Schedule of Events

April 17, 2025

Nebraskan Student Union Ponderosa Rooms

Thursday, April 17, 2025

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

9:00 am - 10:30 am ..... Session 1: Natural & Physical Sciences Poster Presentation & Judging (Ponderosa A&B)

10:30 - 11:00 am……. Poster Removal (Session 1) and set up (Sessions 2a & 2b)

11:00 am – 1:00 pm ..... Session 2a: Behavioral & Social Sciences Poster Presentation & Judging (Ponderosa A&B)
Session 2b: Fine Arts & Humanities Poster Presentation & Judging (Ponderosa A&B)

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

1:30 pm – 3:30 pm ..... Session 3: Professional & Applied Studies Poster Presentation & Judging (Ponderosa A&B)

3:30 pm……Poster Removal (Session 3)

10:00 am – 2:45 pm ..... Oral Presentations

4:30 pm……Closing Ceremony & Presentation of Awards

10:00 – 2:45 pm Oral Presentations

Session 5 (Ponderosa C)

10:00-10:15	Dylan McCoy (Hist)
10:15-10:30	Emily Mayes (G-Hist)
10:30-10:45	Grace Ottman (TE)
10:45-11:00	Payten Gibson (TE)
11:00–11:15	Cody McGregor (G-Bio)

Session 6 (Ponderosa D)

10:00-10:15	Abby Trantham (Eng)
10:15-10:30	Kaitlynn Ashlock (Eng)
10:30-10:45	Faolan Stump (Eng)
10:45-11:00	Sarah Farritor (G – Eng)
11:00–11:15	Amelia Rogers (G-Eng)

Session 7 (Ponderosa C)

11:45-12:00	Peggy Huss (Bio)
12:00-12:15	Naara Ramirez (Bio)
12:15-12:30	Marissa Hoover (Bio)
12:30-12:45	Carter Moss (Bio)
12:45-1:00	Caleb Rother (Bio)

Session 8 (Ponderosa D)

11:45-12:00	Olivia Beauchamp (Pol Sci)
12:00-12:15	Connie Gassaway (Pol Sci)
12:15-12:30	Clarice Wendt (Pol Sci)
12:30-12:45	Lizbeth Trejo (Pol Sci)
12:45-1:00	Bennett Magnuson (Pol Sci)

Session 9 (Ponderosa C)

1:30-1:45	Kim Larbey (Phy)
1:45-2:00	Joe Kubat (Phy)
2:00-2:15	Mohmmed Nour (Phy)
2:15-2:30	Oliver Combs (Bus)

Session 10 (Ponderosa D)

1:30-1:45	Jaden Longfellow (Pol Sci)
1:45-2:00	Arielle Lawrence (Pol Sci)
2:00-2:15	Juliana Merrihew (PolSci)
2:15-2:30	Tiffany Stoiber (G-Comm)

Oral Presentations

Room: Ponderosa C

Session 5

10:00 am---**Dylan McCoy:** *Religious Violence in a Peaceful Religion: A Preliminary Survey of a Problem Needing Additional Research*
(Mentor – James Rohrer)

10:15 am---**Emily Mays:** *The Formation of Race in the Sixteenth Century*
(Mentor – James Rohrer)

10:30 am---**Grace Ottman:** *Accessibility of Early Childhood Stem Curriculum*
(Mentor – Dena Harshbarger)

10:45 am--- **Payten Gibson:** *What can be done to better prepare preservice educators for behavior management in their future classrooms?*
(Mentor – Dena Harshbarger)

11:00 am---**Cody McGregor:** *Avian Communities in Varying Stages of Restored Riparian Habitat Along the Platte River*
(Mentor – Jayne Jonas-Bratten)

Room: Ponderosa D

Session 6

10:00 am--- **Abby Trantham:** *Amor Fati*
(Mentor – Theodora Ziolkowski)

10:15 am--- **Kaitlynn Ashlock:** *The Impact of Your Ego on Reading*
(Mentor – Seth Long)

10:30 am---**Faolan Stump:** *Akiun: Conlang and Construction*
(Mentor – Megan Hartman)

10:45 am---**Sarah Farritor:** *Mighty Oaks from Little Acorns Grow*
(Mentor – Janet Graham)
11:00 am---**Amelia Rodgers:** *Evangelical Activism, Domestic Ideology*
(Mentor – Susan Honeyman)

Room: Ponderosa C

Session 7

11:45 am---- **Peggy Huss:** *Comparative phylogeography of birds from the Albertine Rift*
(Mentor – Jacob C. Cooper)

12:00 pm -----**Naara Ramirez:** *The potential impacts of an FDA-approved antidepressant Trazodone on dyslipidemia*
(Mentor – Yipeng Sui)

12:15 pm -----**Marissa Hoover:** *The potential impacts of an FDA-approved antidepressant Trazodone on dyslipidemia*
(Mentor – Joseph Dolence)

12:30 pm -----**Carter Moss:** *Investigating the Potential Survival Advantage of Staphylococcus aureus Persister Cells Within a Macrophage Environment*
(Mentor – Austin Nuxoll)

12:45 pm---- **Caleb Rother:** *Determining the Effects of the Type Seven Secretion System in Staphylococcal Innate Immune Interactions*
(Mentor – Austin Nuxoll)

Room: Ponderosa D

Session 8

11:45 am ----**Olivia Beauchamp:** *Denial of the Holocaust*
(Mentor Chuck Rowling)
12:00 pm -----**Connie Gassaway:** *The Impacts of Lobbying on US and Foreign Policy Making*
(Mentor Chuck Rowling)

12:15 pm -----**Clarice Wendt:** *Colonialism's impact on the Congolese-Rwandan conflict and Military Culture in Central Africa*
(Mentor Chuck Rowling)

12:30 pm -----**Lizbeth Trejo:** *Violations of International Law in the Israel-Palestine Conflict: A Historical and Legal Analysis*
(Mentor Chuck Rowling)

12:45 pm----**Bennett Magnuson:** *Another Brick in the Wall?: Refugee Policies*
(Mentor Chuck Rowling)

Room: Ponderosa C

Session 9

1:30 pm--- **Kim Larbey:** *Radiation: The Cosmic Catalyst for Star Birth*
(Mentor – Brandon Marshall)

1:45 pm--- **Joe Kubat:** *Searching for Oe Stars*
(Mentor – Brandon Marshall)

2:00 pm---**Mohammed Nour:** *Investigating Infrared Bubbles in the Galactic Plane*
(Mentor – Brandon Marshall)

2:15 pm---**Oliver Combs:** *Creative Personal Identity as a Resource in the Job Demands-Resources Model: A Catalyst For Employee Engagement and Job Performance*
(Mentor – Brooke Envick)

Room: Ponderosa D

Session 10

1:30 pm--- **Jaden Longfellow:** *Early Warning Signs of Democratic Backsliding*
(Mentor – William Aviles)

1:45 pm--- **Arielle Lawrence:** *Nebraska: The Good Life*
(Mentor – William Aviles)

2:00 pm---**Juliana Merrihew:** *Environmental Constitutionalism and its Applications in Latin America*
(Mentor – Peter Longo)

