression and activity using A. rhizogenes-mediated hairy root transformation. Specifically, we created a CRISPR activation construct targeting the gene UGT71L1 – a key gene regulating salicinoid biosynthesis in the poplar clone 717-1B4 (P. tremula x

P. alba). We also included an eYGFPuv gene in this construct as a visual marker. We transferred the construct into the A. rhizogenes strain K599. To date, we have completed two rounds of A. rhizogenes-mediated hairy root transformation using poplar plants that we established in the UNK greenhouse and observed hairy root formation approximately two weeks after transformation. We plan to perform additional rounds of transformation, and harvest transgenic roots, identified by eYGFPuv expression for RNA extraction and quantitative analysis of UGT71L1 expression. Meanwhile, we have been testing a CTAB-based RNA extraction method with poplar tissues harvested from both greenhouse-grown plants and in vitro cultures. Additionally, we plan to test a variety of DNA and RNA extraction methods using the harvested poplar tissues. We will extract RNA from transgenic hairy roots using the most efficient and reliable method and perform semiquantitative RT-PCR to evaluate UGT717L1 expression. In contrast to A. tumefaciens-mediated transformation, which requires at least three months to produce stably transformed plants, this A. rhizogenes mediated transformation shows strong promise for generating transgenic roots within weeks. As such, the results of this study will facilitate rapid evaluation of the efficacy of CRISPRa and other genome engineering technologies in altering gene expression.

Poster 13 – Rylan Nordby

Mentor: Haiwei Lu

Title: *CRISPR Mediated Fine-tuning of Biosynthesis Pathway in Poplar*

Poplars have been used as a natural medicinal source for nearly 49,000 years by our own prehuman primates. This medicinal value stems from salicinoids, a group of compounds which are produced naturally in poplar (Populus) and willow (Salix) species. Many of these compounds exhibit pharmacological properties. For example, salicin, the simplest form of salicinoid, served as the template for aspirin, one of the most used drugs worldwide. Yet, despite their significance, many salicinoids are synthesized in low amounts in poplar. Thus, extracting and purifying salicinoids for large-scale production or at a profitable rate is difficult. Our research aims to enhance salicinoid biosynthesis in the hybrid poplar clone 717-1B4 (P. tremula x P. alba) using CRISPR/dCas-9 mediated gene activation (CRISPRa). Our target gene UGT71L1 was initially identified in P. trichocarpa, and has been shown to control the biosynthesis of several salicinoids, including salicin. Using the coding sequence of UGT71L1, we identified the ortholog gene with two alleles in clone 717-1B4 – PtXaTreH.16G011400 and PtXaAlbH.16G011300. We then designed three guide RNAs (gRNAs) – one targeting PtXaTreH.16G011400, one targeting PtXaAlbH.16G011300, and one targeting both alleles. We have successfully built the CRISPRa constructs and performed transient expression in approximately five batches of 717WT plants. Following transformation, the tissues were transferred sequentially through callus

induction medium, shoot induction medium, and shoot elongation medium agar plates to promote regeneration. To date, we have recovered over 80 events in rooting medium. We are now conducting genetic analyses on the regenerated shoots to confirm construct integration and expression. Our current objective is to calculate transformation efficiencies and evaluate the effectiveness of our CRISPRa constructs in enhancing expression of the UGT71L1 gene and subsequent salicinoid production.

Poster 15 – Connor Harrison
Mentor: Jayne Jonas-Bratten
Co-Author: Jacob C. Cooper
Title: *Evaluating avian community responses to wetland restoration in Waterfowl Production Areas effectswith passive acoustic monitoring*

Wetland complexes in the Rainwater Basin of south-central Nebraska provide key habitat for a range of grassland and marshland birds. Over time, these wetlands have been subject to sedimentation from adjacent agricultural fields. The US Fish and Wildlife Service (USFWS) has used two different restoration techniques to remove this sedimentation and restore habitat for waterfowl and other birds. Using passive audio recording units, we are studying bird assemblages associated with these two wetland restoration techniques, shallow versus deep excavation, in three USFWS Waterfowl Production Areas in addition to an unrestored control area. Monitoring began in summer 2025 and will continue through spring 2026 migration. Evaluation of data files is being done through open-source software. Output is being manually evaluated for accuracy prior to initiating statistical analysis. These data will be used to analyze patterns of bird species and communities between treatments to evaluate success of these techniques on progress toward restoration goals. These ecosystems are vitally important to many migratory and local species, which is why restoration efforts should be analyzed to inform future efforts.

Poster 16 – Megan TenBensel
Mentor: Jayne Jonas-Bratten
Title: *A comparison of seed origin germination rates at past, present, and future Nebraska climates*

Restoring degraded grassland ecosystems is crucial for maintaining biodiversity and ecological function; however, many restorations fail. To improve the success of restoration plantings, we investigate the influence of seed origin in relation to the restoration area. We compared germination rates of seeds of the same set of species but produced in various origin states across the United States. Origins span from USDA hardiness zone 4 (average minimum temperatures (-34C through –40C) to USDA hardiness zone 8 (-12C through -6C). Temperature is a highly influential factor

for germination, affecting germination through three physiological processes: deterioration, dormancy, and germination. Germination rates of two warm season C4 grasses (*Andropogon gerardii, Schizachyrium scoparium*), two cool season C3 grasses (P*ascopyrum smithii, Elymus virginicus*), two forbs (*Helianthus maximiliani, Rudbeckia hirta*), and one legume (*Dalea candida*), were recorded at each of three temperature and relative humidity settings representative of past, present, and predicted future central Nebraska climate. Seeds originating from hardiness zones 7 and 8 (northern US) are predicted to germinate most efficiently in future Nebraska climatic conditions. Seeds originating from USDA hardiness zones 5 and 6 (central US) are expected to germinate quickest in present conditions and past conditions. It is expected seeds originating from hardiness zone 4 will not receive cold enough temperatures to ensue quick germination and will be the slowest (southern US). The crosswise comparison of origins and climatic conditions effects on germination may inform grassland seed restoration seed sourcing decisions. Climate change is shifting growing zones northerly faster than vegetation may be able to adapt. Recognizing potential climatic preference of seeds based on origin could enhance the success of grassland restorations by better matching seed to site environmental conditions.

Poster 17 – Ava Stein
Mentor: Joseph Dolence
Title: *Visualizing immune reactions in peanut allergy*

We have shown the response of innate immune cells to peanut (PN) are negatively regulated by androgen receptor signaling. In our lab, we mainly use flow cytometric analysis to examine allergic immune responses to PN. In this project, we sought to incorporate hematoxylin and eosin (H&E) staining as a complementary approach to visualize tissue-level changes associated with PN exposure. Adding this experimental strategy in the lab will provide a powerful tool to accompany flow cytometry in studying how PN allergy develops following exposure to PN. To start, we used mouse lung tissue fixed in 2% paraformeldahyde sent by a collaborator to conduct H&E staining for another project. After troubleshooting tissue processing and sectioning conditions, we were able to successfully cut the tissue using a microtome with a cold stage, mounted tissue sections onto slides, and conducted H&E staining. Now that we have successfully stained tissue, the next step of this project is to expose mice to PN, harvest lung tissue, and utilize H&E staining to visualize how PN exposure alters airway immunopathology.

Poster 18 – Gracie Woods
Mentor: Joseph Dolence
Co-Authors: Maddie Wocicki, Marissa Hoover, & Zane Carlson
Title: *Vaping alters ILC2 responses to peanut*

Much remains to be learned about the impact of vaping on innate immune responses, particularly those originating in the lung. Our previous data show that vaping inhibits the ability of both innate and adaptive immune cells to respond to peanut (PN). However, it remains unclear how vaping affects the response of type 2 innate lymphoid cells (ILC2s) following PN exposure. To study, we exposed mice to PBS, PN, electronic conditioned media (ECM) containing 6 mg/mL nicotine alone, or PN in ECM using a three-day inhalation mouse model. ECM was generated by bubbling vapor into media used to expose the mice to PN, allowing us to assess whether vapor itself alters ILC2 responses to PN. On day 3, lungs were harvested and processed for flow cytometric analysis. ILC2s from vape-exposed mice displayed reduced responses to PN. Notably, ILC2 responses in mice exposed to PN in the context of vape were comparable to those observed in PBS- and vape-only exposed mice. Together, these findings suggest that vaping suppresses PN-specific immune responses at early time points by inhibiting lung ILC2 activation. This work is important because failure to mount response against PN suggests vaping may inhibit immune responses against common respiratory infections. Further studies are needed to fully define how vaping influences immune responses to PN.

Poster 19 - Joe Paysen
Mentor: Keith Geluso
Title: *Threats to the Stronghold Population of Blanding's Turtles (Emydoidea blandingii): An Overwinter Mass Mortality Event in the Nebraska Sandhills*

Mass mortality events (MMEs) are punctuated instances of heightened death in populations. Turtles MMEs are particularly detrimental due to long lifespans, delayed reproduction, and low fecundity. Blanding's Turtles (*Emydoidea blandingii*) are vulnerable in all states aside from Nebraska. In 2024, rainfall in the Sandhills Region of Nebraska was far below average and reflected in lower water tables and less above-ground water in wetlands. At a lake in the Sandhills, turtles were observed dead in March 2025 and yielded a minimum of 140 Painted Turtles (*Chrysemys picta*), 29 Blanding's Turtles, 6 Common Snapping Turtles (*Chelydra serpentina*), and 5 Yellow Mud Turtles (*Kinosternon flavescens*). Carapace lengths indicated a demographically widespread effect, with individuals from most size classes. Drought and lake shrinkage led to insufficient conditions for overwintering turtles resulting in the MME. The Blanding's Turtle population in Nebraska is considered the stronghold for the species due to large populations persisting due to an abundance of wetlands with low road and agricultural development. Prolonged droughts might lead to widespread wetland drying which could lead to devastating population losses for the entire species.

Poster 20 – Carter Diamond

Mentor: Keith Geluso
Title: *Amphibian and Reptile Use of Blowouts in the Nebraska Sandhills*

I plan on conducting natural history research focusing on herpetofauna activity in the Nebraska Sandhills. We do not fully understand how amphibians and reptiles use the natural features of the Nebraska Sandhills. Blowouts are a common feature created by wind disturbance in the sand hills. These blowouts increase habitat heterogeneity by exposing bare sand. One aspect I would like to investigate is the differences in activity between the interior and the edges of blowouts, as well as between blowouts of varying sizes. I can do this by conducting visual encounter surveys and by setting different arrays of drift fence with pitfall traps around portions of natural and man-made blowouts. I also plan on gathering data by using custom-made camera traps. These camera traps will use trail cams to photograph any species that goes into a blowout or out of a blowout. I hypothesize that herpetofauna abundance and richness will be higher at the edges of blowouts due to the proximity to both vegetation and open sand. My second hypothesis is that herpetofauna abundance will be higher in smaller blowouts due to the higher ratio of edge to interior. This data will be collected during the summer when most amphibians and reptiles are active. I hope to gain information that can help advise land managers and ranchers on how blowouts of different sizes affect amphibians and reptiles.

Poster 21 – Cayden Eyten
Mentor: Keith Geluso
Title: *Anuran Call Survey of Species of Concern in Nebraska*

Unfortunately, many amphibian species are in decline worldwide. In Nebraska, there are several Tier 2 amphibian species of concern that have experienced population declines in other areas of their distribution. Our study aims to use mainly “call surveys” to document the current distribution of American Toads (Anaxyrus americanus), Western Narrow-mouthed Toads (Gastrophryne olivacea), Blanchard’s Cricket Frogs (Acris blanchardi), as well as start to understand the distribution of Northern Leopard Frogs (Lithobates pipiens) mainly in central Nebraska. Additionally, we will attempt to determine whether both Gray Treefrogs (Dryophytes [Hyla] versicolor) and Cope’s Gray Treefrog (Dryophytes [Hyla] chrysoscelis) occur in the state and where they occur. Surveys will be conducted generally from late April to mid-June, coinciding with peak breeding activity. In the daytime, we will locate suitable habitats for anurans, and then during nocturnal surveys each night (mainly auditory call surveys but some limited capture efforts) revisit sites to listen for calling males to detect species presence mainly along roadways. Audio recordings will mainly be used to document species occurrences. Results of this study will contribute to a better understanding of anuran distribution for our species of concern in the state and provide valuable baseline data

to support future conservation and habitat management efforts in Nebraska to monitor declines or expansions in their distributions.

Poster 22 – Ella Buhlke
Mentor: Kim Carlson
Co-Authors: Sunayn Cheku, Michael Moxley, & Darby Carlson
Title: *Roughest as a Candidate Receptor for Nora virus in the Drosophila Midgut*

The *Drosophila melanogaster* Nora virus (DmNV) is a positive sense, single-stranded RNA virus that is related to picornaviruses that is known to establish a persistent infection in the fly midgut. The capsid of the Nora virus, encoded primarily by open reading frame 4 (ORF4), is comprised of repeating VP4A, VP4B, and VP4C units. Of these, VP4C forms a surface protrusion that has structural similarities to cell signaling proteins, suggesting a ptential role in host surface binding. This I vital for the virus to gain access to the intracellular space and replicative machinery. DmNV replication is most concentrated in the R1 and R2 regions of the midgut where the transmembrane immunoglobin superfamily protein Roughest (Rst) is highly expressed. We hypothesized that Rst functions as a primary cellular for DmNV entry. Molecular docking simulations between Rst and VP4C revealed positive protein-protein interactions between the two. Immunofluorescence staining and confocal microscopy were used to show colocalization of Rst and DmNV in the R1 and R1regions of dissected midguts of *D. melanogaster.* Results show that there is significant overlap in the localization of the virus and the Rst receptor. To assess functional relevance of these results, a Rst UAS/Gal driver knockout stock was exposed to DmNV and assayed using reverse transcription-polymerase chain reaction (RT-PCR) for DmNV ORF1. Results show that the flies were infected with DmNV. Together, our results show that while Rst may be involved, it is not the sole cellular receptor of DmNV.

Poster 23 – Kevin Marquez-Ledezma
Mentor: Letty Reichart
Title: *Fishing for plumage traits to distinguish confusing Baltimore Orioles*

Avian plumage can vary within species both between the sexes and within the sexes. For some species of birds, plumage also varies by age of individuals. The focus of this research is to investigate diagnostic plumage characteristics of Baltimore orioles. Baltimore oriole males who are at least older than two years of age are easily distinguished from females of this same age class. However, young male Baltimore orioles who have not yet reached age two look like some older females which makes it difficult to distinguish between these two age classes of males and females. In this study we will use digital images of orioles trapped during spring migration to identify specific plumage patterns for young males and old females. For birds with confusing

plumage patterns, we will also extract DNA and conduct PCR to determine molecular sex for these individuals. The molecular data will allow us to confirm which plumage characteristics will be most informative. Currently we are organizing digital photos of orioles trapped from 2014-2025, creating tools to analyze plumage characteristics. In May 2026, we will begin trapping additional migratory Baltimore Orioles and then test our proposed plumage diagnostic tools.

Poster 24 – Leah Livingston
Mentor: Letty Reichart
Title: *Influence of Sediment Levels in Rainwater Basins on Wetland Plant Availability for Migratory Waterfowl*

Rainwater basins (RWBs) are naturally occurring areas that collect surface water, crucial for plant biodiversity and migratory waterfowl. Erosion, agricultural practices, and urbanization all contribute to sediment buildup in basins. When sediment builds up, it reduces the water-holding capacity in the basin and likely affects seed deposition and survival, ultimately influencing food availability for migratory waterfowl. This study aimed to compare sediment levels in basins to seed/plant diversity available in spring when migratory waterfowl arrive to the area. We collected soil cores from three water basins in central Nebraska in the fall of 2025, put the seeds through cold stratification, and grew the seeds under controlled moist and flooded conditions to assess germination and species diversity. We set up additional environments for the water samples we collected from the RWB with high water levels. We expect our results to show increased plant diversity in basins with the least sediment build-up, making these areas ideal for migratory waterfowl in the spring. The findings from this study will impact how resource managers utilize their time and resources for the conservation of RWBs to support high plant diversity for migratory waterfowl habitat.

Poster 25 – Morgan Holm
Mentor: Letty Reichart
Title: *Discovering birds' hidden hitchhikers, the parasites that travel North*

Many bird species are migratory, traveling long distances between their overwintering location and the breeding location every year. For every species, there are multiple parasites that can potentially hitch a ride on a vertebrate host. We are interested in investigating ecto- and endo-parasites of migratory birds that stop in south-central Nebraska on their migration northward. We are currently conducting a literature review to determine which parasites are likely to be found in common migratory songbirds for our study area. We will begin trapping migratory birds during Spring and Summer to collect ectoparasites and blood smears to determine potential endo-parasites (e.g., Haemosporidians). Ectoparasites can easily be removed from birds and stored in ethanol for future laboratory identification and potential screening for zoonotic diseases. Blood smears are an excellent method to identify some types of endoparasites. The results from this project will help us to better understand important parasites present in migrants stopping in south central Nebraska.

Poster 26 – Matthias Becker
Mentor: Melissa Wuellner
Title: *Critical Thermal Maximum Temperatures for Two Nebraska Fishes of Different Tolerances*

Prairie fishes are adapted to extreme changes in environmental conditions, such as water availability and temperature, but some may be susceptible to persistent issues such as climate change. Green Sunfish (*Lepomis cyanellus*) and Plains Topminnow (*Fundulus sciadicus*) are native to Nebraska but represent different tolerances to environmental conditions. Green sunfish are considered highly tolerant and are ubiquitous, but Plains Topminnow distributions and abundances have declined across the Great Plains. In Nebraska, Plains Topminnow are considered a Tier-1 at-risk species. Understanding the upper lethal limits of temperatures of fishes can be important for identifying stream segments where species are expected to persist and where reintroductions may be possible. The objective of the study is to determine the thermal tolerances of both Green Sunfishes and Plains Topminnow. I used a series of tank experiments to determine the critical thermal maximum (CTmax) of each species (n = at least 30 individuals per species), where I raised water temperatures by 0.33 degrees Celsius every minute before loss of equilibrium was observed in the fish. Mean CTmax values were similar for both species (Green Sunfish: mean = 37.0 degrees Celsius; range = 35.3 – 37.7 and Plains Topminnow: mean = 36.5 degrees Celsius; 31.1 – 38.3) Results from this research indicate that Plains Topminnow distributions are likely not limited by water temperature as they are similarly tolerant to

Green Sunfish, but other factors influencing topminnow distributions should be explored.

Poster 27 – Harrison Kuta
Mentor: Nicholas Hobbs
Co-Author: Rachel Warrick
Title: *Effect of Food Insecurity on Anxiety-like Behavior in Juvenile Mice*

Food insecurity (FI), in which individuals have insufficient access to enough food to sustain an active, healthy lifestyle, has become more common in the U.S. FI is associated with several negative health consequences, including anxiety disorders. Anxiety disorders are more prevalent in women compared to men. Mice, similarly, show a sex difference with anxiety-like behavior as measured on an elevated plus maze (EPM). This suggests that gonadal hormones and their receptors help to modulate anxiety as males with low levels of testosterone or declining testosterone exhibit a higher level of anxiety relative to men with normal androgen levels. However, less is known about how FI affects anxiety-like behavior in juvenile mice, who do not exhibit high levels of gonadal steroid hormones. Therefore, we hypothesize that FI increases anxiety-like behavior of juvenile mice, and such changes in behavior are mediated by changes in hormones and their receptors. Mice were exposed to 1 of 3 experimental treatments: a chronic 10-day FI, an acute 24-hour FI, or were provided with continuous access to food. Blood samples were taken before and after these treatments to determine if such treatments affected specific hormone levels, including corticosterone, testosterone, and estradiol. Mice underwent a series of behavioral assays to measure anxiety-like behavior, including the EPM, open field (OF), and novel object (NO) tests. Brain tissue will be collected following behavior to determine if FI affects activation of neurons in brain regions known to modulate anxiety-like behavior in rodents. We expect to see a higher prevalence of anxiety-like behavior in mice in the FI treatments. Furthermore, we predict that such changes in anxiety-like behavior are driven by changes gonadal steroid hormones.

Poster 28 - Hernan Vargas
Mentor: Suhrabi Chandra
Title: *Comparative Effects of Natural Quinone Classes on the Cytoskeletal Structure and Migration of MDA-MB-231 Breast Cancer Cells under Varying Glucose Conditions*

Triple-negative breast cancer (TNBC) is an aggressive breast cancer subtype known for high invasiveness, poor prognosis, and limited treatment options. Metastasis in TNBC is strongly driven by changes in the cytoskeleton, especially actin filaments, which allow cancer cells to change shape, form protrusions, and migrate. Additionally,

metabolic conditions such as high glucose, commonly associated with diabetes, may worsen cancer progression by increasing reactive oxygen species (ROS) and altering cellular stress responses. Natural quinones are redox-active compounds found in plants, fungi, and bacteria that can generate ROS and have shown potential anticancer effects, including disruption of the actin cytoskeleton and inhibition of cell migration.