2:15 pm -------**Genesis Acosta-Garcia:** *The Impact of Executive Orders on U.S. Immigration Policy*
(Mentor – Satoshi Machida)

2:30pm --------**Tiffany Stoiber:** *Ethical considerations of disproportionately fact-checking candidates: An analysis of press coverage about the 2024 Harris-Trump presidential debate*
(Mentor – Tiffani Luethke)

Undergraduate Oral Presentation Abstracts

Fine Arts & Humanities

English

Abby Trantham
Mentor: Theodora Ziolkowski
Title*: Amor Fati*

Amor Fati is a fantasy novella that explores fate, life purpose, how the past can feed into the present, and the meanings of good and evil. The novella begins with Farren, the prophesized Chosen One with the only ability to stop the end of the world, dying out of ignorance just as the final battle begins. He arrives in the celestial plane of Fate, who must convince him to return to the mortal realm to win the final battle and save humanity. This Undergraduate Research Fellows project was focused on the revision of the novella's first draft and resulted in the completion of a full second draft. The early stages of draft three are currently in the works, along with preparations for Student Research Day. I feel that my work is in conversation with other fantasy pieces that utilize “the Chosen One” trope, such as pieces by Brandon Sanderson, or Rick Riordan. While these works lean heavily into the traditional portrayals of “Chosen Ones”, Amor Fati subverts what a “Chosen One” can look like. I also see my novella in conversation with works such as The Book Thief that personify conceptual elements, such as death, because Amor Fati personifies Fate. My goal with this work is for it to be my debut long-form piece of fiction, and to get it published traditionally. For Student Research Day, I plan on utilizing an oral presentation time slot. For the first half, I will introduce my audience to novellas as a form—both from a reading and writing

perspective—then I will outline the revision strategies I used to edit this piece. Finally, with the remaining time, I will read a scene from the opening of my novella.

Kaitlynn Ashlock
Mentor: Seth Long
Title*: The Impact of Your Ego on Reading*

This study views C.S. Lewis's Experiment in Criticism from a modern-day lens. In his novel, Lewis writes about the ethics of reading while comparing different types of readers; "the few" to "the many". To appreciate literature, Lewis believes readers must completely set aside their truths, memories, and experiences, and surrender themselves entirely. With illiteracy rates at an all-time high, now more than ever, there is a huge importance in studying how humans read. Lewis argues that lower forms of reading, or novels that rely on readers' egos, are detrimental to one's literacy. This is comparable to modern-day bestsellers that fly off shelves, like romance novels or high-life success stories. These books enable readers to sit down for the mere purpose of reading a book and surrender the minimum amount of imagination necessary to receive what they desire, like fast-paced events and cliches. Novels like these invite readers to receive surface-level satisfaction. Lewis's Experiment in Criticism claims that reading to indulge in one's ego is anything but beneficial. In Lewis's words, it "turns [readers] away from most of what is worth having both in books and life" (Lewis 55). But does this idea still apply in an age of illiteracy? In my research, I've discovered that perhaps this lower form of reading is what we must encourage the youth to engage in. Maybe, tapping into this lower form of reading, or what Lewis calls "egoistic castle-building", is a necessary first step toward improving literacy rates in young readers.

Faolan Stump
Mentor: Megan Hartman
Title*: Akiun: Conlang and Construction*

A conlang, or constructed language, is a new language formed for a literary purpose. It can serve to add immersion to fiction or experiment with various real-world linguistic features in new ways. These languages can add a layer of mystery to fantasy settings, and they are a creative way to do so in fictional literature. My conlang, Akiun, has been in development for three years and was created with the intent on adding it into my own novel. Over these years, I have studied linguistic features of English, Japanese, Czech, and other existing conlangs. The largest areas of importance within my conlang

consist of its alphabet, its grammatical setup, and its reflection upon the culture within my novel. The alphabet is what is known as a syllabary, meaning each syllable is represented by a character. Akiun is an inflected language, and just as for languages such as Latin, this means that the function of a word within a sentence changes through its ending. English does not utilize cases and so this aspect of Akiun took much studying from me to ensure that I could build it effectively. As I build the words themselves, they represent the aspects of culture that their people value most. This is a common trait that carries across most languages. In this presentation, I will discuss the construction of this language to highlight its features and the steps taken to build them. My focus will be on the aspects of the language itself, with references to their inspiration and thought process.

History

Dylan McCoy
Mentor: James Rohrer
Title: *Religious Violence in a Peaceful Religion: A Preliminary Survey of a Problem Needing Additional Research*

This undergraduate research project started as an initial exploration of the complex and at times contradictory relationship between Buddhist ideology and violent behavior. This paper, accompanied by a full-size tattoo art print to be created in tandem with this academic research, seeks to refute the common misconception of Buddhism as a peaceful, non-violent religion. In cross-examination of historical texts, this study examines instances of violence perpetrated by those who proclaim to be Buddhist, from state warfare to sectarian violence. The research examines the conflict between the core teachings of Buddhist philosophy, such as non-harming (ahimsa) and compassion (karuna), and the documented examples of violence, such as with warrior monks. It looks at some of the contextual drivers that contribute to this dissonance, including political agendas, cultural attitudes, and the influence of nationalistic ideologies. The report also makes comparisons with other examples of religious violence in other faiths, specifically Christianity, to observe the shared challenges and nuances of aligning religious teaching with violence. The art print, a full-fledged tattoo design, is the visual representation of the report's findings. Drawn on symbolically charged images from Buddhist ideals, the image is intended to prompt consideration of the problems of duality, impermanence, and of human potentiality for both kindness and violence. The initial survey recognizes the glaring gaps in past literature and calls for further scholarly research into the multifaceted nature of religion

and violence. By providing both a visual reading and a written critique, this project hopes to engage a wider readership and create a more thoughtful analysis of the problems of conflict and peace within religious beliefs that have existed for so long.

Behavioral & Social Sciences

Political Science

Olivia Beauchamp
Mentor: Chuck Rowling
Title: *Denial of the Holocaust*

My Undergraduate Research Fellowship revolved around deniers of the Holocaust, including the psychology behind people who deny the Holocaust and the evidence that these people claim to have. Through using books, articles, studies, and more, I hope to figure out why people choose to deny the Holocaust, and how these people can quantify this denial. This subject is important to understand the psychology of people who deny such widely proven events, as well as bring more attention to the fact that the Holocaust did happen, which can help prevent it from happening again. So far, I have found many people denying evidence, but their claims are not backed. Additionally, people claim that the Holocaust was not as bad as it sounds. Minimizing this tragedy is dangerous for many reasons, so my research has the intent of preventing people who have already gone through so much torture from going through more. Whether I am able to further prove these deniers wrong or fully understand how and why these people can claim that such tragedies never happened, this research will be helpful in many ways, and even across many subjects. All in all, my hope is that this research will deconstruct the minds of deniers, as well as prevent further catastrophe.