This study will compare the effects of three classes of natural quinones on the cytoskeletal structure and migration of MDA-MB-231 TNBC cells under low-glucose (5 mM) and high-glucose (25 mM) conditions. Cells will be cultured in glucose-controlled media and treated with optimized quinone concentrations. Cytoskeletal organization will be analyzed using actin staining and fluorescence microscopy, while cell migration will be measured through wound-healing assays. ROS levels will be assessed using a DCFDA-based detection assay and quantified with Image J.

We hypothesize that quinone effects will differ by structural class, with naphthoquinones showing the strongest anti-migratory and cytoskeletal-disruptive effects due to their higher redox activity. We also expect glucose levels to influence quinone activity, providing insight into how diabetic-like conditions may affect therapeutic responses in TNBC.

Poster 29 – Abhi Srivastava
Mentor: Surabhi Chandra
Title: *Anticancer Effects of the Ashwagandha Extract in MDA-MB-231 Cells*

Research on phytochemicals as treatments for various ailments is gaining momentum due to their proven effectiveness in traditional practices with minimal adverse effects. Currently approved anticancer therapies can also be used in combination with phytochemicals. Previous studies have suggested the possible anticancer activity of *Withania somnifera*, widely known as ashwagandha. This study investigates the anticancer properties of *Withania somnifera* in triple-negative breast cancer cells (MDA-MB-231), which are the most resistant to treatment. Currently, cytotoxicity experiments are being performed utilizing a serial dilution series from 10-3 to 10-8 microgram/ml of *Withania somnifera* in MDA-MB-231 cells. The stock was prepared from commercially available root extract of Ashwagandha and dissolving in DMSO to a concentration of 100 mg/mL. Cell viability is being quantified using the Presto-Blue assay, and cytotoxicity is recorded based on the fluorescence of the cells. If the results are suggestive of anticancer activity, we will subsequently determine the molecular mechanism of action.

Poster 30 – Isabel Zaruba
Mentor: Surabhi Chandra
Title: *Impact of Ashwagandha on Apoptotic Cell Signal Transduction in TNBC Cells*

Phytochemical research pertaining to the treatment of human illness has gained popularity in recent years due to its shown effectiveness, age-old usage, and minimal adverse effects. Currently approved anticancer therapies can also be used in combination with phytochemicals. To this effect, our proposal is to evaluate the anticancer properties of the phytochemical Ashwagandha (*Withania somnifera*) in triple-negative breast cancer cells (MDAMB-231), which are an aggressive and difficult form to treat. Current research supports the ability of *Withania somnifera* (WS) to induce apoptosis and trigger tumor suppression, notably through leaf extract. The results of one study found that tumor size in mice was reduced and mediated via upregulation of the p53 gene, suggesting WS enhances expression of pro-apoptotic genes and suppresses proliferative pathways. While WS has demonstrated apoptotic effects in various cancer models, its effects on MDA-MB-231 cells through modification of apoptotic signaling pathways remain unclear. We hypothesize that WS will enhance the apoptosis of MDAMB-231 cells and suppress the proliferation of the cells. Our evaluation will be conducted through colony formation assays and apoptotic signaling to assess specific signal transduction mediators. So far, we have begun with scratch wound healing assays to evaluate the cells' migration and growth when subjected to various concentrations of WS solutions. Through our investigation, we aim to clarify the mechanistic role Ashwagandha plays in the signaling pathways attributing to cytotoxicity and preventing metastasis, providing insight into potential future phytochemical cancer therapies.

Poster 31 – John Placke
Mentor: Yipeng Sui
Co-Authors: Naara Ramirez & Michael Moxley
Title: *The Potential Impacts of Sweetener Metabolite Steviol on Dyslipidemia*

The non-caloric sweetener stevioside is over 250 times sweeter than sucrose, therefore stevioside and other stevioside glycosides are used as sweeteners in food additives and pharmaceutical products in many countries. Stevioside, which is not absorbed in the digestive tract, is hydrolyzed into the aglycone steviol (STL) that is absorbed into the body. Recent studies suggest that steviol, but not stevioside, activates Pregnane X receptor (PXR) in human hepatic cells. PXR is a nuclear receptor activated by a variety of dietary steroids, pharmaceutical agents, and environmental chemicals. In addition to the role in xenobiotic metabolism, the atherogenic and dyslipidemic effects of PXR have been revealed in animal models.

Controversially, steviol not only increases the mRNA expression of CYP3A4, a PXR direct downstream gene, in primary human hepatocytes, but also inhibits the enzymatic activities of CYP3A4. Key amino acid residues of PXR were identified by computational docking study together with cell-based mutagenesis assay. We have also found that STL increases cholesterol uptake through PXR. Thus, it is important to elucidate the molecular mechanisms by which steviol activates PXR signaling and to assess the possible adverse effects of steviol on pro-atherosclerotic events in the cardiovascular system, such as dyslipidemia. Our study aims to explore the cellular and molecular mechanisms by which exposure to steviol activates human PXR and increases the risk of dyslipidemia.

Poster 32 – Laura Velasco
Mentor: Yipeng Sui
Title: *Effects of Environmental Chemicals on Adipogenesis and Osteogenesis in Mouse Mesenchymal Stem Cells*

Obesity and obesity-associated metabolic disorders, such as insulin resistance and type 2 diabetes, are rapidly growing public health epidemics, and there is an urgent need to understand the molecular mechanisms underlying these chronic diseases. Increasing evidence links exposure to environmental chemicals contributing to development of obesity by interfering with lipid metabolism. This study investigated the effects of two plasticizers, 2-ethylhexyl diphenyl phosphate and alkyl sulphonic phenyl Ester (ASE), and two organophosphate pesticides, malathion and dichlorvos, on adipogenesis and osteogenesis in murine mesenchymal stem cell line C3H/10T1/2 cells. Lipid droplet formation was visualized with Oil Red O Staining to evaluate lipid accumulation. Alkaline phosphatase (ALP) staining was used to identify osteogenic differentiation. Our results demonstrated that ASE and EHDPP did not alter adipogenesis. In contrast, malathion and dichlorvos inhibited adipogenesis in C3H/10T1/2 cells. For osteogenesis, EHDPP and ASE did not alter osteogenesis. Both pesticides, malathion and dichlorvos inhibited osteogenesis. These findings contribute to our understanding of how plasticizers and pesticides may influence obesity and will be valuable for future assessments.

Poster 33 – Naara Ramirez
Mentor: Yipeng Sui
Title: *FDA-Approved Antidepressant Trazodone Potentially Increases the Risk of Dyslipidemia*

Cardiovascular disease is the leading cause of death. Many cardiovascular health issues, such as atherosclerosis, are caused by dyslipidemia, a blood lipid imbalance. Pregnane X Receptor (PXR), a xenobiotic nuclear receptor, plays a role in atherosclerosis and dyslipidemia. PXR is activated by various environmental chemicals, including endocrine-disrupting chemicals (EDCs), often found in common household items such as plastics, medications, and food. Trazodone is a clinically used medication to treat depression by increasing levels of serotonin in the brain. This drug's possible impacts on PXR and cardiovascular risk factors such as dyslipidemia are currently unknown. Our preliminary data suggested that Trazodone activated human PXR in both human intestinal (LS180) and hepatic (HepG2) cells. We hypothesized that Trazodone alters cholesterol uptake and negatively impacts human dyslipidemia through the PXR pathway. In this study we used cell-based transfection assay to evaluate the underlying mechanisms by which Trazodone activates PXR. We found that Trazodone was a more potent agonist of human PXR than mouse PXR. Trazodone activated PXR more intensely in HepG2 compared to LS180 cells. Our data indicated that Trazodone was a selective PXR agonist and promoted the dissociation between PXR and its nuclear corepressors. We identified potential key amino acid residues within the PXR ligand binding pocket that interacts with Trazodone using a computational docking study and site-mutagenesis assay. Trazodone and analog Nefazodone were found to synergistically activate PXR. Furthermore, Trazodone was found to increase cholesterol uptake by LS180 through PXR activation. In the future, we plan to use qPCR to analyze the intestinal cholesterol transporters that are directly transcriptionally regulated by PXR in LS180 cells. This study provides potential evidence on future cardiovascular disease risk assessment for Trazodone as well as other antidepressant drugs.

Poster 34 – Anamel Olegario
Mentor: Yipeng Sui
Title: *Potential Synergistic Effects of Widely Used Ingredients in Personal Care Products Parabens and Triclosan on Adipogenesis*

Daily exposure to chemicals used in personal care products has been implied as a potential contributor to obesity and metabolic disorders beyond diet and genetics. Parabens and triclosan are widely used in personal care products that have been associated with metabolic effects in epidemiological and animal studies. However, their

direct effects on stem-cell adipogenesis, particularly under low-dose mixture conditions and across different stages of differentiation, remain insufficiently characterized. Previous studies have focused on the impacts of single compounds on adipogenesis, leaving gaps in understanding stage-specific and mixture-synergistic responses. This study examines how two parabens with differing adipogenic potency, methylparaben and butylparaben, together with triclosan, synergistically influence the differentiation of mouse mesenchymal stem cells (C3H/10T1/2) into adipocytes. Cells are exposed to low doses of each chemical individually and in combination during three differentiation stages: early differentiation (Days 0–2), late differentiation (Days 4–8), and continuous exposure throughout differentiation (Days 0–8). Adipogenic outcomes are evaluated by quantifying lipid accumulation using Oil Red O staining. Additional analyses of cell viability and lipid droplet morphology are conducted to ensure that observed changes reflect adipogenic responses rather than nonspecific toxic effects. By comparing individual and mixture exposures across distinct stages of differentiation, this study aims to determine whether these commonly encountered chemical exposures exert additive, synergistic, or timing-dependent effects on fat cell formation. The findings of this work will contribute to a more comprehensive understanding of how everyday environmental chemical exposure may influence adipogenesis and may provide insight into environmental factors associated with metabolic disease risk.

Biology & Geography

Poster 35 – Isabella Neuhaus
Mentor: Paul Burger & Jayne Jonas-Bratten
Co-Author: Megan TenBensel
Title: *GIScience Approaches for Predicting Grasshopper Density in South-Central Nebraska Waterfowl Production Areas Using Field and Remotely Sensed Environmental Data*

Grasshopper populations play important ecological roles as herbivores and food source for birds within Nebraska's Waterfowl Production Areas (WPAs), yet their spatial drivers remain understudied at fine scales. This research applies GIScience techniques to evaluate how environmental factors—including soil temperature (TIR), vegetation biomass (EVI), plant richness, and Cyperaceae cover—shape grasshopper density patterns across the Prairie Dog and Gleason WPAs near Funk, Nebraska. Field-collected 1-meter ecological measurements were integrated with Landsat-9 environmental indices to construct a multi-resolution spatial database. Geographically Weighted Regression (GWR) revealed strong spatially varying relationships with soil temperature, plant richness, and EVI. Empirical Bayesian Kriging (EBK) generated

continuous prediction surfaces for key environmental variables and Generalized Linear Regression (GLR) derived from Prairie Dog data produced a grasshopper density model across the entire study area. After applying a systematic bias correction to the Prairie Dog–based GLR, the model accurately represented relative density patterns at Gleason and was visualized using quantile-based ordinal mapping. Results demonstrate that grasshopper distribution is most influenced by soil temperature, vegetation structure, and plant diversity, demonstrating how GIScience provides an effective framework for integrating field-surveyed and remotely sensed environmental data to better characterize ecological relationships and support future WPA management strategies.

Keywords: Grasshoppers, Waterfowl Production Areas, GIScience

Chemistry

Poster 36 – Aika Iida
Mentor: Christopher Exstrom
Title: *Raman Spectroscopy as a Tool in Efforts toward Greater Cement Recycling*

Raman spectroscopy is a laser-based scattering method used to analyze vibrational motions of molecules and crystal lattices. By utilizing a confocal microscope, the laser can be focused on very small regions of a sample, making it highly suitable for studying recycled concrete aggregates. When concrete reacts with pressurized CO_2 gas, components such as $Ca(OH)_2$ and calcium silicate hydrate (C–S–H) convert to $CaCO_3$. This carbonation process not only strengthens the concrete but also captures CO_2, contributing to greenhouse gas reduction. In this work, Raman spectroscopy detection of $Ca(OH)_2$, C–S–H, and $CaCO_3$ in cement paste was investigated using two source laser wavelengths (633nm vs 785nm) to determine sensitivity to CaCO3. Results showed that longer exposure to carbon dioxide produced more Calucium Carbonate (CaCO3). The 633nm Raman laser had greater sensitivity to CO32- but lower sensitivity to other structural components. On the other hand, the 785nm Raman laser source resulted in greater signal-to-noise ratios for all components in cement sample.

Poster 37 – Francisco Cantillo
Mentor: Christopher Exstrom
Co-Author: Norikazu Igusa
Title: *Tuning Surface Wettability of FLSP Aluminum 2219 via Fluorinated Silica Xerogel Embedment*

To make aerospace missions more resource-efficient, one strategy is to functionalize the interior surfaces of fuel tanks hydrophobic. This allows for passive fuel management without the need for heavy pumps or moving parts. This study explores the hydrophobic treatment of Femtosecond Laser Surface Processed (FLSP) Aluminum alloy 2219 using fluorinated silica xerogels synthesized from trimethoxy(3,3,3-trifluoropropyl)silane (SiF3). FLSP creates a permanent hierarchical scaffold characterized by self-organized mound-like structures and a near-surface porous oxide layer. This unique morphology is intended to improve the adherence and confinement of functional coatings.

A two-step acid-base catalyzed sol-gel method was employed at room temperature to synthesize the functional xerogels. The study systematically varied the SiF3/TEOS ratio, H2O/EtOH ratios, solvent exchange steps, and thermal treatments. Surface hydrophobicity was evaluated via water droplet contact angle measurements. Material characterization confirmed that the xerogels selectively infiltrate the porous oxide regions without penetrating the underlying bulk aluminum, demonstrating that the FLSP scaffold effectively confines the coating. Furthermore, we compared embedment techniques, finding that wicking produced fewer surface cracks than submersion while preserving the roughness necessary for wettability control. Results indicate that a 75%:25% SiF3:TEOS ratio, combined with solvent exchange to reduce capillary stresses, achieved a superhydrophobic state with a contact angle of 155.6°. This performance is attributed to the preservation of surface roughness and the segregation of fluorinated groups to the exterior surface. These findings offer a scalable approach for tuning surface wettability in high-performance aerospace application.

Poster 38 – Norikazu Igusa
Mentor: Christopher Exstrom
Co-Author: Francisco Cantillo
Title: *Hydrophobicity of fluorinated silica xerogels (SiMeF3) prepared from a room-temperature two-step catalyzed sol-gel process*

In space, where refueling is not an option, maximizing fuel usage is critical. One strategy is to make the interior surfaces of fuel tanks hydrophobic, allowing fuel to be placed in the tank without using pumps or moving parts. This study explores the

hydrophobic treatment of femtosecond laser surface-processed (FLSP) aluminum alloy 2219 using dimethoxymethyl(3,3,3-trifluoropropyl) silane ($SiMeF_3$). A two-step, acid–base-catalyzed sol–gel method was employed at room temperature. Hydrophobicity was assessed by measuring static contact angles of water droplets on the coated surfaces. Our previous results indicate that hydrophobicity is not primarily dictated by the length of fluorinated carbon chains. These findings offer a new perspective for tuning surface wettability in aerospace applications. Ongoing research is focused on how using different silanes will affect the hydrophobicity of the gel, and on changing the TEOS:$SiMeF_3$ ratio to improve hydrophobic gel performance.

Poster 39 – Ethan Brockman
Mentor: Frank Kovacs
Title: *Comparison of fluorescent probes for binding to the Fasciola hepatica fatty acid binding protein isoform V (Fh-V)*

Fasciola hepatica, (*F. hepatica*) or liver fluke, is a zoonotic parasite (infects both humans and livestock) is listed as a neglected tropical disease that infects around 50 million people and is estimated to have a global economic cost to the livestock industry that is in the billions of US$. This organism depends on fatty acid binding proteins for lipid metabolism, which are a potential target for drug development against the parasite. Fatty acid binding proteins (FABPs) are a family of small proteins (~14-15 kDa) that regulate cellular signaling via the binding of lipids within an organism. We measured the binding of two fluorescent probes commonly used for studying FABPs, 8-anilino-1-naphthalenesulfonic acid (ANS) and 11-(Dansylamino)undecanoic Acid (DAUDA), to the Fh-V isoform and a mutant designed to measure the impact of a key tyrosine predicted to be in the binding site. We are targeting Fh-V because it has been implicated in drug resistance in the parasite.

Poster 40 – Trey Schuyler
Mentor: Frank Kovacs
Title: *Characterization of ligand binding to the human fatty acid binding protein form V (FABPV) using a fluorescence displacement assay*

Fatty acid binding proteins (FABPs) are a family of small proteins (~14-15 kDa) that regulate cellular signaling via the binding of lipids within the cell. There are currently 10 known human isoforms that are differentially expressed in various tissues. Here we are characterizing ligand binding to FABPV, a form that was initially discovered in the epidermis and has been targeted for drug development for prostate cancer. We used the fluorescent probe, 8-anilino-1-naphthalenesulfonic acid (ANS) to study the binding affinity of other compounds via a fluorescence displacement assay. Here we will

present results for our lab's initial characterization of this protein for a series of hydrophobic ligands.

Poster 41 – Maggie Luebbe
Mentor: Frank Kovacs
Title: *Comparison of ligand binding to subsets of human and parasitical fatty acid binding proteins (FABPs)*

Fatty acid binding proteins (FABPs) are a family of small proteins (~14-15 kDa) that regulate cellular signaling via the binding of lipids within an organism. In this study, we have characterized the ligand binding of a set of FABPs that have been extensively characterized in literature (FABP3, FABP5, and FABP7) alongside a new set that have not been previously studied (Fh-I and Fh-V). This project aims to compare ligand-binding behavior between human FABPs and unstudied parasitical proteins, Fh-I and Fh-V, to evaluate potential differences in lipid recognition and binding specificity. We started by measuring the binding of the fluorescent probe commonly used for studying FABPs, 8-anilino-1-naphthalenesulfonic acid (ANS), to all of the FABPs in our study. We then determined their binding to a range of ligands via a fluorescence displacement assay using ANS. These fluorescence-based methods provide a model for evaluating ligand-binding to various subsets of FABPs. The range of ligands was introduced to observe and evaluate their abilities to compete with the ANS binding and expose differences in ligand affinity among the different proteins. Although data collection is ongoing, these experiments are expected to provide valuable insight into ligand specificity and structural diversity between various FABPs. This would expand our knowledge and advance our targeted treatments of parasitic infections caused by parasitic organisms.

Poster 42 – Catherine Blomstedt
Mentor: Haishi Cao
Title: *Improving the Sensitivity of DNBS-Based Fluorescent Sensors for Hydrogen Sulfide Detection in Aqueous Media*

2,4-Dinitrobenzenesulfonate (DNBS)-based fluorescent sensors are widely used for hydrogen sulfide (H_2S) detection due to their high selectivity. However, their application in aqueous media is often limited by the hydrophobic nature of DNBS, which typically requires a high proportion of organic co-solvents, such as DMSO. In water-rich environments, DNBS hydrophobicity reduces its effective reaction with H_2S, leading to decreased sensor sensitivity. In this work, a supramolecular additive was used to improve H_2S detection in aqueous media. As a result, the sensitivity of DNBS-based fluorescent sensors was significantly improved in aqueous solutions. This approach

provides an effective strategy to enhance the performance of DNBS-based H_2S sensors under aqueous conditions.

Poster 43 – Haley Hernandez-Sandoval
Mentor: Haishi Cao
Title: *Effect of N-Amide Substitution on Sensitivity of DNBS-Based HS Sensors Using 1,8-Naphthalimide Scaffold*

1,8-Naphthalimides are widely used fluorophores for building fluorescent sensors, especially for the detection of hydrogen sulfide (H_2S). For our research, we used 3-hydroxy-1,8-naphthalimide as the fluorescent core and 2,4-dinitrobenzenesulfonate (DNBS) as the H2S-responsive group to develop a series of H_2S sensors with high selectivity and sensitivity. N-amide substitution on the 1,8-naphthalimide is commonly used to improve solubility and tune fluorescence properties, but its effect on sensing performance has not been well studied. We observed/documented that the variation in the N-amide structure strongly influenced sensor sensitivity, particularly in aqueous solutions. To understand this effect, we synthesized and tested a series of DNBS-based sensors with different N-amide substituents. Our results showed a relationship between N-amide structure and H_2S sensitivity, which provides useful guidance for designing sensitive 1,8-naphthalimide-based fluorescent probes for H_2S detection.

Poster 44 – Linus Borer
Mentor: Haishi Cao
Title: *Synthesis Fluorescence Sensor for the Detection of Hydrogen Sulfide*

The severity of a range of neurodegenerative diseases (e.g., Down's syndrome, Alzheimer's disease, and Parkinson disease) directly correlates with the extent of neuronal damage caused by cellular oxidative stress to cellular proteins. Depending on the intracellular concentration, H2S acts either as a cellular reducing reagent exerting an anti-oxidation function or as a toxin. Critical to an understanding of the possible therapeutic potential of H2S is an ability to measure intracellular [H2S] and relate the relationship to cellular redox levels, which has not been possible due to the absence of reagents for real-time and accurate detection within living cells. To address our long-term goal of understanding the antioxidant role of H2S and its possible therapeutic efficacy in treating neurodegenerative disease, we propose to synthesize a family of cell-permeable fluorescence sensors that will permit the sensitive measurement of intracellular [H2S]. Using these reagents, we propose to unravel the mechanism of action by directly measuring how [H2S] affects central regulators of cellular redox status, such as the abundance of reduced (GSH) and oxidized (GSSG) in PC12 cells, which are commonly used to investigate neuronal functions. Proposed fluorescence sensors will be prepared through a multi-step organic synthesis using dyes with near-

IR emission signals that will facilitate the detection of H2S in living PC12 cells. Three specific aims are proposed, which involve i) the synthesis of cell-permeable sensors selective for H2S, ii) direct measurements of permeability coefficients and pharmacokinetics for [H2S] in living cells, and iii) the possible influence of cellular H2S levels on cellular redox (i.e., [GSH]/[GSSH]. For the sensor design, we propose to use a novel H2S-triggered nitro-amino reduction reaction that will be built around a cyanine 7 (Cy7) dye scaffold, which is proposed to provide a “Off-ON” fluorescence signal in near-IR region in response to H2S binding. The in vivo sensing ability of sensors will be examined through both changes in fluorescence intensities using both PC12 rat neuronal cells and U937 monocytic cells. Finally, the relationship between H2S and cellular redox levels (i.e., [GSH]/[GSSG]) will be investigated by combining fluorescence imaging of H2S sensors with standard molecular biology measurements of the concentration of reduced (GSH) and oxidized (GSSG) glutathione, activity changes of GSSG reductase, and g-GCS mRNA levels; the latter measurements will be made using commercially available assay kits and real-time PCR). The accomplishment of the proposed project will provide a mechanistic understanding of the anti-oxidation effects exerted by H2S in neuronal-like cells and the therapeutic value of H2S as a treatment for neurodegenerative disease.

Poster 45 – Riley Grieser
Mentor: Haishi Cao
Title: *Improving the Formylation Yield in Aromatic System*

Aromatic formylation is a fundamental transformation for introducing synthetically versatile aldehyde groups onto aromatic systems and is widely employed in the construction of fluorescent sensors and functional materials. Despite its long-standing utility, broader synthetic application remains limited by low reaction efficiency, prolonged reaction times, and poor compatibility with electron-deficient substrates. Moreover, few general strategies have been developed to systematically overcome these challenges. In this study, we investigate a new approach to aromatic formylation that significantly enhances reaction efficiency while improving regioselectivity across a range of aromatic substrates. This method offers a promising platform for expanding the practical utility of aromatic formylation in synthetic and chemical biology applications.

Poster 46 – Kian Botts
Mentor: Hector Palencia
Title: *Synthesis of Peptides to Address Antibiotic Resistance*

Antibiotic resistance has become a major global concern due to the increasing ineffectiveness of conventional antibiotics against bacterial infections and the risk of future pandemics, in which treatment options may be severely limited. Moreover, there is a growing concern that even last-resort antibiotics could lose their effectiveness. Various strategies have been explored to address this challenge, including the modification of existing drugs and the development of entirely new antimicrobial agents. Peptides, composed of short sequences of amino acids, represent a promising alternative to traditional antibiotics. They offer several advantages, such as broad-spectrum activity against diverse pathogens and a reduced likelihood of resistance development. Here, we present the synthesis of new peptides designed to combat antibiotic-resistant bacteria.

Poster 47 – Samuel Kramer
Mentor: Hector Palencia
Title: *Silver and gold N-Heterocyclic Carbene Complexes to Combat Antibiotic Resistance*

Since their discovery and widespread use, antibiotics have saved millions of lives. However, indiscriminate and excessive use has accelerated the emergence of antibiotic resistance, rendering many existing drugs ineffective against resistant bacterial strains and leaving limited options to control future outbreaks. In this context, N-heterocyclic carbene–silver (NHC–Ag) complexes have shown promising antimicrobial activity, including against resistant bacteria. Building on our previous results, we have designed a new set of NHC–Ag complexes and are currently synthesizing and evaluating them as potential agents to address antibiotic resistance.

Poster 48 – Tobias Kraft
Mentor: Hector Palencia
Title: *Effect of Structural Variations in N-Heterocyclic Carbene-Silver Complexes on Antibacterial Activity*

Antibiotic resistance represents a growing threat to public health and may significantly limit treatment options during future pandemics. The development of new antimicrobial agents is therefore critical. N-heterocyclic carbene (NHC) silver complexes are a class of metal–organic compounds that have shown promising activity against resistant bacterial strains. Their biological properties are strongly influenced by ligand structure, which affects both stability and antimicrobial performance. In this study, we synthesized a series of NHC–silver complexes with systematic structural variations and evaluated their antibacterial activity. Complexes bearing alkoxy substituents showed some of the most promising results, suggesting that ligand functionalization plays an important role in modulating biological effectiveness.

Poster 49 – Jade Salgado
Mentor: Kristy Kounovsky-Shafer
Co-Authors: Esmeralda Mendez Ortiz & Samantha Bursaw
Title: *Elution and concentration S. cerevisiae DNA in small inserts using 3D-printed devices*

With our large inserts in the elution and concentration device, some of the DNA remained in the insert. To decrease the percentage of DNA remaining in the insert, a smaller insert was used for testing. By decreasing the depth of the insert, the DNA needs to travel a shorter distance to reach the concentration area. Small inserts (1.6 x 5.8 x 7.0 mm) contained S. cerevisiae cells, which were then lysed. The inserts protected the DNA during cell lysis. Since smaller inserts were used, a holder was designed to hold the smaller insert and place it into the 3D printed elution and concentration device. Different pulsed times were tested with two different electric fields (7.5 and 15 V). Different pulsed on and off times were tested to find the optimal conditions for these inserts.

Poster 50 – Mason Taylor
Mentor: Kristy Kounovsky-Shafer
Title: *Improved Containment of Large DNA Molecules in an Inverted Insert*

As sequencing reads get longer, it will require populations of longer DNA molecules. The storage and protection of large DNA molecules will be necessary for sequencing to identify large genomic variations. The agarose-based inverted insert was designed to store and protect DNA. To recover more DNA from an inverted insert, the method used to make the inverted inserts was modified. Finally, these inserts were tested for the amount of DNA that remained inside after 1 day, 1 week, and 3 weeks. The modifications lead to better recovery of large DNA molecules. Further research is needed to improve and test the recovery of DNA of different sizes.

Poster 51 – Samantha Bursaw
Mentor: Kristy Kounovsky-Shafer
Co-Authors: Esmeralda Mendez Ortiz & Jade Salgado
Title: *Elution and concentration S. cerevisiae DNA in large inserts using 3D-printed devices*

Long DNA molecules are vital for genomic analysis and other biomedical uses. To recover concentrated amounts of large DNA, a 3D-printed device was developed to allow larger DNA molecules to congregate into one spot for easier extraction and utilization. Large inserts (2.7 x 6.6 x 7.2 mm) consisting of S. cerevisiae chromosomes (200 kb – 1.5 Mb) were used within the 3D-printed devices, and the DNA was eluted from the insert and concentrated at the acrylamide roadblock. Trials consisted of different variables, including the voltage of the pulsed electric fields (7.5 and 15 V), the on and off times for the pulsed electric field, and the trial duration (1-18 hours). Each trial was run in triplicate, and the amount of DNA recovered was measured.

Poster 52 – Nate Lilla
Mentor: Michael Moxley
Title: *Assay Development for Pyruvate Dehydrogenase Kinase Inhibitor Discovery*

Pyruvate dehydrogenase kinase (PDK) regulates the activity of the pyruvate dehydrogenase complex (PDC) by phosphorylating its E1 subunit, thereby limiting conversion of pyruvate to acetyl-CoA, restricting entry into the TCA cycle, and reducing ATP production. Due to its central role in metabolic reprogramming in diseases such as cancer and type 2 diabetes, PDK has emerged as a therapeutic target, although existing inhibitors have not progressed successfully to clinical use. Initial measurements of PDK activity using the ATP-Glo luminescent kinase assay lacked sufficient sensitivity, prompting a transition to the more sensitive ADP-Glo kinase assay. Using this approach, assay conditions were optimized to evaluate time- and temperature-dependent effects on endpoint ADP-associated luminescence, and known inhibitors AZD7545 and VER-246608 were shown to reduce PDK activity by about 40–60%. To address limitations of a single time point reading, we developed a time-dependent fluorescent PDK activity assay that enabled continuous monitoring of kinase activity. Despite continuous monitoring, this assay did not account for the reduced signal observed in the luminescent readout. To further investigate inhibitor engagement and binding mechanisms, we implemented complementary fluorescence-based competition assays designed to probe ligand interactions at both the ATP and lipoamide binding sites. The ATP-competitive fluorescent analog TNP-ATP was used to test whether ATP-site inhibitors such as VER-246608 could displace a bound probe. In parallel, ANS was employed to monitor ligand binding at the lipoamide site, where inhibitors such as AZD7545 are known to bind, with fluorescence changes reporting

inhibitor-induced conformational effects. Despite their design as competitive assays, neither TNP-ATP nor ANS displacement provided sufficient sensitivity to reliably report inhibitor competition. These results suggested that while the fluorescent probes associate with regions proximal to the ATP and lipoamide binding sites, inhibitor binding does not measurably displace the probes under the conditions tested. Together, these findings indicate that PDK inhibitors engage and induce local structural effects on the enzyme without directly competing in a manner detectable by these assays.

Mathematics & Statistics

Poster 53 – Shingo Kitamura
Mentor: Jia Huang
Title: *Alternating Sums of Parts in Compositions*

Compositions and partitions of integers are fundamental concepts in combinatorics, applied in a wide variety of fields such as representation theory and statistical mechanics. While partitions do not consider order, compositions are characterized by the fact that the order of parts distinguishes them. In this Undergraduate Research Fellowship project, we conducted a detailed investigation into a statistic a(α), defined as the alternating sum of α, that has been studied for partitions but not for compositions.

The primary objective of this research is to analyze the moments of this statistic, the average value of a(α) raised to the m-th power across all compositions of n, both analytically and numerically. Through analysis using computer algebra systems to calculate these moments, E[a(α)m], over a wide range of values of n, we discovered the surprising result that these average values are never fractions, but are consistently integers. Upon further analysis, we successfully identified specific polynomial formulas for both even-order and odd-order moments. Notably, we confirmed that the coefficients appearing in these polynomials match perfectly with known sequences registered in the OEIS (Online Encyclopedia of Integer Sequences), such as sequence A085734. This suggests that the statistic treated in this study possesses deep structural connections with other mathematical objects.

Poster 54 – Ryan Abels
Mentor: Scott Gensler
Title: *Exploring Fixed Points of Two-Dimensional First Order Difference Equations*

In this project, we explore the properties of fixed points of the following system:

$$x_{n+1} = \frac{ax_n+by_n+c}{Ax_n+By_n+C}$$
$$y_{n+1} = \frac{lx_n+my_n+n}{L_x+My_n+N},$$

where a,b,c,A,B,C,l,m,n,L,M,N are parameters. This system can be viewed as a mapping F : R2\(P ∪ Q) → R2, where P is the line Ax + By + C = 0 and Q is the line Lx +My+N =0. Our research question is: What are the properties of the fixed points of this system? We find an upper bound on the number of fixed points for any variation of this system (i.e. the maximum number of fixed points), the feasibility of reaching this upper bound, and fixed point locations for particular values of the parameters. We also attempt to classify the behavior of the fixed points in this system. This project builds off Weiss's work On the Geometry of a Four-parameter Rational Planar System of Difference Equations and our previous work from last year.

Poster 5 – Junghyun Kim
Mentor: Nathan VanderWerf
Title: *Relation subspaces in vertex operator algebras: residue generators for On∘(V) and intersections with (L(-1)+L(0))V*

We study the relation subspace On∘(V) that appears in the definition of the level-n Zhu algebra An(V)=V/On(V), where On(V)=OL(V)+On∘(V) and OL(V)=(L(-1)+L(0))V. Using residue calculus, we introduce operators Rnm,k that encode the circle products u∘nv and prove explicit change-of-generators formulas between the standard generators (u-m1)∘nv and the residue generators uRnm,0v, together with a binomial inversion. These identities provide a practical framework for computing On∘(V), especially in strongly generated VOAs. As progress toward understanding the overlap On∘(V)∩OL(V), we use that the k=0 subspace collapses modulo the k≥1 subspace and we derive the induced action of L(-1)+L(0) on the resulting circle-layer quotient. This leads to a conjecture describing On∘(u,V)∩OL(V) as (L(-1)+L(0)) (On∘(u,V).

Physics, Astronomy, & Engineering

Poster 55 – Corban Preston
Mentor: Jeremy Armstrong
Title: *Investigating the Structure of Light Nuclei*

We investigate the structure of light nuclei, using Brink formalism and Volkov potentials. This allows for more simplistic calculations that still respect Fermi statistics of protons and neutrons. We investigate the He-4 nucleus and the Be-8 nucleus, with a goal toward Be-9. He-4 is a benchmark calculation, then used in Be-8, which seems to be a cluster of two He-4 nuclei, while Be-9 adds a neutron to the skeleton of Be-8 in a somewhat molecular fashion. Be-8 is a vital intermediate in the astrophysical synthesis of C-12, which is necessary for all life, and has a very unique half-life of 8.2*10^-17 s, which stands alone as the only nucleus with a half-life on this order of magnitude for several powers of ten in either direction. Since Be-9 is the only stable isotope of Be that exists and given the instability of Be-8, the singular neutron difference between them seems to hold Be together. Modern potential models are very computationally expensive with potentials having many terms and accounting for 3-body interactions. One of our goals is to see if a much simpler model with a potential of only two terms and accounting for only 2-body interactions is able to capture the same features as a much more rigorous model. For Be-8 we calculate its binding energy and size and compare these values with experimental values.

Poster 56 – Adam Gonzalez Gomez
Mentor: Brandon Marshall
Title: *Detecting High-Mass Emission Stars via Infrared Time-Domain Analysis*

High-mass emission stars are rare, short-lived stars that strongly influence their surrounding environments. However, they are difficult to identify because they often form in dusty regions that block visible light, and their brightness can change over time. Observing in the infrared allows us to see through this dust and study how a star's brightness varies. In this project, we use infrared light curves from the Wide-field Infrared Survey Explorer (WISE) telescope to search for high-mass emission stars. Light curves track how a star's brightness changes over time, and certain variability patterns can indicate emission activity. We analyzed infrared data from six different HII regions, three of which are particularly large and complex star-forming regions and examined stars whose brightness changes suggest they may be emission sources. Our preliminary results have identified approximately 10–15 candidate for high–mass emission stars within these regions. In the process, we also discovered roughly 25–35 Mira variable stars, which are long-period pulsating stars, many of which do not appear

to have been previously classified. Although we have examined only six regions out of roughly 4,000 that could be analyzed using this method, the number of variable stars uncovered demonstrates the effectiveness of infrared time-domain analysis in identifying rare stellar objects. This work highlights the potential to significantly expand the known population of high-mass emission stars and improve our understanding of massive star evolution within our Galaxy.

Professional & Applied Studies

Accounting Finance & Economics

Poster 97 – Mei Takeda
Mentor: Constance Li
Title: *Accounting Scandal: A Comparative Case Study of Enron, WorldCom, and HealthSouth*

Accounting scandals have seriously undermined corporate credibility, investor confidence, and overall financial-market stability by revealing weaknesses in financial reporting, internal controls, and ethical culture. This project examines major U.S.-linked scandals—such as Enron, WorldCom, and HealthSouth—to understand how fraud was executed, why it persisted, and how it was ultimately detected. Using a case study and comparative analysis approach, I will evaluate each company's background and timeline to identify recurring patterns (e.g., earnings manipulation, control failures, governance breakdowns) as well as key differences in fraud mechanisms and detection. In addition, the research will assess the regulatory and legal reforms that followed these events, focusing on how changes in corporate governance, compliance expectations, and risk management altered organizational behavior. Particular attention will be given to the role of internal control systems, compliance infrastructure, and ethical decisionmaking in preventing misconduct and enabling timely intervention. Beyond the causes, I will also consider the consequences—legal exposure, stock-price volatility, reputational damage, and erosion of public trust—and analyze how organizations can recover and rebuild stakeholder confidence. The goal is to generate practical insights into fraud prevention and accountability: how firms can strengthen governance frameworks, design effective control environments, and promote ethical leadership that supports transparent reporting. This research is personally meaningful because it aligns with my long-term objective of becoming an accounting professional who advances integrity and financial transparency. By connecting academic concepts to real-world failures and reforms, I hope to develop the judgment and expertise

needed to support responsible decision-making and foster a culture of trust in future organizations.

Poster 98 – Sylvie Luo

Mentor: Constance Li
Title: *AI-Assisted Auditing: Responsibility Structures and Allocation Models in Algorithmic Error Scenarios*

As artificial intelligence (AI) becomes increasingly embedded in audit processes—including risk assessment, anomaly detection, and continuous auditing—it functions as a judgment intermediary that shapes audit conclusions rather than merely supporting human analysis. This transformation challenges the traditional audit responsibility framework, which assumes single-entity accountability aligned with professional judgment and decision-making control. However, current professional standards from the Public Company Accounting Oversight Board (PCAOB), American Institute of Certified Public Accountants (AICPA), and Securities and Exchange Commission (SEC) do not clearly define responsibility structures for AI-assisted auditing, leaving accountability boundaries ambiguous when algorithmic errors occur. This study examines how responsibility should be allocated in AI-assisted auditing contexts. Using conceptual, institutional, and practical analyses, the research reviews regulatory publications and professional standards and analyzes publicly disclosed audit methodologies. Findings suggest that AI intermediation disrupts the traditional alignment among professional judgment, decision-making control, and accountability, resulting in structural responsibility dispersion. Based on technological dependence and the distribution of judgment control, three responsibility allocation models are proposed: auditor-centered, shared responsibility, and technology-provider-centered responsibility. These models are evaluated in terms of professional ethics, regulatory compatibility, and practical feasibility. The study contributes a responsibility-sensitive analytical framework for AI-assisted audits and offers insights for audit governance, contractual risk allocation, and future regulatory development.

Keywords: AI-assisted auditing, professional responsibility, algorithmic error, accountability

Communication Disorders

Poster 100 – Megan Wells
Mentor: Jane Grothaus
Title: *Parent Attitudes Toward Augmentative & Alternative Communication (AAC) in Children with Speech & Language Disorders*

Augmentative and Alternative Communication (AAC) is a vital tool for children with speech and language disorders. While AAC has been shown to improve communication outcomes, parental perceptions significantly influence its acceptance and effective use. This study explored parent and caregiver attitudes toward AAC, including motivations, concerns, and perceived barriers. A 15-question survey was disseminated over eight weeks to parents of children using AAC, yielding qualitative data from 17 parents who responded to the survey request. Findings revealed positive beliefs about AAC's impact on communication and socialization, as well as challenges related to device reliability, inconsistent use, and limited support. Results highlight the need for additional training, increasing peer networks, and improving school-based support systems. Recommendations are provided to guide clinicians and educators in fostering collaborative AAC decision-making with families.

Poster 101 – Kinley Helmer
Mentor: Ladan Ghazi Saidi
Co-Author: Moriah Gilman
Title: *Exercise as an Intervention for Cognitive Health in Older Adults*

As people age, so does the risk of cognitive deterioration and dementia (Lam, 2011). With no immediate treatments for Alzheimer's disease and other dementias, researchers and scientists should resort to alternative interventions (Nagamatsu, 2013). It has been found that integrating forms of physical activity have profound improvements in neurocognitive functioning in older adults (Scherder, 2005). Aerobic exercises have proven to be the most effective but the most problematic due to mobility problems that come with aging. As humans age, muscle strength, flexibility, agility, and endurance decrease, stressing the importance of identifying a less strenuous physical activity or anaerobic exercise such as stretching and toning to boost cognition (Anderson-Hanley, 2010).

Our study tested how anaerobic exercises (i.e. stretching and toning) affect the cognitive health of adults aged 60-80. Potential candidates were recruited via flyers and social media. Participants took a survey to gauge their qualification for the study based on the inclusion criteria. We assessed participants' cognitive status pre and post

intervention using a battery including phonemic and semantic verbal fluency, nonword repetition, and MOCA. Participants were asked to exercise 30 minutes a day, 5 days a week, for 4 months. I worked first-hand with the participants and communicated with them through emails, phone calls, and zoom. I then monitored their progress and recorded their adherence data in an Excel sheet. Upon completion, they were given the same assessments.

The data collection finalized with 12 participants who completed the intervention and 10 participants who dropped out of the study. We are analyzing the data collected before and after the intervention. We will employ descriptive analysis as well as pre-post comparisons for each measure listed above. The findings will be interpreted in relation to existing literature on cognitive stimulation, particularly Exercise and cognitive reserve in older adults, and healthy aging.