Juliana Merrihew
Mentor: Peter Longo
Co-Author: Paxton Robertson

Title: *Environmental Constitutionalism and its Applications in Latin America*

Environmental constitutionalism is essential to understanding the relationship between Latin American states and extractivist policies in the region. Through this lens, a variety of different constitutional frameworks for incorporating environmental rights can be observed. I apply Sam Bookman's three frameworks for environmental constitutionalism: liberal-conservative, technocratic, and transformative. The liberal-conservative strand draws from traditional Western values, framing environmental rights as an extension of existing human rights such as the right to health. This includes using existing structures like constitutions to enforce these rights. Through the technocratic strand, on the other hand, the constitution delegates these environmental rights to specialized governmental agencies. Finally, the transformative strand calls for revolutionary change in political, social, and economic institutions. It signifies a shift from Western values of capitalism and individualism to one focused on Indigenous rights and the rights of the environment. Using these theories as a base, I examine the reality of environmental constitutionalism in Latin America. Do constitutional protections effectively translate into greater environmental protections? To answer this question, I conduct a comparative analysis of Ecuador and Chile, to analyze their constitutions as applied in specific environmental cases. Some authors claim that the region has seen remarkable success through the application of transformative and technocratic frameworks, while others suggest that this constitutional change has created de jure rights that are not always carried out or protected successfully. I find that ensuring environmental protections is not a single-step process but rather a continuous cycle through which social movements prompt constitutional change and the effective implementation of systems such as prior consultation is needed to further strengthen these rights.

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.

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

Lobbying, a pervasive movement in the political realm, it exerts considerable influence on the formulation and implementation of policies both within the United States and on the global areas. In this abstract, it will dive into the research paper's key points, giving a brief understanding of the topic. On a big stale some of the most successful and biggest lobbyists on capitol hill have their interests overseas in the human rights side of the issue. Foreign policy of human rights overseas can have a large impact on foreign aid, sanctions, and trade throughout the country who are in collaboration. This is in hopes that many countries in need will tilt towards the United States in times of trouble providing information back to lobbyist records. Lobbyists motivate idealism and economic growth for the country or company they are representing. This paper will ultimately dive into cases throughout history and recently to paint a clear vision of how lobbying has a direct impact on policies regarding human rights. This paper will show examples of the campaigns used for these challenges, as well as the networking that goes into this field. Finally, this paper will show the strategies to success and old cases that can prove so.

Clarice Wendt
Mentor: Chuck Rowling

Title: *Colonialism's impact on the Congolese-Rwandan conflict and Military Culture in Central Africa*

The current conflict among militia groups in the Eastern Democratic Republic of the Congo (DRC) has only increased in the past few years, and has continued ever since the limited peace garnered at the end of the Second Congo war in 2003. This research looks at the effects Belgian colonialism had on the limited state capacity of the DRC, focusing largely on the kleptocratic culture created by King Leopold II when he founded the Congo Free State in 1885, as well as on Belgian and American meddling in the DRC during and after its independence in 1960. I argue that due largely to the actions of colonial powers, the state in the DRC has been unable to effectively deal with the conflict in the Eastern Conflict, which itself has often been stirred by ethnic tensions often originating in Belgian colonial policy. Due to Belgian policy in colonial Rwanda, where the Belgian government sharpened divisions between Hutus and Tutsis for decades, general xenophobia towards Tutsis especially, but also towards other minority ethnic groups like the Banyamulenge, developed throughout the region. This xenophobia is currently used by the M23 as a reason for their presence in the Eastern Congo, as the M23 are mainly made up of Tutsis and Banyamulenge, who claim their military activity is necessary for self defense. This is why I argue the conflict in Eastern Congo is a direct result of Belgian Colonial policy, as this colonial policy both weakened the Congolese state's ability to govern, while also heightening ethnic tensions to maintain their former rule.

Lizbeth Trejo
Mentor: Chuck Rowling
Title: *Violations of International Law in the Israel-Palestine Conflict: A Historical and Legal Analysis*

Throughout the Israel-Palestine conflict, it has been shaped by continuous violations of international law, including the laws of war, human rights, and legal principles in military occupation. This research, based on Rashid Khalidi's The Iron Cage and The Hundred Years' War on Palestine, examines important historical events that illustrate violations of various international and humanitarian legal frameworks. Since the 1917 Balfour Declaration and the British Mandate, the colonial policies established laid the groundwork for systemic dispossession and failure to uphold Palestinian self-determination. As a result, the 1948 Nakba displaced over 750,000 Palestinians and the destruction of villages that could be classified as violations of the laws of war and potential crimes against humanity. This research further analyzes the consequences of the 1967 Six-Day War during which Israel occupied the West Bank, Gaza Strip, East Jerusalem, and the Golan Heights. The extended occupation and settlement

expansion defies the Fourth Geneva Convention's prohibitions on collective punishment, i.e., the blockade of Gaza, and the transfer of an occupying power's civilian population into the occupied territories. The Israeli settlements created on the occupied territories are illegal under multiple UN resolutions and the Rome Statute of the International Criminal Court, further illustrating violations of international law. Additionally, this research considers the geopolitical influences that have prevented international institutions from enforcing international legal norms. The failure of international bodies to hold violators accountable has contributed to undermining the legitimacy of global legal frameworks and repeated violations to go unchecked. By situating the conflict within the broader context of colonialism, occupation, and resistance, this research underscores the importance of having a legal framework that ensures justice, accountability, and the protection of Palestinian rights under international law.

Bennett Magnuson
Mentor: Chuck Rowling
Title: *Another Brick in the Wall?: Refugee Policies*

In recent years, there have been many conflicts around the globe. These conflicts have led to a surge of refugees with the United States as one of the top countries who accept refugees. So, in turn, how does the U.S. refugee system compare to other countries? Right now, in the U.S., there is a lot of debate around the immigration policies in place. The U.S., despite its historical role as a haven for refugees, struggles with inefficiencies associated with bureaucracy and a never-ending debate over immigration. This study examines differences in acceptance rates, integration policies, and political discourse surrounding refugees. To be able to make decisions on what is best for the country when it comes to immigration, it is important to be educated on refugee policies. This project includes surveys and related data, as well as policies from NGOs and different countries. I also cover how the United States and Germany differ when it comes to refugee policies. By comparing these two systems, this paper identifies strengths and weaknesses in both approaches, and highlights how historical, legal, and political factors shape refugee policies. Understanding these differences provides insight into global refugee management and the balance between humanitarian obligations and national interests.

Genesis Acosta-Garcia
Mentor: Satoshi Machida
Title: *The Impact of Executive Orders on U.S. Immigration Policy*

Executive orders have played a significant role in shaping U.S. immigration policy, often serving as tools for presidents to bypass congressional gridlock. This paper examines key executive actions, such as the Deferred Action for Childhood Arrivals (DACA) and Title 42, analyzing their legal foundation, implementation, and socio-political consequences. DACA, established under President Obama, provided temporary relief from deportation for undocumented individuals brought to the U.S. as children, sparking legal and political challenges. Meanwhile, Title 42, invoked during the COVID-19 pandemic, enabled the rapid expulsion of asylum seekers under public health justifications, raising ethical concerns. This research assesses the effectiveness of these executive orders, their impact on immigrant communities, and the extent to which they align with broader constitutional and humanitarian principles. By comparing these policies, the study highlights the broader implications of executive authority in immigration governance, exploring whether such actions provide necessary flexibility or contribute to instability in the immigration system. Executive orders have played a significant role in shaping U.S. immigration policy, often serving as tools for presidents to bypass congressional gridlock. This paper examines key executive actions, such as the Deferred Action for Childhood Arrivals (DACA) and Title 42, analyzing their legal foundation, implementation, and socio-political consequences. DACA, established under President Obama, provided temporary relief from deportation for undocumented individuals brought to the U.S. as children, sparking legal and political challenges. Meanwhile, Title 42, invoked during the COVID-19 pandemic, enabled the rapid expulsion of asylum seekers under public health justifications, raising ethical concerns. This research assesses the effectiveness of these executive orders, their impact on immigrant communities, and the extent to which they align with broader constitutional and humanitarian principles. By comparing these policies, the study highlights the broader implications of executive authority in immigration governance, exploring whether such actions provide necessary flexibility or contribute to instability in the immigration system.