Poster 102 – Noelle Abels
Mentor: Ladan Ghazi Saidi
Title: *The Effects of Reading on Cognitive Health in Older Adults Aged 60-80*

Aging comes with cognitive decline. The literature on cognitive interventions to boost cognition with aging is controversial. However, evolving evidence suggests that engagement in activities that activate parts of the brain involved in cognition could improve or slow the regression of cognitive health with aging (Stern, 2003;2019). Previous studies in our lab suggested that learning is associated with multiple brain regions involved in multiple cognitive processes (i.e., attention, memory, reasoning, auditory and visual processing, and processing speed) (Ghazi Saidi et al., 2013; 2017, 2019). In this study, we investigated the effects of reading in the native language (i.e. English) on cognitive performance.

This was a longitudinal pre-post-intervention study. Older adults were recruited via social media, flyers, and word of mouth. A series of cognitive assessments were administered to participants before and after the intervention. This allowed researchers to assess the neurocognitive effects of the reading intervention. Participants agreed to complete at least 60 minutes of reading on their tablets each day, 5 days a week, for 4 months. Cognitive performance was assessed using a series of cognitive tasks and tests, including the Montreal Cognitive Assessment (MoCA), Phonemic and Semantic Verbal Fluency, as well as non-word repetition. We monitored and collected data on the adherence to the intervention.

We are currently conducting statistical analysis on the pre-post intervention changes to the measures listed above. The analysis will include the descriptive analysis, as well as

multiple-measure t-tests. The results will be discussed in the context of the literature on Reading intervention on boosting cognition in older adults.

Poster 103 – Kylee Krol
Mentor: Philip Lai
Title: *Language in Males with Autism Spectrum Disorders while Interacting with their Parent*

In the Unites States, 1 in 31 children at the age of 8 has been diagnosed with Autism Spectrum Disorder (ASD). Recent research has found that ASD is over 3 times more common in males than females. ASD is a developmental disorder that impacts verbal and nonverbal communication and social interaction, typically appearing before the age of three and can affect educational performance throughout development. Without being able to produce or understand language, a child can become frustrated and misunderstood. This current project will exclusively observe males with ASD as they interact in a social setting with one parent. This project will utilize archival data collected within the past 3 years. Once transcription data is obtained, a Lexical Complexity Analyzer will be used to obtain these measures: Lexical Density, Lexical Variation, Type-Token Ratio, Verb Density, Lexical Word Diversity. There are five participants in this project with a few individual diagnosed with ASD and the other participants being their typically developing peers. The transcriber is blind to group identification. The typically developing children will serve as a baseline for this project. In the future, a female group will also be analyzed so that patterns will be observed to see if gender specific characteristics emerge. Understanding developmental language patterns can provide professionals with the knowledge needed to work on potential areas of deficit.

Counseling, School Psychology & Family Studies

Poster 104 – Lateefat Alimi
Mentor: Sharon Obasi
Title: *The Autonomy Paradox*

Algorithms are everywhere. From news feeds to shopping sites and even the content we consume on social media. Therefore, exploring how these algorithms influence our day-to-day decisions is crucial in learning what is influencing our decision-making process. This research explores how algorithm driven platforms like social media, influence what we see and how we make decisions, and to understand whether users retain autonomy as active decision makers or become passive recipients of curated content.

Using a qualitative approach, the study integrates a review of existing research, theoretical analysis, and autoethnography. Four theoretical frameworks were examined to understand how algorithms leverage cognitive processes and influence autonomy. In addition, scholarly literature on platforms like TikTok and Spotify were reviewed to analyze how these platforms work, process data and curate content. An autoethnography documented the author's personal experience with TikTok and Spotify to explore how algorithmic personalization shaped engagement patterns over time.

Findings suggest that algorithms simultaneously make users feel supported or controlled. They make use of nudges that exploit cognitive bias while also preserving freedom of choice. Algorithms work by providing the illusion of autonomy while also guiding behavior. TikTok makes use of genre clusters that categorize users and facilitate endless scrolling. The app creates dependency while feeling like the user's own choice. Spotify makes use of collaborative filtering where the user is matched with similar users as well as audio feature analysis and balancing exploration and exploitation. By learning about these different tactics and understanding these mechanisms users may engage more consciously with algorithm-driven platforms and better reflect on how digital environments shape their choices.

Cyber Systems

Poster 105 – Christian Thede
Mentor: Angela Hollman
Title: *Java Hardware Emulator Environment*

My work is an early proof-of-concept hardware emulator written in Java that is built to be modular, meaning new "hardware parts" can be added as separate JAR files without changing the main program. The project is split into three main pieces: an API module that defines what a device is (IDs, init step, optional per-cycle ticking, and ports), a host application that loads modules and runs the emulation loop, and a modules folder that contains actual hardware implementation. The result so far is that the host can successfully load a hardware module at runtime using Java's ServiceLoader plugin pattern, register the device factories it provides, create devices from configuration properties, and then run the system for a chosen number of clock cycles. As a working example, the project includes a Basic RAM module that registers a RAM factory and creates a RAM device backed by a byte array (defaulting to 64KB). The RAM device supports basic memory reads/writes with bounds checking and currently exposes no bus ports yet, keeping the proof-of-concept simple. Overall, what

this proves is that the architecture works end-to-end: modules are discoverable, devices can be created dynamically, and the emulator can step through time in a predictable, cycle-based way. This sets a clean foundation for later adding a tiny CPU, ROM, and memory-mapped I/O.

Poster 106– Jasmin Chaudhary
Mentor: Chidi Agbo
Co-Author: Clara Rios
Title: *Aircraft Maintenance Prediction*

Predictive maintenance plays an important role in aviation safety and efficiency, but many general aviation aircraft do not have access to advanced sensor-based health monitoring systems. As a result, maintenance decisions often rely heavily on historical maintenance logbooks. This project explores whether airframe maintenance records alone contain patterns that could be used to estimate nearterm maintenance risk using machine learning techniques. The study uses an airframe maintenance log containing dates, tach and Hobbs times, and written descriptions of maintenance work. Several features were derived from the data, including the time since the previous maintenance event and the spacing between consecutive maintenance actions. Written maintenance descriptions were also incorporated to capture information that may not be reflected in numeric values alone. A classification model was developed to estimate whether another maintenance event might occur within the next 50 tach hours. To better reflect real-world usage, the data was split chronologically, so the model was trained on earlier records and evaluated later entries.Model performance was examined using standard classification metrics, confusion matrices, and probability-based evaluation methods. The results suggest that airframe maintenance logs contain temporal and textual patterns that are associated with periods of increased maintenance activity. The model demonstrated an ability to prioritize potential near-term maintenance events, which aligns with safety-oriented maintenance planning. A calibration analysis further indicated that predicted risk values were more consistent in the mid-risk range, while greater uncertainty was observed at extreme probability levels. Overall, this work suggests that historical airframe maintenance records may support predictive maintenance as an exploratory decision-support approach. Future work could incorporate data from multiple aircraft and additional maintenance sources to improve robustness and generalization.

Poster 107– Shantanu Kumbhar
Mentor: Chidi Agbo
Co-Author: Clara Rios
Title: *Predictive Maintenance of Aircraft Components using Machine Learning*

In general aviation, maintenance decisions are largely based on manually recorded logbooks rather than automated monitoring systems, meaning a lot of useful data goes unused. This project looks at whether patterns in aircraft logbook data can be used to predict when a component is likely to need maintenance, using machine learning. The dataset includes maintenance dates, Tach and Hobbs flight hours, written maintenance descriptions, and part identifiers taken from a real aircraft logbook. Several features were pulled from this data, including the time between maintenance events and patterns found in written maintenance descriptions that may signal wear over time. A Random Forest classification model was built to estimate whether a maintenance event is likely to occur within a given Tach hour window. The data was split chronologically, meaning the model was trained on older records and tested on more recent ones, to better reflect how it would work in practice. Model performance was evaluated using standard classification metrics and probability-based methods.

The model achieved an overall accuracy of 69.6%, with a precision of 70% and a recall of 100% for near-term maintenance prediction. The results suggest that logbook records do contain patterns that are connected to periods of higher maintenance activity. The model showed a reasonable ability to flag components that may be approaching a maintenance threshold, which is useful from a safety standpoint. Flight-hour intervals and part maintenance history appeared to be among the more meaningful predictors in the model.

Overall, this project suggests that aircraft logbooks could be a practical starting point for building predictive maintenance tools in general aviation. Future work could expand the dataset to include multiple aircraft for stronger results.

Industrial Technology

Poster 99 – Clara Rios
Mentor: Daniel Smith
Co-Author: Kwanho Kwon, Jasmin Chaudhary, & Shantanu Kumbhar
Title: *Enhancing Flight School Operations Through Predictive Maintenance*

Flight operations rely heavily on the consistency of aircraft availability. However, most maintenance management systems tend to focus on and prioritize scheduling and accounting functions. A constant gap within these systems often falls on predictive capabilities. Reactive maintenance is the common theme among management. This includes routine inspection requirements and responding to unplanned maintenance as they come. Unplanned maintenance within the field intercepts training, reduces aircraft availability, and can create strain within operations and finances. There is a strong need for integrated approaches to include not only documented maintenance data, but also proactive decision-making.

The goal of this research is to examine how maintenance tracking and predictive modeling principles can support more reliable flight school operations. The main focus is the organization and analysis of aircraft maintenance histories to help identify recurring indicators of potential issues. Maintenance histories, including discrepancy reports, component failures, and routine inspections. Transforming the records into an analyzable format can establish the foundation for predictive strategies, overall reducing unexpected downtime.

This study also goes into the consideration of a broader impact of predictive modeling, specifically supply chain planning. This includes parts forecasting, budgeting, and resources. The focus is to build tracking methods that are organized and practical. Aviation safety expectations should be met, but a model should be user-friendly and applicable for day-to-day operations. Through connecting maintenance data to the real-world demands of the industry, unexpected downtime can be reduced, training can be consistent, and overall safer and more efficient operations can take place.

Poster 108 – Nina-Li McNay
Mentor: Dana Vaux
Title: *Women's Health: Designing for advocacy*

Although medical advances have grown rapidly over the centuries, women’s health has not progressed at the same pace as medical knowledge. Despite improvements in technology and research, many women still experience dismissal for their health

concerns. Research articles using both qualitative and quantitative studies relevant to gender studies and the psychological impact reveal how a space or built environment influence patient experience by identifying characteristics that make a space more inviting (Waxman, 2006). In this thesis, I categorize 3 factors from my key findings (Historical, psychological, and systemic) that have been implemented into this issue and continue to consistently shape the dismissal of women's healthcare. Study was conducted by interviewing women from different backgrounds to understand the user experience and to solidify the issues related to women's health. Additionally, I implemented an online survey to female participants provided opportunity to engage more diverse women and get more data. There were common themes of experiencing dismissal and delayed diagnoses with the woman interviewed and participants in the surveys. Future designers and healthcare providers need to advocate for women who cannot speak up by designing femalecentric spaces in women's healthcare setting. When we acknowledge an issue, we can address it by asking what the necessities are to make healthcare more inviting and to make space for women's health concerns. As designers, we can think about what elements can create inviting and innovative spaces for the user experience. This is not only applicable to the dismissal of women's healthcare, but this can apply to making any space more inclusive.

Kinesiology and Sports Sciences

Poster 109 – Raeghann Behrens
Mentor: Cameron Munger
Title: *Post Activation Potentiation on CMJ; Back Squat Utilizing Traditional Resistance, Eccentric Overload, or Accommodating Resistance*

Accumulated Resistance training (RT) can enhance athletic performance by increasing muscular strength, size, motor performance, and power through long term structural and neuromuscular adaptations (7,14). However, acute training can also enhance power and explosiveness (1,5,8,13,15,16). One acute method of RT shown to do this is post activation potentiation (PAP) (1,3,4,5,8,14). PAP typically involves pairing an explosive movement with a strength movement as a pre-conditioning stimulus (3,4,12). As a result of the heavy release of calcium into the cell, a physiological response resulting in increased power during the subsequent explosive exercise occurs (1,2,3,4,14). Additionally, potentiation can be due to phosphorylation of the myosin regulatory light chains, which allow myosin heads to perform the power stroke more quickly (1,2,3,6,8,13,14). Potentiation can occur as a result of manipulating muscle actions on resistance training through eccentric overload (EO) or accommodating resistance (AR) (2,9). EO is a mode of resistance

where loads greater than the 1 rep max are applied during the eccentric phase (10,11,12). Overload can be applied using weight-releasing hooks (10,11,12). AR can be applied by using bands or chains (8,14,16). During the descent of AR, the weight gradually decreases until the participant begins the ascent where the weight will gradually begin to increase (8,16,17). This creates variable load, where the weight is the lightest, where the participant is weakest and heaviest at the point where the participant is strongest (8,14,16,17). Prescription of intensity is typically prescribed relative to the concentric ability usually in the form of 1 repetition maximum (3,10,11,12,16).

Purpose:

The purpose of the study is to compare EO, AR, and traditional isoinertial back squat as a potentiating stimulus for countermovement jump (CMJ).

Methods:

Day 1:

- Anthropometrics: Height and Weight
- 1 Repetition Maximum Testing in the Back Squat

Days 2-4 (Conditions Randomly Ordered):

Eccentric Overload

- 2 pretest CMJs
- 1 set of 1 rep in eccentric concentric fashion based on 1RM: 105% 80%
- 2 post-test CMJs

Traditional Resistance

- 2 pretest CMJs
- 1 set of 3 repetitions at 80% 1RM
- 2 post-test CMJs

Accommodating Resistance

- 2 pretest CMJs
- 1 set of 3 repetitions with 80% of 1RM via chains; ~25% reduction occurs at depth
- 2 post-test CMJs

Statistical Analysis

The jump with a greater estimated jump height for pre and post-tests will be used for analysis. Multiple 3x2 (condition x time) Repeated Measures ANOVAs will be conducted on the following CMJ variables: braking rate of force development, peak braking force, peak propulsive force, positive impulse, take off velocity, peak propulsive power, and propulsive impulse.

Poster 110 – Trevor Baird
Mentor: Cameron Munger
Title: *Transient hypertrophy*

Skeletal muscle hypertrophy is important for sports performance, fitness, health, and aesthetic purposes. Manipulating both volume and intensity has lead to 3 modes of skeletal hypertrophy training; Low Load High Rep(LLHR), High Intensity Training(HIT), and Myo-Reps (Myo). However, the optimal method of the three is unknown. There are 3 acute effects from hypertrophy training that are precursors to long term growth. Those effects are metabolic stress(), tension(), and cellular swelling(). PURPOSE: To determine which mode of hypertrophy training yields the greatest acute effects. METHODS: 6 resistance trained (RT) males have been recruited so far. Day 1: 1 Repetition Maximum (RM) biceps curls were determined. Days 2-4: Subjects performed LLHR, HIT, and Myo conditions each day in random order. Pre testing and post testing consisted of blood lactate measurement (mmol/l), arm circumference (cm), muscle thickness (cm). Multiple 3x2 (Condition x Time) Repeated Measures ANOVAs were conducted. RESULTS: An interaction for biceps thickness was observed where Myo had a greater increase than HIT. Main effects were observed for blood lactate, biceps thickness, and arm circumference where post was greater than pre. APPLICATION: All three training protocols increased metabolic stress, arm circumference, and muscle thickness. Myo induced greater cellular swelling. Therefore, Myo may yield great long-term hypertrophy while reducing risk of injury associated with HIT. However, strength potential may be limited since external loads and muscle tension are lower.

Poster 111– Shyann Hollingsworth
Mentor: Elena Dille
Co-Author: Jordan Dille
Title: *Dry Cupping Therapy Styles Vary for Hip Range of Motion Changes*

Context: Dry cupping therapy is a type of manual therapy that involves negative pressure within a cup that is placed on the skin to lift underlying tissues. It is commonly

used on larger areas of the body and has several positive effects on the body such as improving tissue mobility, pain, tightness, and range of motion (ROM).

Purpose: The purposes of this study are to determine if multiple sessions of cupping therapy can progressively improve hip ROM and to determine differences in hip ROM between static and moving cupping therapy.

Methods: The individuals recruited for this study will be between the ages of 19-30 who perform light activity five days a week. They will undergo three dry cupping therapy sessions in two weeks. Subjects will have baseline measurements of an active straight leg raise (SLR) taken for both legs, three times each side, with the average calculated. Each cupping session will start by using static cupping on the left leg hamstring region. Static cupping includes the use of three cups placed in a row, from the top of the hamstrings to the bottom. Using a pump, negative pressure is applied to suction the cup to the skin. The cups will remain in place for five minutes before measurements of the SLR will follow. Then moving cupping will be performed on the right hamstring region by using one large cup that is suctioned and glided along the hamstrings at a rate of about 10cm/second for five minutes. Post-measurements of the SLR will follow. A minimum of two days of rest will be required between sessions. The primary outcome measure will consist of the SLR averages. A within-subjects and between-subjects repeated measures ANOVA will be used to assess effects of multiple cupping therapy sessions on hip ROM as well as the effects of the two modes of cupping therapy.

Poster 112 – Isaac Haselhorst
Mentor: Gregory Brown
Co-Author: Kylee Bober
Title: *Changes in Predicted Maximal Oxygen Consumption in Men Due to Fitness Testing in the Heat*

Background: Exercise performed in hot environments alters heart rate, ventilation, and oxygen consumption and increases the risk of heat-related illness. Fitness testing guidelines recommend that assessments be conducted in thermoneutral or cool conditions. However, sometimes fitness testing must be conducted in hot environmental conditions whether due to problems with indoor environmental controls or variations in seasonal weather during outdoor testing. Limited data exists regarding the influence of elevated environmental temperature on submaximal physiological responses typically used to assess cardiovascular and aerobic fitness.

Purpose: The purpose of this study is to measure the effects of a 20-degree Fahrenheit (11o C) increase in environmental temperature on ventilation, oxygen consumption,

and heart rate at rest and during a submaximal graded treadmill test in recreationally trained men, and to determine how these changes affect predicted maximal oxygen consumption(VO2max).

Methods: Ten college-aged men who regularly engage in aerobic exercise without contraindications to exercise will participate in the study. Ventilation, oxygen consumptions, and heart rate will be measured at rest and during a submaximal graded exercise test at a thermoneutral environment (75o F, 24o C) and a hot environment (95o F, 35o C). Measurements will be taken with a Parvo Medic Metabolic cart. Data will be analyzed for statistical significance using a two-factor (temperature X stage) repeated-measures ANOVA, and percent differences in physiological variables between conditions will be calculated.

Conclusion: These findings will improve understanding of how elevated environmental temperatures influence submaximal physiological responses and the prediction of VO2max during fitness testing. This information is important for the safe interpretation of aerobic fitness assessments and for guiding appropriate exercise prescription during hot outdoor exercise.

Poster 113– Kylee Bober
Mentor: Gregory Brown
Co-Author: Isaac Haselhorst
Title: *Does Fitness Testing in the Heat Change Predicted Maximal Oxygen Consumption in Women?*

Background: Exercise performed in hot environments increases cardiovascular and ventilatory strain and elevates the risk of exertional heat illness. Although aerobic fitness assessments are ideally conducted in thermoneutral conditions, real-world testing often occurs in warmer environments due to seasonal or facility-related constraints. Physiological responses to heat may differ between males and females because of differences in body composition, surface area-to-mass ratio, sweat rate, and cardiovascular regulation. However, limited research has examined how elevated environmental temperatures influence submaximal physiological responses specifically in recreationally trained women during aerobic fitness testing.

Purpose: The purpose of this study is to measure the effects of a 20-degree Fahrenheit (11°C) increase in environmental temperature
on respiratory and cardiovascular factors at rest and during a submaximal graded treadmill test in recreationally trained women. A secondary objective is to determine how heat-induced physiological alterations influence the estimation of maximal oxygen consumption (VO_2max) derived from submaximal testing protocols.

Methods: Ten college-aged women who regularly engage in aerobic exercise without contraindications to exercise will participate in the study. Ventilation, oxygen consumption, and heart rate will be measured at rest and during a submaximal graded exercise test in a thermoneutral environment (75^{o}F, 24^{o}C) and a hot environment (95^{o}F, 35^{o}C). Measurements will be taken with a Parvo Medic Metabolic cart. Data will be analyzed for statistical significance using a two-factor (temperature * stage) repeated-measures ANOVA, and percent differences in physiological variables between conditions will be calculated.

Conclusion: Understanding how elevated environmental temperatures affect submaximal exercise responses in women will enhance the interpretation of aerobic fitness assessments conducted in non-thermoneutral settings. These findings may inform best practices for fitness testing in warm conditions and contribute to evidence-based recommendations that promote safety and accurate exercise prescription for physically active women.

Poster 114– Gabe Hardisty
Mentor: Gregory Brown
Title: *Effects of Breathing Strategy on Measurement of Maximal Voluntary Ventilation*

Background. Maximal Voluntary Ventilation (MVV) reflects the maximal functional capacity of the respiratory system and is commonly used to assess ventilatory limitations, such as with asthma and emphysema, and provide a global indicator of pulmonary performance. Although standard instructions encourage rapid and deep breathing, the specific breathing strategy employed (e.g., shallow–rapid vs. deep–slow) may influence the measured MVV value.

Purpose. This study will examine how different breathing strategies affect measured MVV in healthy young adults.

Methods. Twenty healthy college-aged participants (10 males, 10 females) will complete three 30-second MVV trials using a spirometry system (Biopac Inc., Goleta, CA). Trials will be performed in randomized order using three distinct breathing strategies: (1) very rapid, shallow breaths; (2) slow, large-volume breaths; and (3) moderate rate and depth consistent with standard MVV instructions. Strong verbal encouragement will be provided during each trial, with 3–5 minutes of rest between trials to minimize fatigue. MVV (L/min) will be calculated for each condition. A two-way (Sex X Breathing Strategy) repeated-measures ANOVA will be used to determine whether breathing strategy significantly influences MVV and whether sex differences or interaction effects are present.

Results. Findings will clarify whether MVV values are sensitive to breathing strategy and may inform best-practice guidelines for standardized MVV testing procedures.

Conclusion. If MVV values differ by breathing strategy, this would suggest that testing outcomes are partially dependent on breathing pattern rather than solely respiratory capacity. Such findings could support the need for stricter standardization of MVV instructions to improve reliability and comparability across clinical and research settings.

Poster 115 – Benjamin VanDiest
Mentor: JP Rech
Title: *Relationship between parent-reported eating behaviors and preschoolers' working memory and inhibition control*

Previous research has shown eating behaviors may have a significant impact on the development of executive functions including working memory and inhibition control. However, less is known about how eating behaviors in preschool children affect their working memory and inhibition control. Therefore, the purpose of this study is to examine the relationship between parent-reported eating behaviors and preschoolers' working memory and inhibition control.

This cross-sectional study uses data collected from the United States SUNRISE Preschool Study, which included roughly 1,200 3–4-year-olds. Parents reported their child's eating behaviors (food consumption, meal-time behaviors, etc.) via a validated, standardized questionnaire. Inhibition control and working memory were measured through iPad-based games, Go/No-Go and Mr. Ant respectively. Parent reported eating behaviors were analyzed to assess the potential association with working memory and inhibition control. Our preliminary findings from the Nebraska sample (n=100) found that preschool children who scored at or below average on eating behaviors scored significantly lower on average on the inhibition control test compared to their peers who had above average eating behavior scores. Although not significant, a similar relationship was found for working memory.

Among the national SUNRISE sample, it is hypothesized that preschoolers' eating behaviors are positively associated with greater working memory and inhibition control scores. Understanding the various dietary factors of a nationally representative sample of preschoolers may help further understand variability in executive function development. This may help to inform caregiver practices that influence young children's eating behaviors as well as future intervention. Findings from our study may contribute to the growing body of literature on the importance of healthy eating behaviors for young children's working memory and inhibition control.

Poster 116– McKenzie Clark-Brownlow
Mentor: Kate Heelan
Co-Author: Nick Lamoureux
Title: *Validity of Artificial Intelligence Apps to Measure Body Composition*

Body composition assessments are widely used to monitor changes in muscle and fat mass, but the most valid method, Dual Energy X-ray Absorptiometry (DXA), is costly and requires trained personnel. Recently, visual body composition (VBC) smartphone applications that use artificial intelligence have emerged as inexpensive and convenient alternatives, though validity is uncertain. To evaluate the validity of two VBC apps (APP 1 and APP 2) against DXA for estimating percent body fat (%BF). Ninety-seven college-aged participants (52 females: age = 20.8 ± 1.9 years, BMI = 23.6 ± 3.7 kg/m2, BF%(DXA) = 31.2 ± 7.3%; 45 males: age = 20.9 ± 1.8 years, BMI = 26.0 ± 4.7 kg/m2, BF%(DXA) = 21.6 ± 8.3% completed body composition assessments by DXA and the two VBC apps. DXA scans provided gold-standard %BF values, while the VBC apps estimated %BF using standardized two-angle photographs. Validity will be assessed by comparing app-derived %BF to DXA using mean absolute percent error and Bland-Altman analysis.

Poster 117 Calie Dockter
Mentor: Kazuma Akehi
Title: *The Role of Kinetics and Kinematics During the Golf Swing Among Competitive Collegiate Golfers*

Introduction: The modern golf swing requires precise coordination to manage complex and multi-directional forces. Although vertical ground reaction force (GRF) is frequently analyzed, the horizontal and rotational GRF, coupled with specific knee and hip kinematics, play a crucial role in creating angular impulse. Purpose: This study aims to quantify three-dimensional GRF and 3D joint kinematics of the lower limbs, providing a comprehensive analysis of the kinetic and kinematic strategies during the downswing in golf. We hypothesized that vertical and rotational GRF may be a key contributor to the golf ball and club performance, however horizontal force may cause additional shear force to the knee and hip, leading to musculoskeletal pathologies. Methods: Fifteen female collegiate golfers (ages 19-25) will be recruited to complete the study. Participants should not have any musculoskeletal or neurological injuries in the last 3 months that may alter their normal golf swing. Participants will perform ten swings using driver, 7-iron, and pitching wedge on the dual force plates and 3D motion capture system platform. Data will be extracted and analyzed, including horizontal GRF (toe/heel; left/right), rotational GRF, vertical GRF, lower limb and trunk kinematics, and

kinetics data such as club impact position, club head speed, and total ball distance. We will conduct a Pearson correlation to examine the research question. This information can be applied to facilitate golf swing and injury prevention strategies. Appropriate force production from the lower limbs during the downswing and at impact will be key to maximizing golf performance.

Poster 118– Dennis Pelowski
Mentor: Kazuma Akehi
Co-Author: Ethan Twohig
Title: *Effects of High-Intensity Laser on Tissue Response Following Delayed Onset Muscle Soreness*

This study examines the effects of high-intensity laser therapy (HILT) on tissue response following delayed onset muscle soreness (DOMS), with an emphasis on pain perception, tissue composition, and muscle healing. Previous research on this topic shown to significantly reduce pain perception in patients with chronic low back pain and have indicated notable improvements in tissue healing and structure when compared to a control group. Therefore, the purpose of this study was to examine how HILT affects pain perception, and also the effects on tissue composition and healing after exercise-induced DOMS. This was a randomized control trial of 12 healthy recreationally active males between 19 and 25 years old that had no history of serious lower extremity musculoskeletal injury and no history of disease or debilitating medical condition. An isokinetic dynamometer was used for inducing DOMS as well as for baseline and ending muscle strength testing. A diagnostic ultrasound machine s used to acquire a musculoskeletal sonography of the quadricep to determine muscle thickness and tissue quality before and after HILT. A visual analog scale (VAS) was used to determine perceived pain/soreness over the course of the research. Participants were randomly assigned to either the HILT intervention group or to a control group. It was hypothesized that participants in the intervention group show a faster decrease in pain/soreness, improved recovery, and more favorable muscle composition than the control group. In a clinical setting, the improvements due to HILT would aid athletes' recovery following intense workouts or practices.

Poster 119– Elizabeth Herll
Mentor: Kazuma Akehi
Title: *E Mental Factors in Athletic Comebacks: Mindset and Athletic Performance After 4-month and 6-month Meniscectomy: Clinical Exploratory Case Study*

Context: Meniscal tears are common sports injuries with typical return-to-play (RTP) timelines of 4 to 8 months. Although meniscectomy generally enables a faster physical recovery than anterior cruciate ligament (ACL) reconstruction, athletes can experience comparable psychological barriers during RTP, particularly with agility and explosive athletic tasks. Psychological challenges may peak near the 6-month mark despite objective physical gains. Purpose: The purpose of the study was to explore the relationship between physical performance and mental readiness at 4 and 6 months after meniscectomy. Subject: A Division II female collegiate athlete with a recurrent right knee meniscal tear underwent a second meniscectomy. Clinical Intervention: At 4 months post-operation, she was cleared for light aerobic activity (jogging 30 minutes twice weekly) and controlled sports-specific drills without cutting or explosive movements. By 6 months, the involved limb tested stronger isokinetic muscle strength than the uninvolved limb. She focused on maintaining gains while addressing hamstring deficits. She was then cleared for directional movements, agility work, and sport-specific activities. Procedure: Lower-body kinematics were collected using a 3D motion-capture system during functional exercise at 4 and 6 months postoperatively. Psychological readiness was assessed using a return-to-play questionnaire that assessed quality of life, sport-specific concerns, and future preparedness. Comparative Outcomes: Between 4 and 6 months post-meniscectomy, she showed significant improvements in lower-body mechanics. Hip ROM decreased during singleleg squats (R:-24.6%, L:-13.19%) while knee ROM increased in overhead squat (R:+9.7%, L:+8.7%) and single-leg squat (R:+10.81%), indicating improved squat mechanics and reduced guarding. Vertical jump height (+5.39%) and peak power (+19.91%) improved. Single-leg jump showed the greatest gains with increased hip (R:+12.6%, L:+16.8%) and knee ROM (R:+11.96%, L:+29.86%), reflecting greater unilateral strength and explosiveness. Mentally, quality of life improved (+20%), but ACL-RSI decreased (-13%), indicating increased fear of reinjury despite improved physical performance. Clinical Application: Mental readiness may decline despite apparent improvements in physical performance. Clinicians should combine mental readiness assessment with functional testing, as assessing physical readiness alone does not provide a full picture of return-to-play preparedness following a meniscectomy.

Poster 120 – Samantha Wells
Mentor: Kazuma Akehi
Co-Author: Tessa Wells
Title: *Effects of Breathing Strategy on Measurement of Maximal Voluntary Ventilation*

Context: Fastpitch softball players typically develop an individualized style early in their careers. Their early kinematic adaptation can directly correlate with pitching performance. However, early adaptation would also limit important joint kinematics, including hip joint mobility and trunk stabilization, thereby reducing the explosive force output they can generate when pitching. Purpose: The purpose of this study was to examine lower limb kinematics and softball pitching kinetics among youth and adolescent pitchers (12-18 years old). Methods: Nineteen softball pitchers (age=14.39□2.07yrs, height=163.16□4.72cm, body mass=59.05□11.85kg) who did not report any known musculoskeletal injury in the 3 months prior completed the study. Each subject completed a dynamic warm-up session, standardized dynamic athletic exercises (i.e., vertical jump and squat) on the 3D motion-capture platform, and 10 fast and slow pitches on the softball pitch-analysis system. In the 3D motion analysis, lower-leg kinematic data (i.e., ankle, knee, and hip range of motion [ROM]) and ground reaction force (GRF) data were captured. In the pitchball analysis, each softball's ball velocity (mph), rotations per minute (RPM), and gyro degree (°). Results: High school (HS) pitchers demonstrated higher pitching velocity ($F_{2,32}=8.04$, $P<0.001$) and a higher maximum RPM than youth pitchers. Without considering age groups, pitching velocity was positively correlated with vertical jump and single-leg jump GRF ($R^2=0.49$, $P<0.01$). Practical Application: GRF is a key performance indicator for youth and adolescent softball pitchers. Pitchers who generated higher GRF during vertical and single-leg jumps also threw with higher velocity, indicating that explosive lower-body force directly contributes to pitch speed. Because these GRF values were taken from general athletic tasks rather than pitching alone, they likely reflect overall lower-limb power instead of pitchingspecific mechanics. HS pitchers also exhibited higher velocity and greater maximum RPM than younger players, likely due to age-related gains in strength, coordination, and more refined kinematics. These findings suggest that training programs for young pitchers should emphasize lower-body power development, such as plyometrics, jumps, and single-leg strength work, to enhance push-off force and improve pitch velocity as athletes mature.

Poster 121 – Sarah Musil
Mentor: Kazuma Akehi
Title: *Biomechanical Analysis On Competitive Athletes*

Context: Lower back pain (LBP) remains one of the most common musculoskeletal conditions among collegiate athletes, despite their high level of physical conditioning. The repetitive, highdemand nature of collegiate sports exposes athletes to substantial biomechanical stressors that increase susceptibility to lumbar pathology. Common mechanism of injury includes repetitive twisting, excessive spinal motion (deceleration), sudden axial loading, and high-impact activities, all of which are characteristic of competitive sport participation. Over time, these stressors contribute to conditions such as lumbar disc herniation, spondylosis/spondylolysis, sacroiliac (SI) joint dysfunction, and lumbar hypomobility. Assessment/Diagnosis/Screening: Initial evaluation priorities a structured history tied to sport demands and training loads, followed by observation of posture, alignment, and gait to identify asymmetries and compensations relevant to on-field tasks. Targeted orthopedic tests localize pain generators (e.g., straight-leg-raise and crossed SLR for discogenic irritation; SI testing when pelvic contribution is suspected). Functional performance screening (FMS/FMA, timed up and go, functional reach, balance scales) captures movement-efficiency and stability deficits that affect return-to-play readiness, while patient-reported outcomes (Oswestry, Roland-Morris, Quebec, Pain Self-Efficacy, PatientSpecific Functional Scale) quantify disability and guide progression criteria. Imaging (Xray/CT/MRI) is reserved for suspected structural or bony involvement and diagnostic confirmation. Therapeutic Intervention: Early care emphasizes symptom modulation and controlled mobility such as lower trunk rotations, pelvic tilts, single and double knee-to-chest, and diaphragmatic breathing. Mid-phase training restores lumbopelvic control using bridging progressions, bird-dog, dead bug, plank progressions, and abdominal bracing. Mobility restoration targets hamstrings, hip flexors, and piriformis, complemented by quadruped patterns (cat-cow, thread-the-needle) to reduce compensatory lumbar loading during change-of-direction or overhead tasks. Functional reconditioning advances to squats/lunges, step-ups, single-leg balance, loaded carries, and selective machine-based strengthening, aligning with sport-specific movement demands and RTP benchmarks. Low-impact aerobic work supports tissue tolerance and conditioning. Later phases add sport-specific aerobic challenges. Clinical Application/Conclusion: A condition-agnostic approach anchored in shared mechanisms, standardized assessment, and progressive exercise dosing streamlines on-field and clinic workflows for collegiate athletes with LBP. By aligning tests and staged therapeutic interventions with sport demands, athletic training and physical therapy teams can reduce symptoms, restore function, and build durable spinal resilience that supports timely and safe return-to-play.

Poster 122 – Ashlyn Dodds
Mentor: Nick Lamoureux
Title: *The relationship between hand grip strength asymmetry, muscle mass, and cognitive function*

Relationships between cognitive and physical function in older adults have been established. The purpose of this project is to examine the relationship between hand grip strength asymmetry before and after accounting for differences in appendicular muscle mass, and cognitive function in adults over the age of fifty. Individuals over the age of fifty completed assessments of hand grip strength, body composition using DEXA, and cognitive function using the Montreal Cognitive Assessment (MoCA). To facilitate evaluation, asymmetry was categorized as symmetrical (1.0-1.1), moderate asymmetry (1.1-1.2) and highly asymmetrical (>=1.2). Associations were evaluated using correlation coefficients, and independent sample ttests to compare individuals with normal cognitive function and those screened with mild cognitive impairment. Sixty participants (61.67% female, 63 ± 8 years) were included in the analysis. Hand grip asymmetry and lean mass asymmetry were weakly correlated (r = 0.27). Results demonstrated that MoCA scores were lower for those with moderate (-0.83 points) and high asymmetry (-0.49 points) compared to those with symmetrical grip strength, though differences were non-significant. Weak grip strength was also associated with worse MoCA scores (-0.26 points), and joint adjustment strengthened these associations. Adjustment for lean mass asymmetry did not improve the strength of these associations. Grip weakness and had grip asymmetry were each associated with lower cognitive function. Each of these factors could be used to screen for mild cognitive impairment. When these factors are considered together, the association with cognitive function is stronger. Combining these measures may have potential for use as a screening tool for mild cognitive impairment. Longitudinal research is needed to better evaluate the use of these tools for predicting cognitive decline.

Poster 123– Blake Mulinix
Mentor: Nick Lamoureux
Title: *The Association Between Fall Risk and Objectively Assessed Physical Activity*

Introduction: Falls are a leading cause of injury among older adults aged 50 and older. Previous evidence has suggested a self-perpetuating cycle of decline where older adults avoid physical activity after a fall as a risk mitigation strategy, resulting in functional decline and further increases in fall risk. To date the association between objectively evaluated physical activity and previous fall history has not been well

explored. This study was designed to examine differences in accelerometer-derived activity data based on fall risk in older adults aged 50.
Method: Participants were classified as low, moderate or high risk for falls using STEADI, a broadly used fall risk screening protocol that includes functional and self-reported data. Participants then wore an accelerometer to objectively assess physical activity over 7-days of free-living activity. Each minute was classified as active or inactive using previously validated cut-points, and activity pattern was classified using the Active-to-Sedentary Transition Probability (ASTP).

Results: 58 participants were included in the analysis, with 52% having an elevated fall risk. Results showed no differences in proportion of time spent active between elevated and low risk participants (12.7±3.9% vs 13.3±0.3%, p=0.50) or in ASTP (0.60±0.07 vs 0.61 ±0.4, p=0.79). Notably the low-risk group had a larger proportion of individuals spend more than 10% of recorded time active, but a lower proportion of individuals spend at least 15% of recorded time active.

Conclusion: When comparing older adults with and without a risk for falls, there were no statistically significant differences in either the volume or the pattern of physical activity. This suggests that fall risk does not result in evidence of activity avoidance, however further research is needed to evaluate the impact of recent fall history and the severity of those falls, as well as the direct impact of fear of falling on physical activity patterns.

Poster 124 – Gracyn Jozsa
Mentor: Nick Lamoureux
Title*: The Use of Music and Physical Activity to Manage Anxiety*

Introduction: Anxiety is one of the most prevalent and impactful mental health concerns, particularly among college students. While there are established treatment plans for reducing long term anxiety (trait anxiety), less is known about the effectiveness of strategies for reducing feelings of anxiety acutely (state anxiety). Both physical activity and music have offered benefits for managing depression and depressive symptoms, but it is unclear if similar effects are provided for anxiety management. Methods: Participants engaged in three anxiety reducing strategies, including quiet sitting, moderate intensity physical activity, and listening to calming music. Each condition lasted 15 minutes and was completed in a random order, separated by at least 24 hours. State anxiety was analyzed before and after each trial using a 10cm visual analogue scale. Pre-post effects and between group comparisons were analyzed using t-test and ANOVA methods. Results: 29 participants were enrolled (82.8% female, 20.3+/- 1.495 years of age). Music significantly reduced state anxiety (-1.14 +/- 1.11, p=0.004), and PA trended towards a significant effect (-1.59 +/- 2.5, p= 0.049). No significant effects were noted with quiet sitting (-0.16 +/-1.89,

p=0.777). Between condition effects showed that both music and PA trended towards greater effects than quiet sitting (p = 0.133699, p= 0.126989 respectively), but were not different from each other (p = 0.574145). Visual inspection showed that one participant had an outlier response to PA. Sensitivity analysis was conducted by removing this participant and showed a greater effect of PA (-2.21 +/- 1.35, p=0.049) and showed PA may offer greater anxiety reductions than quiet sitting or music (p=0.007312, p=0.050217 respectively). Discussion: Preliminary findings suggest music and physical activity may be more effective than quiet sitting for reducing state anxiety levels, with PA potentially having a greater, though more variable effect than music. Further research is needed.

Poster 125 – Zander Lockling
Mentor: Nick Lamoureux
Title: *Impact of height in clinical assessment of gait speed in older adults*

Introduction –

Falls pose a serious threat to health in older adults, yet early and reliable risk detection still poses a challenge. Gait speed is widely used as a simple screening tool to assess mobility and overall health status in older adults. Gait speed is influenced by individual characteristics such as height, and the potential implications of using height adjusted gait speed have not been well explored.

Method –

Community dwelling adults provided self-reported fall history and completed a series of standardized functional assessments. These assessments included measurement of gait speed along with other mobility tests. Unadjusted gait speed and height-adjusted gait speed were compared between individuals who reported any falls and multiple falls in the past 12-months.

Results –

There were no significant differences in gait speed or height-adjusted gait speed between participants who reported any falls and those who reported no falls (gait speed: 1.35 vs. 1.34 m/s, p = 0.920; adjusted gait speed: 0.805 vs. 0.805 m/s/m, p = 0.998). However, gait speed and height-adjusted gait speed were significantly lower among participants who reported multiple falls compared to those with no falls (gait speed: 1.14 vs. 1.34 m/s, p = 0.009; adjusted gait speed: 0.70 vs. 0.80 m/s/m, p = 0.026). Logistic regression models based on unadjusted and adjusted gait speed predicted past fall history with similar accuracy after adjusting for age and sex.
Discussion/Conclusion –

These findings suggest that experiencing multiple falls may be associated with decreased gait speed, while a single fall does not appear to significantly impact gait performance. Further, height adjusted gait speed does not appear to offer additional predictive value over unadjusted gait speed.