Jaden Longfellow
Mentor: William Aviles
Title: *Early Warning Signs of Democratic Backsliding*

Research into the process of autocratic regression in democracies has seen a rapid and resurgent interest due to a recent rise in autocratic politics worldwide. This has led to increased academic interest in the study of democratic backsliding and their connections to other current topics of interest within the political science field, like political polarization and populism, but the literature has recently been forced to reckon with newly recognized limitations of research design hindering efforts thus far. I seek to use this opportunity to advocate for a topic that has not received significant attention by

laying a foundation for an investigation into the early warning signals of democratic backsliding by identifying the most likely candidates given the current literature, both on democratic backsliding itself and on subjects that have perhaps untapped potential as candidates. I make the case for why existing literature supports a focus on the following candidates--the rise of a populist movement, political polarization, economic inequality and media centralization—as the most promising potential early warning signals for democratic backsliding. My paper highlights the theoretical connections between these candidates and backsliding, to assist researchers in overcoming hurdles identified by recent meta criticisms by advancing novel ways of operationalizing these variables.

Natural & Physical Sciences

Biology

Peggy Huss
Mentor: Jacob C. Cooper
Co-Authors: Joe D. Manthey and Ben D. Marks
Title: *Comparative phylogeography of birds from the Albertine Rift*

The Albertine Rift is a mountainous region in East Africa that extends from Lake Albert in the north to the southern end of Lake Tanganyika. It includes several spatially discrete montane regions with diverse montane bird communities. Valleys and lakes separate the region into highlands east and west of the rift, within which there are several isolated massifs including the Rwenzoris and Misotshi-Kabogo (i.e., the Kabobo Massif). Glacial and interglacial cycles play a key role in creating repeated isolation events on the mountains of the rift. This raises questions about allopatric diversification patterns and whether there are shared biogeographic patterns among different taxa. To this end, we analyzed the phylogeography of *Batis diops, Phylloscopus laetus, Chamaetylas poliophrys,* and *Dessonornis archeri* throughout the Albertine Rift. Whole genomes were extracted from each specimen, and resulting genomes were filtered to identify biallelic single nucleotide polymorphisms (SNPs). Multiple methods confirmed similar patterns of geographic isolation among taxa in the

region. Our results show a distinct separation of Misotshi-Kabogo to other locations in the Albertine Rift, highlighting the importance of this massif for regional diversification. Further research is necessary to understand the historical isolation and uniqueness of Misotshi-Kabogo from other localities.

Caleb Rother
Mentor: Austin Nuxoll
Co-Authors: Mariam Garcia Escobar, Kyle Dittmer
Title: *Determining the Effects of the Type Seven Secretion System in Staphylococcal Innate Immune Interactions*

Staphylococcus aureus is an opportunistic pathogen that leads to upwards of twenty thousand deaths and five billion dollars in healthcare-related costs in the United States annually. While many virulence factors within *S. aureus* are well characterized, the type VII secretion system (T7SS), a protein secretion system found within many bacterial species, remains poorly understood. Studies within *Streptococcus intermedius* indicate the T7SS is responsible for secreting proteins that allow the pathogen to evade immune responses. To investigate whether the T7SS in *S. aureus* was important in survival to innate immunity, a *Drosophila melanogaster* sepsis model was utilized. A knockout in the *essC* gene encoding the T7SS ATPase was studied for differences in *D. melanogaster* survival. *D. melanogaster* infected with the *essC* knockout exhibited significantly increased survival compared to flies infected with wild-type *S. aureus*. Survival within a macrophage cell line was explored further to elucidate the mechanism behind the differential survival. RAW264.7 macrophages were infected with an *essC* knockout and wild-type *S. aureus* at a multiplicity of infection of 25. 24 hours post-infection, macrophages infected with the *essC* knockout exhibited a 1-log reduction in bacterial burden compared to macrophages infected with wild-type. To explore the differential macrophage survival, a reactive oxygen species (ROS) assay was performed, as ROS is a primary method of killing within macrophages. No significant difference in survival was found. The T7SS of *S. aureus* remains a poorly understood virulence factor that may play a pivotal role in bacterial survival to components of the innate immune system.

Naara Ramirez
Mentor: Yipeng Sui
Title: *The potential impacts of an FDA-approved antidepressant Trazodone on 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), 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 PXR pathway. In this study we use 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 could activate PXR more intensely in human liver cells compared with human intestinal cells. Our data indicated that Trazodone was a selective PXR agonist and promoted the dissociation between PXR and its nuclear corepressors. Furthermore, we identified potential key amino acid residues within the PXR ligand binding pocket that interacts with Trazodone using computational docking study and site-mutagenesis assay. Next, we plan to use fluorescence labeled cholesterol to investigate if Trazodone alters cholesterol uptake within human intestinal cells. This study provides potential evidence on future cardiovascular disease risk assessment for Trazodone as well as other antidepressant drugs.

Marissa Hoover
Mentor: Joseph Dolence
Co-Authors: Joseph Roeder, Zane Carlson
Title: *Elucidating the impact of vaping on peanut allergy*

The health effects of vaping remain unclear, especially how it impacts immune responses that originate in the lung. In this study, we examined whether vaping can influence the ability of the immune system to mount allergic responses against PN. First, we showed that mice sensitized using PN solution containing vape juice displayed decreased PN-specific IgE responses and milder anaphylaxis. Next, we sensitized mice using electronic conditioned media (ECM) to expose mice to vapor. 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 containing 6 mg/mL nicotine ECM displayed severe reductions in PN-specific antibodies when compared to PN alone. The suppressive effect of ECM on PN-specific antibody responses decreased when ECM without nicotine was used during PN

sensitization. This suggests that nicotine within ECM drives inhibition of PN-specific antibody responses. We are currently developing an assay to measure IL-4 secretion to elucidate how ECM suppresses PN-specific immune responses. This knowledge is important because our data suggests that vaping may inhibit immune responses against common respiratory infections.