Poster 126 – Clara Kunze
Mentor: Nick Lamoureux
Title: *The Relationship Between Physical Activity, Cognitive Function, and Sleep*

Introduction: Cognitive decline is seen as normal with aging but identifying factors that support cognitive health are essential for promoting quality of life and healthy aging. Modifiable variables, such as sleep and physical activity, influence cognitive function. Previous research suggests that insufficient sleep and low levels of physical activity correlate with an impairment in attention, memory, and thought processing. The purpose of this study is to examine the relationships between global cognition, sleep, and physical activity among community dwelling older adults.

Methods: Cognitive function was evaluated using the Montreal Cognitive Assessment (MoCA) test. Subjective sleep duration and quality were assessed using the Pittsburgh Sleep Quality Index (PSQI). Physical activity was assessed objectively using an Actigraph GT3x+.

Results: A total of 63 participants (75% female; mean age 62.9±8.3 years) completed study procedures. Of these, 17 participants were classified as having early-stage mild cognitive impairment (MCI). Individuals with early-stage MCI demonstrated significantly longer sleep duration compared to cognitively healthy participants (8.69±1.31 hours vs. 7.85±0.93 hours; p=0.007). Participants with MCI had a slightly higher mean PSQI score (3.29±1.40) compared to healthy participants (3.21±1.74), though this difference was not statistically significant (p=0.86). Finally, participants exhibiting early signs of MCI recorded a higher average step count per minute (8.79±2.22) compared to healthy participants (7.66±2.07), with a trend toward significance (p=0.067), and engaged in a lower proportion of time spent sedentary (82.3±0.04% vs 83.9±0.04%, p=0.19).

Conclusion. In this data, participants with early-stage mild cognitive impairment showed longer sleep duration and a trend toward higher physical activity compared to cognitively healthy individuals, although overall sleep quality scores were similar between groups. These findings suggest that while sleep duration and activity patterns may differ in individuals showing early signs of cognitive decline, general sleep quality may be unaffected. Understanding these relationships may help in developing lifestyle strategies to support cognitive health in aging adults.

Poster 127– Cara Bunger

Mentor: Rachel Silverman
Title: *Pushing Through Pain: Training Load, Injury Risk, and Disclosure Among Women Athletes*

Female athletes are often faced with an intensive training load, and when injury occurs, they can feel the pressure to push through their pain. In previous studies, it has been found that women were more likely to continue playing through injury than male athletes (Jessiman-Perreault & Godley, 2016). One reason female athletes may feel the need to continue practice through pain is that they are not wanting to miss out on any activity. They also may feel pressure from peers or coaches to work through an injury or to not disclose they have an injury. Previous studies have also found that including higher training loads can have a protective impact on female athletes, reducing injury risk (Franks et al., 2025). Moreover, implementing a sport-specific training load for these female athletes can reduce setbacks and reduce overuse injuries (Piedra et al., 2020).

The purpose of this survey study is to examine women athletes' training load, injury risk, and pain tolerance in individual and team sports. The study will inspect how comfortable female athletes feel about continuing participation despite pain, whether they feel willing and able to report pain or injury, and the outcomes of these behaviors. In addition, the study will investigate training load characteristics and the frequency of injuries. The study aims to give a better understanding of injury prevention strategies and how to provide an improved environment for female athletes' training and overall athlete health and safety. This poster presentation will explore the literature on this topic and will lead to a pilot study in the fall semester.

Poster 128 – Alex Lee
Mentor: Rachel Silverman
Title: *A Content Analysis of Legal Cases Shaping NIL Rights in Collegiate Sports*

NCAA v. Alston (2021) established that the NCAA’s restrictions on NIL compensation violated antitrust laws. Following that case, the NCAA then had to allow schools to offer their student-athletes NIL deals. In the House v. NCAA settlement, the NCAA has agreed to pay $2.8 billion in damages to current and former athletes from three different federal antitrust lawsuits (House v. NCAA, Carter v. NCAA, Hubbard v. NCAA). In exchange, the NCAA would be allowed to limit how much each school can spend on its athletes per year, creating a general idea of a salary cap. As of April 23, 2025, the judge delayed the House settlement approval over roster limits. The NCAA planned to implement roster limits for all sports, causing studentathletes to lose their spots on the team (Murphy, 2025).

Former University of Michigan football players decided to sue the Big Ten Network and the NCAA for “unlawfully denying” name, image, and likeness earnings during their college careers. They feel as if they are entitled to a “present and future share of any revenue generated from the use of their publicity rights” (Bialek & Elpren, 2024). A similar case regarding studentathletes and NIL is that of Matthew Sluka, a former UNLV quarterback, who entered the transfer portal after the end of the 2024 season. Sluka decided to step away because UNLV did not hold up its end of the bargain during the recruitment process. “While UNLV claims no formal contract was in place beyond a $3,000 relocation stipend, his representatives argue that a verbal promise of $100,000 was made” (Ricco IV, 2024).

Beyond these early cases, a growing body of litigation offers a broader perspective on NIL’s legal challenges. In Tennessee v. NCAA, the states of Tennessee and Virginia successfully challenged the NCAA’s ban on NIL-related recruiting incentives. The federal court issued an injunction against the enforcement of the restriction, and a subsequent settlement permanently eliminated the rule (Walker, 2025). This outcome reshaped recruiting practices nationwide, enabling schools to engage recruits more directly with NIL opportunities. It also demonstrated the power of state governments to intervene in NCAA governance.

High-profile individual disputes also underscore the fragility of NIL agreements. In May 2024, quarterback Jaden Rashada sued the University of Florida’s head coach and a booster after a promised $13.85 million NIL deal collapsed (Murphy, 2025). As one of the first cases to directly involve litigation over failed NIL payments, it highlighted the blurred lines between contractual promises, inducements, and the realities of collective booster agreements. The Rashada case exemplifies the risks athletes face in navigating an unregulated marketplace where promises often outpace enforceable contracts.

In an earlier case, Donald De La Haye v. UCF, a kicker for UCF lost his eligibility in 2017 after refusing to monetize his YouTube channel. He later sued UCF, ultimately settling in 2018 (Donald De La Haye v. University of Central Florida, 2018). Although predating the modern NIL framework, De La Haye’s case foreshadowed the central issue of whether athletes have the right to monetize personal digital content and laid the groundwork for today’s disputes around social media branding.

The O’Bannon v. NCAA case provides an even earlier precedent. Filed in 2009, the class action challenged the uncompensated use of former athletes’ likenesses in video games. The Ninth Circuit ultimately ruled that NCAA restrictions violated antitrust law by prohibiting athletes from being compensated for their images. Though limited in remedy, the O’Bannon case created crucial legal precedent and public momentum that contributed to the eventual collapse of NCAA restrictions on NIL (O’Bannon v. NCAA, 2015).

These NIL cases and other recent developments illustrate the wide-ranging legal terrain of NIL, as antitrust law, contract enforcement, consumer rights, and gender equity all intersect in ways that are reshaping collegiate sport governance. Through systematic content analysis of court opinions, settlements, and scholarly/legal commentary, this study identifies key patterns across the cases: (a) antitrust law continues to be the most powerful tool for challenging NCAA authority, (b) informal and oral NIL agreements pose significant risks for both athletes and institutions, (c) recruiting has been fundamentally altered by the removal of NIL restrictions, (d) transparency and fairness in NIL deals are increasingly framed as consumer protection issues, and (e) gender equity claims may soon expand the scope of NIL litigation under Title IX.

This poster presentation will display case timelines, highlight key themes, and map the legal evolution of NIL. The goal is to provide legal scholars, practitioners, administrators, and educators with both a synthesized understanding of the NIL landscape and a practical framework for anticipating future disputes. Ultimately, NIL litigation has forced a reevaluation of the NCAA's amateurism model, blurring the lines between collegiate and professional athletics. What was once a system designed to emphasize education and team loyalty has evolved into a semi-professional market where mobility, recruitment, and compensation are the dominant factors. This research suggests that the future of collegiate athletics will hinge on striking a balance between expanded athlete rights and sustainable governance structures. Whether through continued litigation, federal intervention, or institutional adaptation, NIL will remain at the center of sport law and policy debates for years to come.

Marketing, Agribusiness & Supply Chain Management

Poster 129 – Anh Ho
Mentor: Ngan Chau
Title: *Success Factors in Short-Form Video Marketing: A Comparative Study of TikTok and Instagram Reels*

Short-form video has become one of the most important channels for brand communication, yet it's still new and evolving, leading marketers to debate whether macro- or micro-influencers generate stronger consumer engagement and whether those effects hold consistently across TikTok and Instagram. This study examines how influencer tier and platform context jointly shape engagement outcomes in two high-

activity categories: beauty and travel. Influencers are classified as macro (100,000–1 million followers) or micro (10,000–100,000 followers). To separate platform effects from creator status, the design compares creators who maintain the same tier across platforms ("same-status") versus those whose tier differs by platform ("cross-status": macro on TikTok but micro on Instagram, and the reverse). The final sample comprises 160 U.S.-based, English-speaking influencers (20 per cell) who were active on both platforms in the past three months (10/23/2025–12/23/2025). Influencer candidates are initially identified on Wednesday.app influencer marketing platform, and post-level performance data are collected using Apify scraping tools for TikTok and Instagram. The dataset is cleaned and harmonized to retain comparable variables across platforms, including hashtags, posting timestamps, video duration, views, likes, and comments. Engagement rates are calculated at the influencer level by averaging engagement across posts within the study window, then summarized using Excel pivot tables to compare patterns by influencer tier, category, and status alignment. This project contributes applied marketing insights by testing whether "scaled reach" (macro influencers) or "niche resonance" (micro influencers) is more strongly associated with engagement, and by evaluating whether platform-driven differences in influencer tiers affect expected performance. Results are intended to support more evidence-based influencer selection, cross-platform budgeting, and short-form content planning decisions for brands investing in TikTok and Instagram Reels.

Teacher Education

Poster 130 – Isabelle Cerveny
Mentor: Jesslyn Hollar
Title: *Unequal Access to Play: An Analysis of Recess Policy Inconsistencies in Nebraska*

Recess is a critical part of a child's school day, yet policies across different schools can look extremely different from one another. Frequently overlooked in policy frameworks, recess has a wealth of well-documented benefits for cognitive, emotional, and physical health. Using the Whole School, Whole Community, Whole Child (WSCC) framework, this study investigates the landscape of recess policies across select public districts in Nebraska. Through an analysis of publicly accessible documents, this study explores the recess policies of 28 school districts and examines the quality and scope of these practices through WSCC-aligned domains, including health, safety, engagement, support, and whole-child development. Findings reveal substantial variation in the presence, clarity, and comprehensiveness of recess policies across districts. Larger

urban districts generally demonstrate more robust and holistic approaches, including guaranteed daily recess, explicit time allocations, safety and supervision guidelines, and protections against withholding recess as punishment. In contrast, many suburban and rural districts rely on minimal or implicit policy language, often lacking equity protections, inclusion for students with disabilities, or connections between recess and learning readiness. Across the state, safety and supervision are addressed more consistently than engagement, inclusion, or cognitive and social development. Interestingly, only a limited number of districts clearly define recess as crucial for both academic preparedness and overall whole-child growth. These results emphasize important equity issues, as the availability of high-quality recess experiences varies widely based on the district context rather than the needs of the students. This research highlights the necessity for more explicit guidance and enhanced policy alignment to guarantee that recess is acknowledged and safeguarded as an essential element of student well-being and academic achievement.

Fine Arts & Humanities

Art & Design

Poster 85 – Rilynn Lutt
Mentor: Derrick Burbul
Title*: Interactive Workbook*

This project examines how UI/UX (User Interface and User Experience) design principles can enhance the accessibility, engagement, and effectiveness of educational materials in university-level art and photography courses. Traditional textbooks and rigid grading structures often fail to support creative learners or adequately reflect artistic growth, particularly for students with diverse learning styles. In response, this study investigates the design and classroom implementation of an interactive, student-centered photography workbook developed using Adobe InDesign. The workbook integrates visual hierarchy, modular layouts, color coding, and intuitive navigation, while encouraging experiential learning through hands-on exercises, reflection prompts, and the incorporation of students' own photographic work. Using a mixed-methods approach, the research builds on initial survey data evaluating a previous workbook iteration and expands into a classroom study. The study further explores how visual, kinesthetic, and auditory learners interact with the redesigned material, including optional multimedia components for alternative modes of engagement. This study also looks at Experiential Learning by having students use professional applications like Adobe InDesign to integrate their examples directly into an existing

student workbook, reinforcing reflective learning by having them write short captions about what they learned and active learning using a computer application they will encounter in their professional world. Findings aim to demonstrate how thoughtful UI/UX design can foster creative ownership, improve clarity, and support inclusive learning environments without relying on one-size-fits-all assessment models. This research contributes to broader discussions on inclusive design, student voice, and the role of design systems in education, ultimately arguing that well-designed educational tools can bridge the gap between academic structure and creative exploration while better supporting diverse learners in visual disciplines.

Communication

Poster 86 - Jenju Peters
Mentor: Tiffani Luethke
Title: *Carrying Memory: MENA Women, Migration and Material Life*

The purpose of this study is to examine the role of memory objects in the lived experiences of forced displacement and resettlement among Middle Eastern and North African (MENA) refugee women in the United States. Using object-elicitation interviews, this research asks: What do memory objects reveal about the experiences of displacement, migration, and resettlement as narrated by MENA refugee women themselves? To address this question, we will photograph participants' selected memory objects and conduct object-elicitation interviews with up to fifteen eligible participants (i.e., women from the MENA region who have experienced forced displacement and are at least 19 years of age). Interview transcripts will be analyzed using thematic analysis to identify patterns of meaning related to memory, identity, loss, continuity, and belonging. This study aims to generate insights that contribute to scholarship on forced migration and material culture, and inform policy and practice related to refugee resettlement and support.

English

Poster 87 – Darius Hurt
Mentor: Janet Graham
Title: *Alternative Assessment in English Education*

Education has evolved to push students through an age-defined factory line. This has resulted in many modern students caring little about their education, leading to poor performance and a lack of graduation readiness. Many educators today are seeking to remedy this situation by using interactive learning and ungrading. To bring this ideal into an English Language Arts (ELA) classroom, this research dissects the facets of ungrading and pairs them with alternative assessment when needed. Alternative assessment is the replacement of standardized grading with a focus on grading the individual based on effort and growth. This places priority on learning and applying goal-setting skills, introspection, and participation. Ungrading is the method of removing grades entirely. This is not feasible in a modern classroom until we reevaluate the system of education through alternative assessment. The goal is to one day achieve a classroom without grades; however, to get there we must work within the modern system. Alternative assessment works within the current grades structure while continuing to shift the paradigm towards the student's favor. When these grades are used to reward growth on the individual level rather than the collective, students will be more motivated to learn. To implement this in an ELA classroom, group work environments such as writing workshops and book clubs will allow students to be interactive and collaborative with their assignments. To implement alternative assessment, this research proposes the use of overlying assessments of growth by the student and the instructor that evaluate goal setting and completion, reflective writing, and instructor-student communicative feedback, ideally in the form of one-on-one conferencing. The assignments also must change from a rigid, standardized structure to an open format where experimentation is rewarded, rather than penalized. Instead of long due dates to finish a project in its entirety, smaller subsets allow students to submit ungraded drafts for feedback. This allows the instructor to guide students away from experimentation that may not be beneficial without penalizing them. Overall, the goal of this research is to discover a system that allows students to let go of the stress of grades and learn to love learning again.

Poster 88 – Adrienne Parker
Mentor: Megan Hartman
Co-Author: Autumn Lindsley
Title*: The Write Angle Marketing*

In this poster presentation, I analyze the development and marketing evolution of The Write Angle, a podcast I co-host with Autumn Lindsley. During its first two seasons, the podcast primarily focused on in-depth literary analysis and discussions rooted in academic approaches to fantasy and writing. In season three, however, we intentionally shifted toward making the podcast more accessible and relevant to a broader community of readers and writers by centering practical, relatable conversations about the writing process and contemporary fantasy. My main contribution to the project includes collaborating on the planning, scripting, recording, and production of six to eight season-three episodes, as well as leading the development of new social media marketing strategies. This presentation specifically examines how promotional efforts on Instagram, Facebook and TikTok, including revised visual branding, targeted posts, and more consistent content scheduling, supported this shift in focus. By comparing audience reach, engagement rates, and interaction data from season three with metrics from seasons one and two, the poster evaluates whether these creative and marketing changes expanded our audience and increased engagement. Ultimately, this presentation argues that intentional adjustments in both content focus and digital promotion can broaden a podcast's reach and make literary discussions more accessible to a wider audience.

Poster 89 – Faolan Larson
Mentor: Megan Hartman
Title: *The Grammar and Syntax of Storytelling in Akiun*

Through the expansion of Akiun during my efforts to translate a myth about their alphabet into the language, various grammar and syntax have made themselves known in my writing. The English language is full of complexities, some that we are consciously thinking about and some that we do not. My writing style is full of these, due to its very poetic style, paired with the natural repeating rhythm that occurs within myth and verbal storytelling. As each new aspect of my language's grammar emerges, a new question comes into view with it. Akiun's base is in the meaning behind its syllables and inflections, and so that must be taken into account when making new rules for a part of speech or particular English peculiarity. This process has been both challenging and enlightening as it offers a deeper perspective into the nuances of English grammar. My poster will highlight some of the more abstract English rules and odd parts of speech, detailing how I responded to them within Akiun. Some of these choices were straightforward, but many were not, and so each choice contributes to

the unique style of speech and grammar that Akiun holds. Thus creating the rich and complex language that their myth about how their alphabet got its order has now been translated into.

History

Poster 90 – Hannah Vraspir
Mentor: Nathan Tye
Title: *Caril Ann Fugate "Victim or Accomplice"*

The role of Caril Ann Fugate in Charlie Starkweather's 1958 murder spree remains of the most debated aspect of the case to this day. As Starkweather's girlfriend, Fugate was present during most of the crimes. People continue to examine is whether she was an active accomplice or a coerced victim. This has shaped the public memory and legal interpretation these events.
During the killings Fugate was fourteen years old, which raised significant concerns about her vulnerability and her ability to make decisions. She later claimed that she was held hostage and feared for her life, stating that Starkweather threatened to kill her and her family if she tried to leave. Many people that view this argue that her youth, isolation, and dependence make it difficult for her to resist. These interpretation highlights broader issues surrounding gender norms in the 1950s, including power, manipulation, and domestic abuse.

However, prosecutors portrayed Fugate as a willing participant who helped Starkweather avoid being captured. They pointed to moments when she had the opportunity to seek help but did not, suggesting that she complicit in the crimes. She was sentenced to life in prison and being released early in 1976. Her case reflects mid-twentieth-century attitudes about gender, responsibility, and juvenile crime, as well as their limited understanding of trauma in legal context.

This project reexamines Fugate's role through the lens of victimization. The Starkweather case continues to influence discussions about accountability, phycological control, and complexities of determining guilt when coercion and violence intersect. Drawing on surviving trial records, interviews, and other primary sources, this project reevaluates Fugate's role in the crime by situating it within the wider cultural context of the era and attention to her position as a victim in the crime.

Poster 91 – Carson Kreager

Mentor: Torsten Homberger
Title: *The Jeep That Won The War*

The Willys MB Jeep played a pivotal role in World War II, serving not only as a versatile military vehicle but also as a symbol of American industrial capacity and innovation. This study examines the design, production, and deployment of the Jeep, focusing on how government procurement policies, standardized engineering practices, and public messaging shaped its development. Using primary source documents, including Quartermaster Corps reports, technical manuals, and government contracts, alongside secondary analyses from engineering and military history scholarship, this research investigates the interactions between military needs, industrial production, and public support. Findings reveal that the Jeep's success depended on rapid standardization and mass production, which allowed Willys and Ford to scale from prototype to hundreds of thousands of vehicles within a few years. The study also highlights the Army's role in coordinating manufacturers, enforcing parts interchangeability, and adapting designs to meet battlefield requirements. In addition, marketing strategies and wartime publicity campaigns demonstrated the Jeep's significance to the home front, fostering public confidence in the military-industrial system and encouraging support for defense spending. By examining the Jeep's production, operational use, and cultural impact, this research illustrates how a single vehicle exemplified broader patterns of industrial mobilization, military innovation, and public persuasion during WWII. The findings contribute to understanding the interconnected nature of technology, policy, and society in wartime America, offering insights into how coordinated industrial and governmental efforts can produce strategic advantages. Future research might explore comparative analyses with other military vehicles or examine postwar civilian adoption of military technologies.