Carter Moss
Mentor: Austin Nuxoll
Co-Authors: Kim Carlson, Alexis Hobbs, Kenan Brodd, Emma Weis
Title: *Investigating the Potential Survival Advantage of Staphylococcus aureus Persister Cells Within a Macrophage Environment*

Staphylococcus aureus is a component of human microflora that typically exists benignly within the skin and nasal cavities of 30% of the population. However, under the right conditions, S. aureus acts as an effective opportunistic pathogen linked to inducing several diseases and nosocomial infections. Consequently, despite medicinal efforts, S. aureus has evolved various ways to circumvent both antibiotics and aspects of the innate immune system. Professional phagocytes, predominately macrophages and neutrophils, are critical innate immune cells that interact with S. aureus, acting as a line of defense against the bacteria to resolve infection via phagocytosis. Yet interestingly in recent studies, S. aureus persisters, which are a subpopulation of cells with lower metabolic activity, have been shown to exhibit a survival advantage against innate immune components, namely antimicrobial peptides. Given this, we reasoned persisters may also possess a survival advantage to other components of innate immunity such as macrophages. To investigate this, we utilized a wild type S. aureus strain, HG003, and a high persister strain, fumC::NΣ to determine whether persisters were better able to survive within macrophages post phagocytosis. Furthermore, we employed a persister marker, Pcap5A::dsRed to monitor whether S. aureus cells with the highest expression of the persister marker are more adept to survival within a macrophage. Understanding S. aureus's subversion and exploitation of these multifaceted innate immune system interactions may prove paramount for comprehending host-pathogen interactions.

Physics, Astronomy, and Engineering

Kim Larbey
Mentor: Brandon Marshall
Title: *Radiation: The Cosmic Catalyst for Star Birth*

I present a study of triggered star formation via radiation-driven implosions (RDIs) within the Milky Way, by looking at the Cas OB5 association of stars. This cluster, located at roughly 2.7 kilo-parsecs (kpc) away from Earth, is formed of 45 massive O and B -type stars, with an estimated ionization flux of 10^49.6. To start the search for RDI around the Cas OB5 association, I used CO data from the Canadian Galactic Plane Survey (CGPS) and infrared observations from the Wide-field Infrared Survey Explorer (WISE) telescope to locate possible candidates by studying their morphology. After locating possible candidates, I calculated their molecular hydrogen mass by integrating the CO data cubes and using the Xco factor, and then calculated their densities, and ionization parameters to determine if they agree with the simulations of RDI. I performed color-color cuts to determine the young stellar object (YSO) content in and around the CO/infrared clouds and I removed the contaminants. The distances of the CO clouds and the OB5 association relative to Earth are found to be similar, which is a good indication that any evidence of RDI would most likely be caused by the nearby OB5 association. Through this data, I have found evidence of RDIs occurring within some of my possible candidates. Looking at their cloud morphologies, they have the “U” and “V” shape front expected from cloud collapse due to differing strengths of radiation. The impact form the ionization gives many of the clouds a cometary shape, with a tail of the cloud being pushed in the opposite direction of the assumed source of radiation, that OB5 association, via the rocket effect. The final piece of my evidence is the study of the YSOs classes and their distribution within the clouds.

Joe Kubat
Mentor: Brandon Marshall
Title: *Searching for Oe Stars*

Context: With only 20 confirmed accounts, Oe stars are one of the rarest types of stars in our universe. However, this study believes there are probably more Oe stars out there that have not been classified as such. It is estimated that only 0.00003% of stars in the Milky Way are O-type. Furthermore, it is estimated that Oe stars make up 2-3% of O-type stars. This means that in the Milky Way there are likely 200 to 300 Oe stars, meaning 20 stars are just a small fraction of those we believe exist.

Aims: The aim of this study is to identify and classify more of these stars in order to compile a larger sample of Oe stars for further study, as the mechanism for this evolutionary stage is not well understood.

Methods: There are two primary methods that have been used to find these stars. The first method was to search HII regions identified from the GLIMPSE survey, which high mass O-stars are known to power. We used a Python SED-fitting package to identify high mass stars. Once we identified a star as an O-star, we cross-referenced with the NEOWISE catalog then look for trends in the stars brightness profile that indicate excess infrared emission. The second method is to check known emission stars, such as those from VES, to see if they displayed characteristics of O-star models using the same SED fitting tool. Next, we checked to see if they are O-type stars by comparing the stars to stellar models for O-type stars. With this strategy, we can identify Oe stars fairly quickly.

Analysis: We analyzed the accuracy of our SED-fitter by gathering data about how our model reacts to HII bubbles with different distances and radii. Also, we verified the accuracy of our program by using known Oe stars and seeing if the outputs of our program match with what we expected. Finally, we discuss different modifications to our code that could help increase efficiency and help to filter out stars that have bad, incomplete, or time dependent data. Altogether, this should make the identification of Oe-type stars easier and more accurate.

Results: Our preliminary results suggest that VES 2,3,and 51 are Oe stars. Furthermore, we have identified a potential source star for the HII bubble N36. These stars will be a focus of more future studies to verify their classification.

Mohmmed Nour
Mentor: Brandon Marshall
Title: *Investigating Infrared Bubbles in the Galactic Plane*

Context: Analysis was done on detected infrared bubbles from GLIMPSE to support high mass star formation theory: disks of material gravitationally bound to the star, continually accreting material despite the extreme radiation pressure that would otherwise hinder mass accretion. When the mass levels reach approximately 8 solar masses, the radiation pressure would reverse mass accretion. A disk would allow material to grow in mass, material that otherwise would've been pushed out. These bubbles are the natal clouds of these high-mass stars, and the fact that we still see them, even though they are old enough to have formed bubbles on the scale of parsecs in radius, the model times for dense accretion disks are comparable, and may still be detectable

Methods: We have employed a program that uses magnitudes from Spitzer and 2Mass to build SEDs of each star within the bubble simultaneously and compare against parameters of high-mass star models to determine if there are any candidate O stars. Once a potential O-star is identified, we analyzed the bubble's expansion. Assuming there is one source driving its expansion, a functional form of the bubble's radius was found using wind luminosity and mass loss rate of the candidate. We compare against the known radii of detected bubbles, so plotting the radius as a function of time provided us with an estimated age. We then compared that age with the disk destruction time of the chosen O-star, which determines whether or not it is a likely source of the bubble's expansion.

Results: A sizeable sample of candidates with their respective bubbles was generated. A candidate pool of 61 potential O-stars was yielded from a group of 10 bubbles.

Conclusions: This sample is primed for further observations through broader spectral analysis. We remove some sources due to the large amounts of extinction required to fit our models and those that have very low disk destruction timescales, leaving us with 60 candidate O stars that are suitable for further observation via spectral analysis.

Professional & Applied Studies

Marketing, Agribusiness & Supply Chain Management

Oliver Combs
Mentor: Brooke Envick
Title: *Creative Personal Identity as a Resource in the Job Demands-Resources Model: A Catalyst For Employee Engagement and Job Performance*

The Job Demands-Resources (JD-R) model has traditionally focused on job-related resources in predicting employee engagement and performance. However, this article explores the potential of creative personal identity (CPI), integrating creativity into one's self-concept as a personal resource within the JD-R framework. Although not explicitly included in existing taxonomies of personal resources, we argue that CPI can act as a catalyst for employee engagement and performance. Based on existing literature, we propose that CPI empowers employees to navigate job demands, enhances engagement, and improves their job performance. We examine the mechanisms through which CPI operates, including enhanced problem-solving, adaptability, and innovative thinking. Additionally, we discuss practical implications for organizations, suggesting that fostering CPI through recruitment, training, and supportive work environments can unlock employees' full potential and drive organizational success.