Poster 92 – Grace Schaefer
Mentor: Will Stoutamire
Title: *Camp Atlanta Oral History Project*

In 1942, per the request of the British, the US government was preparing to take 175,000 axis POWs soldiers. In order to do this, they needed land across the country to form camps for these prisoners. According to specific rules set by the government, these camps could not be near war plants or shipyards. They had to be at least seventy-five miles inland from both coasts, and at least one hundred and fifty miles from the Mexico and Canadian borders. Because of its location, Nebraska was an ideal place to house these prisoners. There were three main Nebraska POW camp locations: Fort Robinson, Scottsbluff and one just outside of Holdredge, also known as

Camp Atlanta. Each of these camps had branch camps that stemmed across Nebraska and surrounding states

In my research project I have focused on Camp Atlanta, using materials provided by the Nebraska Prairie Museum in Holdredge. My focus has been to transcribe freshly digitized oral histories from former POWs, guards, and persons involved with the camp. The next step in the project is to make an Omeka website that hosts these digitized tapes and transcripts of the interviews, along with letters, photos, and other records from the camp. If time allows, I will work to build a virtual exhibit on Camp Atlanta using these resources. The goal of this project is to bring a lesser known Nebraska history more accessible and available to the public and thus bring awareness to this important time.

Modern Languages

Poster 94 – Mariana Mosqueda
Mentor: Janet Eckerson
Title*: Mentorship and Induction: What Are Rural Educators Telling Us*

Teacher workforce shortage is a national issue exacerbated by the COVID-19 pandemic. Many schools struggle with retaining teachers, especially underserved areas like rural communities. Teacher retention in rural schools remains a pressing issue, as educators' decisions to stay are heavily influenced by their relationships with students, colleagues, and the broader community (Seelig & McCabe, 2016). The shortage is among all teaching certifications and affects almost every school district in the state. Mentor and induction programs for early career educators play a bigger role in teacher retention. Studies show that teachers who participate in structured mentoring and induction programs are more likely to remain in the profession (Ingersoll & Strong, 2011). Teaching experience is positively associated with student achievement gains, with the largest improvements occurring in the early years but continuing well into the second and third decades of a teacher's career (Kini & Podolsky, 2016). Drawing from nine interviews of early career teachers from central Nebraska, this study examines the participant's attitudes and experiences of mentoring and induction programs. Findings highlight the role of informal mentors in addition to assigned mentors and unmet needs of early career teachers. Impactful induction relies not only on assigned mentors but also on supportive relationships and school structures that help early career teachers manage obstacles such as daily challenges. Implications of the analysis include considerations for designers of mentoring and induction programs in K-12 schools.

Poster 95 – Sayuli López
Mentor: Michelle Warren
Title*: Voces silenciadas (Silenced Voices)*

The years 2024-2026 have brought a sundry of life challenges to immigrants in general, but particularly to immigrants in Central Nebraska. ICE's latest actions in Omaha are a direct result of inhumane federal immigration policies that are tearing families apart and leaving lasting damage in our communities. Misunderstanding and misrepresentation frequently pervade news and popular narratives about the immigrants who live among us–making my research for promoting positive understanding of immigrants, particularly Latinx immigrants, crucial and timely. This project has grown out of a smaller project I began in the summer of 2025, expanding to a broader data set.

This project aims to amplify the voices of Latin American immigrants in Nebraska whose stories have often been unheard. We will share the challenges they face on their journey, as well as those they face today. Through this research, we will expand knowledge and foster a better understanding of our Latinx community among the general population. My goal is to share true stories from personal narratives of resilience, hope, and fear. An oral interview will be conducted with five participants with diverse backgrounds who reside in Nebraska. Despite facing obstacles during my research, such as participant recruitment, the project continues to move forward to ethically represent immigrant stories, eventually becoming a documentary, an exhibition, a presentation, and other academic and public humanities products. By centering on immigrant voices, this work contributes to a more inclusive and humanized understanding of the Latinx experience in Nebraska.

Music, Theatre, & Dance

Poster 96 – Daniel McCarty
Mentor: Tim Ferrell
Title*: Advancing Your Advance Players*

This website was something I had hoped to create personally for myself and music teachers all over the state. I was a student that advanced in music faster than others and understood how hard it is to sit in class when you know the music but other students are still struggling. I went out and spoke with many teachers and professionals in the music industry to figure out what all is needed to know for middle to high school level music students. I'm thankful that I am a professional musician

myself and I have an understanding of what goes into becoming a successful musician. In today's world music is super easy to access so it gives even more chances for kids to find the spark to keep them advancing. In this website I have included the three most common types of music found in schools: jazz, classical, small groups. From those categories I then broke it down into instruments, genres, styles, and many other sub sections. I have given them links to all kinds of music like songs to listen to, solos to perform, musicians to listen to, or books that will help you advance. I do think the best option to grow stronger as a musician is private lessons, but not all students can afford them. So, I hope that this website will allow teachers to give their more advanced students something to practice and grow as a musician.

Calvin T. Ryan Library

Poster 93 - Emma Huggins
Mentor: David Arredondo
Title*: Textual Analysis of the Warren Commission Report*

The Warren Commission Report is a foundational investigative document in the study of the assassination of President John. F. Kennedy, yet its length and structural complexity make large-scale narrative analysis difficult. This project applies what literary theorist Franco Moretti refers to as distant reading, alongside natural language processing and network analysis, to examine how the report constructs its narrative through patterns of named person-entity co-occurrence.

Using a text-proximity co-occurrence window, we generate chapter-level networks that model relational structures among individuals mentioned in the report. These visualizations and accompanying network metrics complement close reading by making shifts in centrality, clustering, and relational emphasis visible across chapters. The resulting networks allow inferences about how the Commission organizes actors, distributes attention, and structures the narrative of the investigation.

This study demonstrates how a rules-based entity-linking workflow can support network-based interpretations of complex historical texts and provide a reproducible framework for analyzing other texts within the JFK assassination corpora.

Graduate
Poster Presentation Abstracts

Fine Arts & Humanities

English

Poster G2 - Grace Fuchser
Mentor: Janet Graham
Title*: This is My Design: The Mythologization of Will Graham and Hannibal Lecter in NBC's Hannibal (2013)*

This research explores how NBC's Hannibal (2013) transcends traditional psychological horror genres by employing classical art and mythic archetypes that reshape a fundamentally toxic and manipulative relationship into a divinely tragic queer romance. From Achilles and Patroclus, the visual works of Sandro Botticelli, and reference to folkloric creatures like the Wendigo and Raven Stag, this poster will show how the series provides a mythic comparison that elevates these two characters' violent 'becoming' into something more "digestible". Their roles in the narrative portray powerful metaphors for 'otherness,' that in particular offers queer viewers an area of validation, mentioned by Bryan Fuller lead writer of the show, by centering a connection that, while dangerous, prioritizes mutual recognition and authentic attachment that defies conventional societal morality. In addition, drawing on Nietzschean philosophy in particular, the show intentionally mythologizes and romanticizes Hannibal and Will's relationship after extended amounts of time engaging with their more dangerous dispositions in order to force moments of empathy for each other as well as with us as the audience. As empathy is a core theme in the show, the aestheticization of violence is the key element in what functions as an essential mode of intimacy that purposely blurs the lines between a terrifying monstrous reality and an artist's limerence.

History

Poster G3 - Logan Osmera
Mentor: Will Stoutamire
Title*: Campus in Confusion: Kearney State College from 1970-1995*

What role do colleges play in society? Are they meant to foster professional and intellectual growth, challenge students to grow personally, and expand their horizons? Or are they meant to guide teenagers into adulthood, creating good, moral, and upstanding citizens? This was the central debate in higher education in the 1970s and 1980s, and students, learning from their experiences protesting the Vietnam War and for free speech from the 1960s, sought to shape higher education by challenging traditional power structures and advocating for their personal and academic freedoms both as students and adults.

Unlike the 1960s, however, there was no mass protest or counterculture movement throughout the following decades. Instead, through the 1970s students rebelled against authority in more subtle ways, and authorities became more accommodating to their demands. With their newfound freedoms, students in the 1980s expressed themselves through partying and other forms of nonconformity. By the 1990s, colleges and universities had to “reign in” their students after such actions worried the larger public’s perception of higher education, especially after several high-profile incidents leading to student’s deaths.

While this history is generally well understood for most larger institutions on the coasts and the United States’ urban centers, for smaller, rural institutions in America’s conservative heartland, this history has rarely been explored. Collegiate history has also rarely been explored from a student-centered perspective, focusing mostly on administrators, faculty, and sports. This project centers the experience of students at Kearney State College, exploring how these national trends looked at a small rural colleges in a majority conservative area of the nation while also exploring what unique factors impacted students at Kearney State College, such as the debate to become UNK or remain a small state college.

Graduate Studies & Academic Outreach

Poster G22 - Jashna Samuel
Mentor: Megan Adkins
Co-Author: Erin Sweeney
Title: *Understanding the Online Graduate Student Experience: A Qualitative Study of Engagement, Connection, and Support at the University of Nebraska at Kearney*

The landscape of higher education has shifted significantly, with rapid advancements in technology accelerating the growth of online learning 1. According to the National Center for Education Statistics, the percentage of students enrolled in postsecondary distance learning was 53.8% in 2024 2. As online graduate enrollment continues to expand, student satisfaction affects a student's performance, motivation, and engagement and is an important factor to be considered in online education. The purpose of this study was to evaluate the experience and overall satisfaction of online graduate students at UNK. Graduate students who took at least one online course were asked to participate in a 30-40 minute focus group session held over zoom. The focus group questions consisted of the students' experience and overall satisfaction with their program, faculty advisors or academic coordinators, navigation through canvas, resources provided by UNK and UNK community. Preliminary data was analyzed using thematic coding, and found graduate students expressed overall positive experience and satisfaction. Improvements are needed in communication between advisors and students and the mode of communication used by professors to relay information to students. Findings from this study may be used to inform strategies to enhance student engagement, access to campus resources, and overall satisfaction with academic experience.

Natural & Physical Sciences

Biology

Poster G1 - Nnamdi Okore
Mentor: Yipeng Sui
Title: *The Molecular Mechanism Linking a Food Packaging Plasticizer EHDPP to Dyslipidemia*

Environmental exposure to endocrine-disrupting chemicals (EDCs) is a significant, yet underappreciated, contributor to cardiovascular health risks. While Pregnane X Receptor (PXR) is known as a xenobiotic sensor that helps the body detoxify drugs and steroid hormones, recent evidence suggests activation of PXR could increase hepatic lipid production and atherosclerosis. PXR can be activated by a variety of EDCs, which could be a potential link between EDCs and cardiovascular diseases. Our preliminary data indicated that 2-ethylhexyl diphenyl phosphate (EHDPP), a plasticizer and flame retardant widely used in PVC food packaging, could activate PXR. EHDPP is frequently detected in indoor dust, water, and human tissues, and is implied to affect fatty acid metabolism. However, the underlying mechanism of how EHDPP alters lipid metabolism remains unclear. In this study, we first used cell-based transfection assays in human liver cells (HepG2) to investigate the mechanism by which EHDPP binds and activates PXR. Our results suggest that EHDPP is a potent PXR agonist. More importantly, EHDPP did not significantly activate other nuclear receptors we tested, suggesting it was a selective PXR agonist. Future research is needed to evaluate how EHDPP regulates lipid uptake in human intestinal cells through PXR signaling. These findings could provide novel insight understanding on how environmental chemicals in food packaging could increase cardiovascular risks in humans.

Professional & Applied Studies

Counseling, School Psychology, & Family Studies

Poster G4 - Emma Arens
Mentor: Doug Tillman
Co-Authors: David Hof & Kailey Wilcox
Title: *Mental Health Literacy in Educational Settings: Counselor Interventions, Observational Insights, and Strategic Recommendations for Future Practice*

A significant number of children and adolescents (1 in 5) experience a diagnosable mental health condition each year in the United States (CDC, 2024). With as many as one-third of youth in the U.S. at a heightened risk for experiencing mental health issues prior to the COVID-19 pandemic, subsequent rising rates of mental health diagnoses have become an increasingly pressing area of national concern (Figas et al. 2024). Despite the documented prevalence, and ever-increasing necessity for the delivery of mental health services in school settings, there remains a lack of mental health literacy for teachers (Dart et al., 2020; Woloshyn, 2020). The mental health needs of students in schools are numerous, and the amount of consistent time a teacher spends with their students amplifies the potential impact that they can make on student mental health (Dart et al., 2020; Johnson et al. 2023). Unfortunately, several studies have found that teachers feel inadequate when addressing mental health issues in students (Woloshyn & Savage, 2020; Ball & Anderson-Burther, 2014). Given the clear mental health needs of children in schools, and the lack of significant training to assist them, teachers are left with pre-existing stigmas around mental illness as they educate their students. As advocates and practitioners, counselors can improve mental health literacy and intervention in school settings.

The factors influencing attitudes toward mental health stigma of preservice teachers were examined in this research study. A total of 151 participants at a Midwestern public university in the United States were surveyed about their attitudes towards mental health and counseling services and their willingness to seek or recommend these services. Principal axis factoring was conducted to examine dynamic attitudes towards mental health. The results of the factor analysis showed that comfort, resistance, and environment influence pre-service teacher's attitudes toward mental health stigma, which influence their belief and willingness to seek mental health counseling. While there is a burden on current teachers to work in various roles with students and their mental health needs, administrators face a similar strain to support

their teachers and set aside the additional time that is required to meet the needs of their students. This study critically examines mental health stigma in pre-service teachers and subsequent willingness to seek or recommend services. Counselors play a crucial role in mental health support and the accessibility of services in schools and are equipped to offer both education and support. Recommendations for such interventions are provided.

Poster G5 - Peyton Neff
Mentor: Macey Kohls
Co-Authors: Taylor Philbrick, Lauren Ferguson, Mayson Fago
Title: *The Relationship Between Exercise and Self-Efficacy*

It is a common belief that exercise greatly improves the health and well-being of individuals. Specifically, individuals involved in sports-related activity for long periods were positively associated with better fitness, health, and a healthy BMI (Schmidt et al., 2017). Additionally, research has found that increased physical activity is strongly associated with fewer depressive symptoms (Ojiambo, 2013). Self-efficacy relates to an individual's belief in their ability to accomplish tasks to achieve specific goals (Matsuo et al., 2015), which can also be associated with self-esteem and mental wellbeing. By addressing the relationship between exercise and self-efficacy, this study aimed to gather more information about the positive effects that exercise can have in young adults.

This study examines the relationship between exercise frequency/intensity and perceived self-efficacy by asking undergraduate students to complete a 15-minute survey online. The survey asked participants to report their exercise habits and complete the General Self-Efficacy Scale (GSE) (Luszczynska et al., 2005).

It was hypothesized that greater minutes of exercise would be related to higher self-efficacy, and more intense exercise would also be related to higher self-efficacy. After using Spearman's rank correlation coefficient, results revealed that there were no significant effects between self-efficacy and exercise frequency ($r_s(58) = .22$, $p = .094$) and self-efficacy and exercise intensity ($r_s(58) = .17$, $p = .216$). Though these results were not significant, both correlations were positive, providing insight about the importance of exercise in terms of self-efficacy. For example, almost all participants reported some type of exercise per week, suggesting that any type of exercise for any duration may be related to self-efficacy. This research can add to previous literature about exercise and self-efficacy while furthering knowledge about how exercise can be related to multiple domains in an individual's wellbeing.

Poster G6 – Andrea Hornung
Mentor: Tammi Ohmstede-Schmoker
Co-Authors: Jaelyn Ramirez
Title: *Relationship Between Teacher Wellbeing and Teaching Self-Efficacy*

The purpose of this project is to better understand how teachers' own wellbeing affects their ability to teach effectively. Participants were recruited through school administrators, whose email addresses were obtained from the Nebraska Department of Education database. Researchers sent an email to administrators, asking them to forward the survey to their teaching staff. The recent increase of stress on teachers, exacerbated by events like the COVID-19 pandemic, has led to increased rates of burnout, lower self-efficacy, and teachers leaving the profession altogether. The dominant explanation for this trend is growing expectations for teachers to meet higher standards, which leads to time pressure, work overload, and emotional exhaustion. The Spearman rank correlation coefficient (rs) was .46 with a p-value (p) of < 0.01.

Poster G7 - Kiarra Biede
Mentor: Tammi Ohmstede-Schmoker
Co-Authors: Karley Oberheide, Jenna Craven, & Brian Herr
Title: How *Have Standardized Reading Test Scores Changed Before and After Covid-19?*

The COVID-19 pandemic abruptly disrupted education systems around the world, forcing schools to shut down and transition to remote methods of learning. During the pandemic, many children faced disengagement from learning, attendance issues, and drops in performance, especially impacting students who were already considered at risk (Whitley et al., 2021). This study will include a diverse sample of students to provide the best understanding of how COVID-19 impacted academic performance in reading. The study will analyze the effect size of time from 2019 to 2021 on test scores in standardized MAPS, STAR, and SAEBERS testing. Students in 3rd, 4th, and 5th grade are being analyzed for this project with the total being 363 students. The study will use MAPS data from the years of 2019-2021 to examine the impact of COVID-19 on reading scores. The results from the analyses show support for part of our hypothesis that we would see a decline in reading scores. The results showed that 3rd grade had the sharpest decline. The strongest differences were observed in third grade. Fall MAP Reading scores for third graders in 2020–2021 were significantly lower while STAR testing showed similar data. Behavioral data from SAEBERS assessments also followed a similar trend.

Poster G8 - Kori Roberts
Mentor: Tammi Ohmstede-Schmoker
Co-Author: Jordan Bolte
Title: *Follow-Up Study of a Midwestern School Psychology Graduate Program*

A school psychologist has diverse and complex roles within the field, and those roles are constantly evolving. It is important for graduate programs to adjust their programs to meet the needs of future school psychologists. The National Association of School Psychologists (NASP) has set standards and domains for graduate programs to follow to ensure that future school psychologists are prepared for their future. Occasionally, NASP reviews its domains to ensure that the domains are effective for school psychologists once they go into the field. Graduate programs must follow the NASP domains to be considered as an accredited program. The Midwestern college that is examined in this study is considered an accredited program. This means that the program must base its curriculum on the requirements of the NASP Domains. The goal of the current study is to determine how well the Midwestern School Psychology Graduate Program covers the professional standards, determined by NASP, so that the graduate students feel prepared in their role as a school psychologist. Participants of this study were graduates of the Midwestern College School Psychology Program from the years 2020-2024. Participants rated both the perceived importance and preparedness for each of the NASP domains. A quantitative analysis examined the average feeling of importance and preparedness of each NASP domain. A Paired Sample T-Test was conducted to determine the relationship between preparedness and the importance of the NASP Domains. Results showed that the difference between preparedness and importance scores was statistically significant.

Poster G9 - Morgan Hansen
Mentor: Tammi Ohmstede-Schmoker
Co-Authors: Jacob Brownell & Brandon Grachek
Title: *Use of Habitude's Social-Emotional Curriculum in Secondary Education*

Social-emotional learning (SEL) is essential for helping students manage emotions, build relationships, and make responsible decisions. Habitudes, a SEL curriculum grounded in the Collaborative for Academic, Social, and Emotional Learning (CASEL) framework, was implemented in a rural Nebraska school district serving students in grades 7-12. This study evaluated the short-term impact of the curriculum on academic outcomes and social-emotinoal competencies as reported by both students and teachers. Archival data from the Fall and Winter 2024-2025 semesters included academic performance measures from NSCAS and NWEA assessments, as well as student- and teacher-completed Social, Academic and Emotional Behavior Risk Screener (SAEBRS) ratings. Participants were drawn from a predominately White

(93.8%) rural district. Results indicated that no statistically significant differences between Fall and Winter scores across academic or social-emotional measures, with all ANOVA comparisons yielding p-values greater than .05. These findings suggest that short-term implementation of the Habitudes curriculum did not produce measurable changes in academic performance or SEL competencies. Limitations of the study include the brief evaluation period, unmeasured classroom-level variables, and variability in teacher implementation. Future research should explore long-term outcomes, consistency of implementation, and qualitative perspectives from students and teachers to better understand the conditions under which SEL programs may be most effective.

Poster G10 - Charlotte Okraska
Mentor: Umut Arslan
Co-Authors: Emma Arens & Kailey Wilcox
Title: *Mental Health Literacy in Educational Settings: Counselor Interventions, Observational Insights, and Strategic Recommendations for Future Practice*

The aim of this research is to examine future counselors' ethical beliefs regarding political conversations with clients. The American Counseling Association (ACA), the governing ethical body for professional counselors, states in its 2014 Code of Ethics that counselors must be aware of their personal beliefs and avoid imposing them on clients, particularly when their beliefs conflict with those of the client or when they reflect bias or prejudice.

Socio-political attitudes and values (SPAVs) are part of one's personal beliefs. However, a review of current literature shows a lack of attention paid to SPAVs within clinical practice. Clinicians may not consider how their personal SPAVs could affect the therapeutic relationship (TR) with clients, and as such they may unconsciously impose bias (Redding & Cobb, 2023). Additionally, while SPAVs are a component of multicultural counseling, they are often overlooked and not addressed as being an element of cultural competence (Redding, 2020).

To further understand how clinicians perceive the role of SPAVs within the counseling alliance and the impact it has on the TR, it is relevant to explore how future counselors plan to address SPAVs and integrate them into ethical practice. To achieve this goal, researchers selected a sample of approximately 30 Nebraska counseling students and used a semi-structured Qualtrics survey to collect data on their ethical beliefs, actions, and reactions. Findings contribute to the ongoing discourse on ethical counseling practices in an increasingly polarized political climate.