Teacher Education

Grace Ottman
Mentor: Dena Harshbarger
Title: *Accessibility of Early Childhood Stem Curriculum*

Early Childcare providers are expected to provide children with an academically stimulating environment. Incorporating science, technology, engineering, and mathematics (STEM) curriculum in Early Childcare settings can help achieve this while also providing structure and guidance. STEM education, particularly science, supports children's natural curiosity and improves understanding of the world to improve student academic performance in the future. The goal of this study was to identify how accessible STEM curriculum is for Early Childhood providers and what STEM curriculums are currently being used by Early Childhood providers. While this study looked at STEM education as a whole, I focused on the science aspect included in a STEM curriculum. An anonymous online survey was sent to Early Childcare providers in ESU 10's district, targeting those currently working in in-home family childcare facilities. The survey asked questions covering demographics, type of Early Childcare work setting, education background, self-efficacy in providing STEM curriculum, planning for the use of STEM curriculum, and identifying curriculum being used by the provider. The initial survey data indicates that most Early Childcare providers are somewhat confident in their planning and implementation of the STEM content they provide to the children they serve. However, many do not have access to a purchased STEM curriculum. While most Early Childcare providers know where to find information for planning and implementing STEM activities, having a STEM curriculum that includes activities and lessons would allow for more providers to more readily use

STEM education with young children. In this session, I will discuss the results in more detail and share suggestions for increasing options and accessibility of Science and STEM curriculum that would help providers achieve an academically stimulating environment.

Payten Gibson
Mentor: Dena Harshbarger
Title: *What can be done to better prepare preservice educators for behavior management in their future classrooms?*

This session focuses on better preparing preservice educators to set them up for success with classroom management and expectations in their future classrooms. In today's world of education, behavior challenges are at an all-time high. With these new behaviors, teachers feel like they are not equipped with the skills needed to handle the complexities of the modern classroom. Without sufficient training, teachers have difficulty managing behaviors while ensuring students can thrive in school. One current elementary teacher reflected on the current gap in preparation: "I feel like in college, I didn't learn what strategies to use on the behaviors that kids can't control, like behaviors caused by trauma or ADHD that aren't medicated yet or students that might be on the spectrum." This reflection indicates that the preparation gap is true; I will go more in-depth throughout my presentation.

Research and interviews identify four components needed for classroom management in today's educational setting: trauma, mental health, relationships, and professional development. Once the connection is understood, teachers can use more effective teaching strategies and improve classroom student outcomes. Studies show that adequate preparation impacts the quality of instruction provided by future educators and their confidence levels and overall well-being during their initial classroom years (Moh. Rif'attullah & Ciptaningrum, D.S., 2024). Educators who receive the proper preparation in these categories are more likely to remain in the profession and create classrooms that support academic and social-emotional growth. Join me for an in-depth conversation about my findings.

Undergraduate Posters

Behavioral & Social Sciences

Criminal Justice

Poster U1– Ella Waller
Mentor: Theresa Wadkins
Title: *Mass Shootings in the Age of the Internet*

This study focuses on the different ways mass shooters utilize the internet before committing an attack and focuses heavily on their online activity in relation to their attacks. This study also identifies certain categories of mass shooters based on their motivations in relation to their online activity, including fame-seeking individuals, political and religious extremists, involuntary celibates, racists, and more. Previous studies have shown that the internet plays a significant role in mass shootings, and this study aims to expand upon those findings by looking deeper into these specific categories of mass shooters and whether their internet usage reflects their specific ideologies.

Political Science

Poster U2 - Harmony Mathes-Riensche
Mentor: Chuck Rowling
Title: *The Rise of Nazi Germany, the Holocaust, and World War II*

This paper will explore the perverse role of propaganda in shaping public opinion, highlighting the Third Reich's portrayal of Jewish people and concentration camps as a safe place to protect Jews, hiding the realities of persecution and genocide. It traces

Holocaust denial to the post-World War I revisionist movement, highlighting key figures who sowed the seeds of doubt through the misrepresentation and manipulation of key historical narratives and documents, framing the Holocaust as a fabricated event, like Harry Elmer Barnes who is commonly known as the “father” of the denialist movement. The study further examines notable Holocaust deniers like David Duke, whose tactics rely on the distortion of historical facts and a strong reliance on pseudo-science. Additionally, the underlying psychological mechanisms of denial reveal how trauma and memory interact in cultural contexts. As contemporary society battles the resurgence of hate speech under the guise of free speech, the paper raises questions about legitimizing disinformation as historical discourse along with the consequences of disinformation. The findings underline a troubling trend: as Holocaust survivors dwindle in numbers, denialist rhetoric gains traction threatening the integrity of historical memory and necessitating a critical engagement with both trauma and the politics of remembrance. The trauma and politics of remembrance urge scholars to confront denialist narratives and reinforce the importance of factual historical accounts to prevent the politicization of memory and the erasure of truth.

Poster U3 – Ella Ferguson
Mentor: Satoshi Machida
Title: *Politics and the Freedom of Educators: A View From Nebraska Public Schools*

This undergraduate research project will focus on how politics affect primary and secondary schools, with a focus on Nebraska public schools. Federal and state law and policy and school board decisions regarding this subject are often in competition, especially in times of high political divisiveness, forcing public schools to balance often conflicting rulings in their internal systems. This is an essential topic to learn about due to the potential these bodies of authority have to affect daily educational proceedings. The initial compilation of research, though this subject is continually changing and updating, revealed that public schools, administrators, and teachers are seemingly being given minimal guidance from any level of government on how to implement these policies, even when there is potential for backlash. While this topic has been studied to an extent on a national scale, there is clarification needed for the correlation between politics and public education in Nebraska specifically. Through a survey distributed to K-12 public educators in Nebraska, perceived levels of politics regarding certain subjects in schools, such as COVID-19, LGBTQ+ youth, and book and content bannings will be tested for correlation with teacher’s perceptions of their freedom to run their classroom and curriculum in various areas.

Poster U4 – Samuel Schroeder

Mentor: Peter Longo
Title: *Lobbying in the Unicameral*

Nebraska's state legislature, commonly known as "the unicameral", is unique among the fifty states as the only single-bodied legislature. Nebraska's unicameral has existed since 1934, when Senator George W. Norris made a push for a single legislative body through a ballot initiative. Throughout its history, the Nebraska unicameral has seen both praise and criticism in regard to its functionality. Proponents argue that the unicameral possesses a number of different qualities that make it advantageous to a bicameral legislature: its simplicity, responsibility to the people with less blame to shift on another body, less corruption, more capable legislators, enhanced dispatch, it's cheaper, and a better possibility of planning. On the other hand, the alleged defects of the unicameral include a lack of deliberation, inadequate representation, inability to perform special functions, and an imperiling of property and minority interests. It can be difficult to determine the "effectiveness" of a unicameral compared to a bicameral legislature in the United States, as Nebraska is a single example. Though unicameral legislature exists outside of the country, it would be unfair to compare. This research aims to examine the unicameral as it relates to bicameral legislatures under a different lens: lobbying. How does lobbying differ in a single, nonpartisan house compared to the rest of the country? Is lobbying easier or more difficult, and how is it different? By studying lobbying regulations and practices throughout the country, the "nonpartisan" nature of the unicameral, and the processes of government, I hope to answer these questions.

Poster U5 – Paxton Robertson
Mentor: William Aviles
Co-Author: Juliana Merrihew
Title: *Environmental Constitutionalism and its Applications in Latin America*

Environmental constitutionalism can be used to evaluate the effectiveness of constitutional structures in combating extractivism in Latin America. Sam Bookman introduced three frameworks of environmental constitutionalism: liberal-conservative, technocratic, and transformative. First, the liberal-conservative strand, is in the traditional Western structure. It includes environmental rights but only as an extension of human rights to health and property. Second, the technocratic strand, constitutes a constitutional delegation of responsibility to specialized governmental agencies that manage environmental rights and regulations. Third, the transformative strand, which is most favored by Bookman, is the revolutionary alteration of the political, social, and economic frameworks. This also includes a change from Western values and structures to more traditional ones, often based on regional indigenous values and

beliefs regarding the environment. This presents as constitutional rights of the environment and Indigenous land rights. Within the context of these three theories, I examine the current state of environmental protection in Latin American countries. Do constitutional protections effectively translate into greater environmental protections? Our analysis involves a comparison of cases in Ecuador and Chile, states with markedly different constitutional structures to evaluate the effectiveness of each. While some academics claim that there has been considerable success through the new constitutions in several Latin American countries, others claim that these constitutional changes have yielded de jure rights that have not been carried out in practice. The literature suggests that de facto environmental protections can be prompted by social movements that create bottom-up change and ensure that de jure rights, such as prior consultation, are properly carried out. This relates to the transformative strand, which also calls for societal as well as legal changes. My focus is on the implementation stage of environmental protection while my co-author explores the theoretical frameworks of environmental constitutionalism.

Poster U6 – Austin Schroeder
Mentor: Peter Longo
Title: *Wealth Disparity: Modern Segregation of Schools*

The issue of inequality in the United States education system is a pressing issue that is growing more relevant with the current administration and their efforts to eliminate the Department of Education. However, the issue of education inequality did not originate from the action of the Trump administration, nor was it solved by the ruling of Brown v. Board of Education. There is a modern segregation of school systems occurring in the United States that is pushed by the funding from property taxes. Funding for public schools in the United States, especially in rural areas, is often derived from property taxes in the respective school districts. This can lead to inequality between different educational systems because of the wealth disparity between different locations. Property taxes differ greatly between counties that are urban and have higher populations compared to those that are rural with lower populations. This can also be seen in areas where the population has lower incomes compared to counties where individuals have higher incomes. The wealth disparity seen here leads those who have less financial success to have a harder time finding proper education. This leads to a vicious cycle of furthering inequality, as those who lack a proper education are less likely to pursue a college education and thus will likely pursue careers that have lower incomes. By utilizing a thorough literature review, I intend to show that the general wealth of a region leads to a lower quality of education.

Poster U7 – Alyssa King
Mentor: William Aviles
Title: *Fighting Moral Crusades: Anti Sex Trafficking Politics in Nebraska*

Anti-sex trafficking research suggests that legislation and treaties have rested on an alliance between conservative Christian organizations and secular feminist organizations. Yet little work has been done to assess the extent that this coalition has been relevant on the state level. Given the dominance of Nebraska's Republican party and the power of Christian conservatives in the state one would expect that the influence of conservative Christian groups would be sufficient to develop and implement anti-sex trafficking legislation. However, we find support for the centrality of anti-prostitution feminist organizations working with religious organizations in the development and passage of this legislation.

Poster U8 – Isaac Herman
Mentor: Chuck Rowling
Title: *American Exceptionalism's Influence on Foreign Coups*

This study titled, "American Exceptionalism's Influence on Foreign Coups", was conducted by me with mentorship from Dr. Rowling. I choose to conduct this study based on previous experience I had with learning about Post WWII American foreign policy. While learning about how the United States conducts its foreign policy we focused in on the president and his role regarding the making and implementation of foreign policy. Throughout my study on the subject and began to become very interested in the disconnect between presidential rhetoric at home and foreign policy action abroad. Historically, presidential rhetoric has been characterized with exceptional notion about America's past and current place in the world. Examples of exceptionalist rhetoric includes phrases like: "A city on a hill" or "Leader of the free world". These phares characterize American as being set apart from other nations of the world. In our research we wanted to see how presidential rhetoric changes during rocky times in America history. More specifically, we are focused on how presidential rhetoric shifts in the light of secretive United States coups in foreign countries (Iran 1953, Guatemala 1954, Nicaragua 1990). Currently, we have not finished conducting our case study analysis for these coups; but we do provide a graph with a broad overview of exceptionalism's use over time in presidential rhetoric as well as some analysis. Conducting this research gave us a better understanding of how presidential rhetoric has affected foreign policy decisions and implementation. We also were able to see the disconnect between how policy is portrayed to a domestic audience vs its implementation in foreign countries.

Poster U9 – Carson Kreager
Mentor: Satoshi Machida
Title: *Attitudes Among International Students at UNK*

Higher education institutions increasingly attract international students, creating diverse and multicultural learning environments. This study examines the attitudes of international students at the University of Nebraska at Kearney regarding language engagement, social integration, and civic participation. As language proficiency plays a critical role in navigating academic and social settings, this research explores the relationship between English-language engagement and students' participation in social and civic activities. Using survey data, this study investigates how international students interact with English and native-language media, participate in discussions, and engage in community activities. Findings reveal that students with higher exposure to English media and interactions demonstrate greater involvement in civic and academic discourse, while those with limited English exposure face barriers to participation. The study also highlights the significance of language accessibility programs and social inclusion efforts in supporting international students' engagement. This research contributes to understanding how language proficiency affects the social and academic experiences of international students at UNK. By emphasizing the importance of intercultural exchange and linguistic support, the findings suggest strategies for fostering an inclusive campus environment. Future research should explore policy interventions and institutional initiatives that enhance language accessibility and promote greater civic participation among international students.

Poster U10 – Hidaya Mohamed
Mentor: Satoshi Machida
Title: *Minorities in China*

In this study it investigates the systematic discrimination against Uyghur Muslims in Xinjiang, China, as well as the selective coverage of the human rights abuses. Of course, the more serious the infraction, the less there is of it in the media. This study points at the difference in news representation and its effects in terms of international awareness and action through an examination of the elements that make up this silence-cum-business interests in political dynamics and media bias. Such an understanding, it points out, further illuminates the Uyghur community's importance-historical and cultural context-from which the initiative sees the extent of oppression they face. It analyzes how the lack of media attention translates into globally assembled responses and reactions to these violations. This study invites students to consider the moral and emotional saliency of human rights, especially those individuals

who may have experienced such concerns personally. Much of it strikes a lyrical note for those people raised in religious homes, where the identity of freedom in religion is much more dramatically resonant, fostering a sense of both empathy and solidarity with those who experience similar oppression. The research aims at stimulating such thinking, developing such empathy, and motivating such action to secure the rights of marginalized communities. At such dramatization that even color, religion, or origin matters, people can organize better to act towards freedom, equalization, and dignity for all. These are typically authoritarian states, which are suppressing or distorting the issues of human rights violations through a tight control of the avenues of media and information. Since such governments restrict press freedom and limit access to foreign news accounts, they convey through state-run media a heavily censored version of events so as to minimize global awareness of issues such as the systematic oppression of Uyghur Muslims. This manipulation of information usually safeguards that violations are relegated mostly out of sight, thus enabling political and economic interests to platform without incurring much international pressure or accountability. Therefore, the control of information serves to hide the truth and also diminish the chance for any meaningful international intervention, which shields these human rights violations.