Poster G11 - Kailey Wilcox
Mentor: Umut Arslan
Co-Author: Emma Arens
Title: *Surveying Trainers: Suicide Prevention Education in Counseling Programs*

Prior to entering the workforce, many clinicians are trained in programs guided by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). In 2024 20,982 students graduated from CACREP Programs (CACREP, 2024). A majority of these individuals will address a suicide related crisis early in their career. According to Morris and Minton (2012), 80% of new counselors reported encountering a suicidal client. Many of these graduates feel underprepared to respond in a crisis situation. Cureton and Sheesley (2018) reported that only 45% of students received training in suicide risk assessment as a part of their graduate program, though exposure to suicide risk assessment and suicide-specific training in graduate school can aid counselors in feeling more prepared (Schmidt et al., 2016). Despite the critical role of graduate training programs in the education of counselors regarding suicide-specific training, only 40-50% of clinical psychology, mental health counseling, and social work graduate curriculums mandate formalized curriculum on suicide risk assessment and response procedures (Cho et al. 2024). The Council for Accreditation of Counseling and Related Educational Programs (CACREP) references suicide prevention in only two instances, specifically in relation to counselor practices and ethical responsibilities toward clients (CACREP Standards, 2024). Community based suicide prevention trainers have experience and insight related to empirically informed and effective training curriculums. The National Alliance for Suicide Prevention (2025) listed five organizations providing suicide prevention training programs across the country (ASIST, QPR, safeTALK, Working Minds, and Yellow Ribbon). Collaboration is a critical contributing factor to counselor success, and research is lacking on the topic of best practice and training standards in relation to suicide (Binkley and Elliot, 2021). This project aims to fill this gap by collaborating with community-based suicide prevention trainers.

Kinesiology and Sports Sciences

Poster G12 - Madison Shapland
Mentor: Cameron Munger
Title: *Exploring the Role of Imagery in Reducing Run-Throughs for Pole Vaulters*

Imagery is a widely used mental skills strategy shown to enhance confidence, attentional control, and performance (1,4,5). The PETTLEP model incorporates

Physical, Environment, Task, Timing, Learning, Emotion, and Perspective elements to strengthen functional equivalence between imagery and movement execution (3). Despite strong support across sport settings, limited research has examined imagery in pole vault, where run-throughs are often associated with confidence breakdown and attentional disruption. Purpose: To examine the effects of PETTLEP-based imagery on run-through frequency in collegiate pole vaulters. Methods: Ten NCAA Division II pole vaulters participated in a six-week indoor-season study. Following a two-week baseline phase, athletes completed a four-week PETTLEP-based imagery intervention, practicing approximately five minutes of guided imagery prior to jumping sessions (2–3 times per week). Run-through-to-attempt ratios were recorded across practices and meets. Imagery ability was assessed using the Movement Imagery Questionnaire-Revised (MIQ-R), with items averaged to create a composite score. Wilcoxon signed-rank tests compared baseline and Phase One outcomes ($p \leq .05$). Results: A Wilcoxon signed-rank test revealed that run-through ratios were not significantly different after the intervention (Median = 0.20) compared to baseline (Median = 0.06, n = 39), $Z = 1.80$, $p = .064$. Confidence scores were not significantly different post-intervention (Median = 12) compared to baseline (Median = 12, n = 10), $Z = –1.00$, $p = .339$. Focus scores were also not significantly different (Median = 11.5) compared to baseline (Median = 12, n = 10), $Z = 0.00$, $p = 1.000$. Average baseline MIQ-R score was 41.1 (SD = 7.3). Manipulation check scores during intervention averaged 19.4 (SD = 4.2), reflecting moderate-to-high imagery vividness, control, and quality. Although short-term effects were not evident, these patterns align with prior research indicating that longer interventions during stable training periods may be required to observe meaningful psychological and performance changes (3,4). Practically, PETTLEP-based imagery offers coaches a low-cost, time-efficient strategy to reinforce technical cues, enhance perceived control, and support psychological readiness without increasing physical load.

Poster G13 - Connor Gutz
Mentor: Elena Dille
Co-Author: Kazuma Akehi
Title: *In-Season Fluctuations in Sleep and Perceived Wellness Across Player Positions in Collegiate Football*

Context: Collegiate athletes are exposed to a variety of stressors, including intense training, sleep disruption, and academic demands. Sleep is a key modifiable factor that influences an athlete's ability to adapt to physical and mental stress. Adequate sleep has been shown to enhance performance and recovery, whereas insufficient sleep may worsen the effects of high training loads and negatively impact overall well-being. Perceived wellness measures, such as fatigue, mood, and soreness, are commonly used to guide training and recovery decisions and may help optimize athlete readiness.

The purpose of this study was to examine differences in perceived wellness scores across player positions throughout a collegiate football season. Methods: One hundred thirty midwestern NCAA Division II university football athletes completed a wellness survey, which included reported sleep quality, mood, soreness, and fatigue, before each weight-training session throughout the competitive season (August–December). Collected data included sleep quality, sleep duration, player position, muscle soreness, fatigue, and mood. Fluctuations in wellness scores throughout the season and differences between player positions were analyzed. Results: There were significant interactions between position and time for sleep quality ($P<0.001$), energy ($P=0.003$), soreness ($P=0.02$), and mood ($P<0.001$). A significant main effect of time was observed for illness ($P<0.001$). Discussion/Clinical Application: We observed that the tight end position demonstrated significantly poorer sleep quality in August, whereas running backs experienced poorer sleep during October, November, and December. Tight ends also reported greater muscle soreness in August, higher stress levels in August and September, increased fatigue from August through October, and lower mood in August and September. Running backs reported greater overall stress in November and December, and increased fatigue in December. These findings suggest wellness and sleep patterns fluctuate throughout a competitive football season and differ by position. By monitoring these trends, recovery and training strategies can be targeted to optimize athlete performance.
Future research should explore how these interventions relate to injury risk and performance.

Poster G14 - Isabel Margritz
Mentor: Kate Heelan
Co-Author: Bryce Abbey
Title: *Impact of Attendance and Engagement at a Family Healthy Weight Program on Weight Change*

Building Healthy Families (BHF) is a Family Healthy Weight Program (FHWP) designed for children 6 to 12 years of age with a body mass index (BMI) at or above the 95th percentile. The BHF Program is a 12-week FHWP designed to reduce weight status by teaching nutrition education, physical activity and behavior-change strategies. This study aims to determine the association between attendance and self-regulation of healthy behaviors on change in body mass and BMI percentile. 33 families with 35 qualifying children enrolled in the BHF program. Families attended 12-weekly group-based learning sessions that consisted of nutrition education, behavior modification, and family lifestyle physical activities. Each week participants were weighed, attendance was recorded and they self-reported their self-regulation of healthy eating, physical activity and goal retention. Responses were on a 4-point scale [0= none to 4= most days (5-7)]. Weight and height were assessed at baseline and 12-

weeks for outcome changes. Percentage above the 95th percentile BMI (%BMIp95) was calculated using CDC algorithms. After 12-weeks, qualifying children lost -0.14 ± 5.4 lbs. and decreased %BMIp95 -3.58 ± 4.37%. There was a significant negative association between attendance and weight change ($r = -0.35$, $p < 0.05$). Children who practiced self-regulation of healthy behaviors showed a greater change in %BMIp95 ($r = -0.47$, $p < 0.05$). A combined metric of self-regulation X attendance showed a greater association with change in %BMIp95 ($r = -0.51$, $p < 0.05$). Attendance and engagement of children attending a FHWP influences the positive changes in weight status among children with obesity.

Poster G15 - Bridgett Jensen
Mentor: Kazuma Akehi
Co-Author: Elena Dille
Title: *The Effects of Sleep on the Physical and Mental Well-being of Collegiate Football Athletes*

Context: Sleep plays a vital role in the health, recovery, and performance of collegiate athletes. Adequate sleep has been shown to improve athletic performance and support physical recovery, while insufficient sleep may worsen the effects of intense training loads and negatively impact overall well-being. Previous studies showed that athletes sleeping less than seven to eight hours a night have higher levels of stress and a greater risk of injury. Additionally, higher sleep quality has been reported to improve mood and reduce mental stress and the likelihood of injury in a variety of athletes. However, few studies have examined the separate effects of sleep on overall well-being and injury occurrence among collegiate football athletes. This study aimed to examine whether there was a relationship between sleep, soreness, stress, mood, injury occurrence, and player positions among collegiate football players during the competitive season. **Methods:** Secondary data were collected from the Midwest region of a Division II intercollegiate athletics department. Data were collected during the competitive season, from August to November, by the sports performance and athletic training staff. Data included both qualitative measures (i.e., sleep quality, muscle soreness levels, stress levels, perceived mood, player position, and injury type) and quantitative measures (hours of sleep and injury date). These data were analyzed to identify potential relationships between sleep duration, sleep quality, soreness, stress, mood, player position, and injury occurrence. **Results:** Sleep quality was significantly associated with rate of energy ($P<0.001$), muscle soreness ($P<0.001$), overall stress ($P<0.001$), and mood ($P<0.001$). There were significant interactions between player position (TE) and rate of energy ($P=0.003$) and soreness ($P<0.01$). There were significant interactions between position (TE) and injury occurrence with overall stress ($P=0.02$) and mood ($P<0.001$). **Clinical Application:** Sleep quality and quantity were positively associated with mental well-being. Tight ends had the most significant

interactions with injury occurrence, rate of energy, soreness, overall stress, and mood. Sleep quality or quantity did not significantly affect the occurrence of injuries in specific positions. To maintain high athletic performance and overall well-being, it is important for athletes to have high quality and quantity of sleep during the competitive athletic season.

Poster G16 - Izzy Edwards
Mentor: Kazuma Akehi
Title: *Impact of Knee Arthroscopy on Lower Limb Force Production in the Early Phase of Rehabilitation*

Context: Anterior cruciate ligament injuries (ACL) are one of the most common musculoskeletal injuries in sports. Recovery after ACL reconstruction typically takes 6-12 months, during which severe muscle atrophy may occur and take time to rebuild. Preoperative muscle strength and activity levels are major determinants of how muscle will rebuild during postoperative rehabilitation. Ground reaction force (GRF), rate of force development (RFD), and net impulse are measured to assess strength and the recovery stage. This is important for athletes who have sustained injuries because it helps determine performance outcomes, identify movement strategies, monitor fatigue, and plan training and rehabilitation. Purpose: The purpose of this study is to examine how lower-limb explosive force output is affected by a history of knee arthroscopy within the last 12 months post-operation. The hypothesis is that lower-extremity explosive force on the affected side will not equal that on the unaffected side until 9-10 months postoperatively, particularly with respect to RFD and net impulse, which will improve more slowly than maximal torque production. Study design: A factorial design. Subjects: Collegiateaged competitive athletes who have undergone knee arthroscopy within the last 12 months will be recruited. Procedure: A 3D motion capture system will be used to collect vertical jump, single-leg jump, drop jump, 5 single-leg hops, and lateral hop data to examine joint kinematics. Force plates will be used to track GRF during lower-extremity exercises. These measures will be assessed every 4 weeks to monitor progress in strength and changes in GRF, RFD, and net impulse. Statistical analysis: A repeated-measures ANOVA will be conducted to address the research question. Clinical application: This study will help clinicians better understand athletes' rapid muscle strength characteristics (i.e., RFD and net impulse) to inform rehabilitation and return-to-play plans, rather than relying solely on traditional measures of maximal muscle strength.

Poster G17 - Keila Gillispie
Mentor: Kazuma Akehi
Co-Author: Elena Dille
Title: *Monitoring Sleep, Strength Load, and Match Exposure to Predict Soreness and Injury in NCAA DII Collegiate Women's Soccer*

Context: Sleep, training load, and recovery strategies are essential contributors to athlete health, performance, and injury prevention in collegiate sport. Adequate sleep duration and quality support physiological recovery and physical readiness, whereas insufficient sleep can magnify fatigue associated with high training and match demands and negatively affect subjective wellbeing. Reduced sleep duration has been identified as an independent predictor of in-season injury in collegiate athletes. Subjective wellness measures, particularly muscle soreness, have also been associated with an increased risk of time-loss injury. In addition, objective external load metrics collected via GPS, including total distance, high-speed running, and accelerations, provide valuable insight into physical demands and accumulated fatigue across a competitive season, as excessive or congested training and match exposure may disrupt the balance between physiological stress and recovery, potentially influencing sleep duration and quality and contributing to impaired recovery, increased soreness, and elevated injury risk. Despite the growing use of these monitoring tools, limited research has examined how physical load and recovery readiness independently and collectively relate to muscle soreness and injury occurrence in collegiate women's soccer. The purpose of this prospective, in-season cohort study is to examine the relationships between physical readiness (training and match demands quantified by GPS-derived external load metrics and playing time) and recovery readiness (sleep duration and sleep quality) with (a) next-day self-reported muscle soreness and (b) time-loss musculoskeletal injury risk in NCAA Division II women's soccer athletes. Methods: Data were collected from an NCAA Division II women's soccer team in the Midwest region during the competitive season, from August to November, with support from the team's sports performance staff. Collected data include qualitative measures (sleep quality and self-reported muscle soreness) and quantitative measures (sleep duration, GPS-derived external load metrics, match playing time, and injury events, including type, date, and time-loss duration). These data were analyzed to identify potential relationships among external load, sleep duration and quality, muscle soreness, and injury occurrence. We hypothesized that low practice and training volume may contribute to increased soreness and injury risk due to insufficient physical preparation for matches, and that poor sleep quality may further exacerbate these outcomes. Clinical Application: Monitoring training volume, sleep, and soreness may help athletic trainers identify players at risk of injury due to insufficient preparation or

poor recovery. Targeted adjustments to training and recovery strategies may reduce soreness and prevent time-loss injuries during the season.

Poster G18 - Kilee Sauer
Mentor: Kazuma Akehi
Co-Author: Sarah Bailey
Title: *Phase-Specific Variation in Body and Performance Across Menstrual Phases: Current Clinical Concept*

Biological differences between men and women include cyclical fluctuations in ovarian hormones across 21- to 28-day menstrual cycle: menstruation, follicular, ovulation, and luteal. These fluctuations are hypothesized to influence fluid regulation and water retention, with estrogen generally promoting sodium and water retention. For female athletes, potential phase-related variation in hydration status is clinically relevant because hydration can affect cognition, mood, perceived fatigue, sleep quality, thermoregulation, and exercise capacity. Sleep patterns may also vary across the cycle, with reports of poorer sleep quality, increased fatigue, and elevated injury risk during the luteal phase. Beyond physiology, psychological factors such as menstrual-related pain, perceived bloating, and perceived changes in body composition, may alter performance even when objective measures are unchanged. Findings on performance across menstrual phases are mixed. Some studies report phase-related differences in peak power, maximal strength, squat jump, and sport-specific skills (e.g., basketball shooting and rebounding), often favoring the follicular phase. Others observe no meaningful changes in sprinting, jumping, agility, coordination, endurance performance, or muscle force production. Physiological markers such as heart rate, lactate responses, musculoskeletal stiffness, water turnover have shown phase-dependent patterns in some cohorts. However, many studies report no significant differences in hydration status, thermoregulation, knee laxity, or overall fluid retention across phases. Thus, current evidence does not support uniformed performance decrements or hydration changes by menstrual phase. Individual variability is substantial. Perceptual factors including poorer sleep quality and greater fatigue in the luteal phase, plus cycle-related pain and bloating may be a contributor to modulate performance. Increased awareness of normal, transient fluid retention and temporary weight fluctuations can also support individualized nutrition planning and promote psychological well-being during cycle-related changes. Female athletes and practitioners may use phase-informed hydration and recovery strategies, coupled with education on expected short-term fluid and weight variability, to optimize training readiness and reduce symptom burden throughout the menstrual cycle.

G19 - Ukyo Kokubo
Mentor: Kazuma Akehi
Title: *Effects of Caffeine and Functional Warm Up on Lower Muscle Activation and Performance: Systematic Review*

Objective: The purpose of this systematic review was to review research related to caffeine consumption and functional warmups (e.g., FIFA 11+) that might affect muscle activation levels and strength of the lower limbs in athletic populations. Specifically, the effects of caffeine and warm-up exercises have been evaluated using muscle activation, electromyography (EMG), and peak torque production in soccer athletes and other athletes who are physically fit. Data sources: This systematic review was conducted by PubMed to identify peer-reviewed articles. The keywords of this systematic review were “caffeine,” “warm-up,” “neuromuscular activation,” and “performance.” Study selection: To be eligible for the study, participants must have been assessed for whether caffeine intake and/or functional pre-participation warm-up programs were applied and whether muscle activation, strength, or endurance was measured as an outcome of the studies examined. Data extraction: Information collected from the studies included the following: 1) participant characteristics, 2) number of participants in the study, 3) amount and timing of caffeine consumed, 4) type and duration of warm-up utilized, and 5) outcome measures such as EMG and maximum weight. Data synthesis: Most studies recommend consuming 3 to 6 mg of caffeine per kilogram of body weight to enhance muscle activity and performance, allowing 30 to 60 minutes for caffeine absorption before the activity. Researchers have applied functional warmups such as FIFA 11+, which consists of 10 min running drills and 10 min of balance, plyometric, and strength exercise (1 to 3 sets), may increase performance. Most studies have shown positive effects of caffeine and high-intensity conditioning activity on vertical jump, 20-m sprint time, peak power, and voluntary activation; however, results have not been completely consistent across studies. Conclusion: Acute caffeine ingestion may enhance neuromuscular performance and may further augment it when combined with a functional warm-up protocol. However, there are side effects that the athletes need to be aware of by consuming high doses of caffeine.

G20 - Megan Bradford
Mentor: Nick Lamoureux
Co-Author: Elena Dille
Title: *Pickleball Participation and Functional Health Outcomes in Adults Aged 50 Years and Older*

Introduction: Maintaining skeletal muscle health is fundamental to supporting healthy aging and preserving long-term quality of life. Pickleball, a rapidly growing sport among

middle-aged and older adults, involves weight-bearing activity, multidirectional movement, and dynamic balance demands that may help mitigate age-related declines. Despite its increasing popularity, little research has explored the musculoskeletal effects of regular pickleball participation.
Methods: This cross-sectional comparative study compared long-term (≥6 months) pickleball participation (PB) (63.4 +/-8.66 years) to non-participants (NPB) (62.43 ± 7.6 years) in indications of musculoskeletal health and motor function. Musculoskeletal health was assessed using dual-energy X-ray absorptiometry (DXA), and motor function was assessed using common clinically appropriate tests of balance, mobility, and strength. Independent t-tests were used to examine between-group differences.

Results: PB had greater lean mass (mean difference = 5.56lbs, *d*=0.27, *p*=0.322), higher bone mineral content (mean difference = 0.21lbs, *d*=0.17, *p*=0.518), and lower body fat percentage (mean difference = 0.95%, *d*=0.13, *p*=0.611) compared to NPB. They also exhibited superior functional performance, including faster TUG times (mean difference = -0.24s, *d*=, *p*=0.487), greater gait speed (mean difference=0.03m/s, *d*=-0.18, *p*=0.574), longer single-leg stance duration (mean difference = 3.01s, *d*=0.37, *p*=0.181), and stronger handgrip strength (mean difference = 0.78kgf, *d*=0.09, *p*=0.735). Falls incidence did not differ significantly between groups.

Conclusions: Individuals with prolonged participation in pickleball had greater musculoskeletal health and motor function, despite being older than non-participants, though differences were small to moderate and non-significant for most health outcomes. These findings suggest that pickleball participation may be associated with healthy aging and preserving functional independence. However, more research is needed to evaluate longitudinal associations and determine the potential for reverse causality.

Poster G21 - Narindra Ranaivo
Mentor: Rachel Silverman
Title: *More Than a Game: The financial and social impact of Husker Football on Lincoln and Nebraska*

The purpose of this research study is to measure the comprehensive direct expenditures and the social impact of Husker Football home games on the city of Lincoln and the state of Nebraska. The study measures variables such as visitor spending, community pride, social identity, and social cohesion. This is a non-experimental quantitative research study using an existing validated survey. Direct expenditure questions were provided by Dr. Anthony Dixon, from Troy University, based on his previous research while social impact measures were adapted from

frameworks by Praet et al. (2024) and Taks et al. (2020). Data collection began during the final home game of the most recent season, serving as a pilot study.

Preliminary results from 22 respondents indicate significant economic contributions. Notably, 46% of non-resident participants stayed overnight in Lincoln, directly impacting the local hospitality sector. Initial data on the social impact shows strong positive trends in social identity and community pride, with the majority of attendees traveling in groups of family or friends. The final report will assist local policymakers in justifying investments in Husker athletics, provide business owners with data to optimize staffing and marketing on game days, contribute to literature on sports mega-events at the regional level, and serve as a model for sports management students to understand real-world event impacts. Since data collection began late in the football season, we will continue this research next Fall to reach a larger sample size. This presentation will demonstrate initial findings from the pilot study, and data collection will resume at the start of the next football season.