Poster U11 – Alexis Gill
Mentor: Peter Longo
Title: *Nebraska's Blue Dot: A Constitutional and Political Analysis of the Electoral College*

When the Founding Fathers drafted the United States Constitution, they carefully considered several factors in designing the democratic voting system. The adoption of the Electoral College was a subject of intense debate but has remained in place since its inclusion in the Constitution. While most states utilize a winner-take-all approach to allocating electoral votes, Nebraska is one of only two states that follow a district-based system. Under this system, Nebraska apportions its electoral votes based on the popular vote within its three congressional districts, with the remaining electoral votes awarded to the overall statewide winner.

This system has recently gained attention in the 2024 election cycle, sparking discussion and debate. By examining the electoral college, the district-based voting system, and the implications of potential reforms, I aim to inform voters and foster a deeper understanding of whether Nebraska should maintain or abolish its current approach.

A proposal to transition Nebraska to a winner-take-all system has been introduced by State Senator Loren Lippincott for the 2025-2026 congressional session. If enacted, this bill would amend the Nebraska Constitution, permanently eliminating the district-based allocation of electoral votes. This research is significant to me, as it has the potential to educate voters who may feel uncertain or uninformed about Nebraska's electoral voting policies. By providing clarity on this issue, I hope to contribute to a more informed electorate and a well-reasoned discussion on the future of Nebraska's electoral system.

Poster U12 – Caleb Bremer
Mentor: Satoshi Machida
Title: *Does political tension in the U.S. affect businesses that interact internationally with American companies?*

Public opinion on political tensions in the United States from foreign citizens is an important perspective to consider for the impact on business relationships. Whether we realize it or not, how we conduct ourselves politically in the United States has great implications worldwide, especially with our allies. This research looks at how political tensions within the United States affect Japanese citizens' perception of various issues. More specifically, this research looks at their view of the United States democracy, global partnership, and economic ties and how it influences the direction their company might go. The research was conducted using a survey of Japanese citizens who currently live in Japan, and it is written in their native language. The respondents were primed by first asking about their views on American politics and then their opinion on the United States and its relationship with Japan. The results show that only among those who say the United States is "very important" or "somewhat important" to their businesses do political tensions negatively influence their business relationships with the U.S. Further research is needed in a variety of countries to support or disprove this correlation I have found between the U.S. and Japan. This research is important as many U.S. citizens need to look outward and see if political actions in the U.S. will have consequences abroad.

Poster U13 – Trenton Carrizales
Mentor: Peter Longo

Title: *The Developments between Chiropractic Care and Legal Policy*

In the last century, chiropractic care has changed and evolved in numerous significant ways. When the practice was founded in 1895 by Daniel Palmer, it was considered a false practice akin to witchcraft. Even after 130 years, some still view chiropractic care as a fraudulent practice. Chiropractic care received its latest state license in 1974, marking a major milestone for chiropractors. What occurred between its founding in 1895 and the nearly full century it took to obtain its final doctoral status? Why, even after decades, do some people still regard chiropractic care as a dubious practice? These are the questions this study aims to explore: what legal milestones have contributed to chiropractic care achieving its current status? One significant milestone involves the American Chiropractic Association (ACA), which ensures all providers adhere to the Code of Ethics, originally adopted in 1961, with its most recent version adopted in 2014. Despite chiropractors being licensed doctors, some still perceive them as less qualified than traditional physicians. Chiropractic students must earn their doctorate by attending graduate school to obtain their D.C. (Doctor of Chiropractic), just as traditional physicians must acquire their MD (Doctor of Medicine) through medical school. In this regard, a Doctor of Chiropractic should be regarded as equal to a Doctor of Medicine. However, they continue to be viewed as inferior. The history of chiropractic care concerning legal policies and public perceptions of the field over the years is precisely the research being examined in this paper.

Poster U14 – Gavyn Brauer
Mentor: Peter Longo
Title: *An Analysis of Foundational Texts and Landmark Supreme Court Cases*

This project explores the influence of foundational texts such as The Federalist Papers on shaping judicial reasoning in landmark Supreme Court cases including Marbury v. Madison, Brown v. Board of Education, Gideon v. Wainwright, and Trump v. United States. By analyzing judicial opinions, this research examines how justices interpret and apply historical texts in shaping constitutional law. In researching the frequency and manner in which these foundational texts were referenced in Supreme Court opinions, this study will also investigate the different interpretive methods—such as textualism and originalism—and the influence they have on the development and outcome of historical Supreme Court decisions. This research will incorporate scholarly discussions regarding the legal weight of The Federalist Papers and other foundational texts, as well as the extent to which they serve as authoritative and reliable sources in constitutional adjudication. By analyzing both majority and dissenting opinions, this project will seek to identify trends in how justices apply historical texts across different cases, legal issues, and time periods. In exploring these patterns, this project aims to

provide insight into the evolving role of foundational texts in Supreme Court decision-making. This work will contribute to the broader discourse on constitutional adjudication and American jurisprudence, by assessing how foundational texts continue to influence the reasoning behind contemporary judicial decisions.

Poster U15 – Bella Neuhaus
Mentor: Peter Longo
Title: *Normative Consideration for Environmental Policy: Photos and Fragile Values*

Description: Environmental policy often falls short due to a combination of factors, ranging from inadequate enforcement mechanisms to a lack of comprehensive and forward-thinking strategies. One key issue is the tendency for policies to prioritize short-term economic interests over long-term environmental sustainability. Policymakers may succumb to industry pressure or prioritize immediate economic gains, neglecting the long-term consequences of environmental degradation. Overall, the shortcomings in environmental policy highlight the need for more comprehensive, collaborative, and future-oriented approaches to address the pressing challenges that the environment is currently facing. Policymakers and academics are frequently enamored and encapsulated by so-called data-driven environmental policy. Mounds of data and information are crunched in order to justify various environmental decisions. However, many of these policies often fail to truly alleviate and reduce environmental harm. “Fragile values” are needed to address the importance of normative solutions to complex environmental issues. Visual depictions of the environment provide vivid insights into environmental problems as well as solutions to mitigate environmental harm. The purpose of this project is to explore environmental issues and the efficacy of the policies meant to address these problems. In order to achieve this objective, an in-depth review of environmental problems and policies will be carried out accompanied by the aid of photography. This research will be conducted in four parts: 1) An overview of major environmental concerns will take place. 2) The visual perspective of expressive photography will be utilized to demonstrate environmental perspectives. 3) Normative analysis will be conducted using both photos and key normative arguments. 4) Considerations for better policy will be derived from both my photography and normative analysis. I will be continuing my research from last semester, however, I will be shifting my focus to encompass more than just Halsey National Forest and will be diving into nature in Omaha as well. With this project, I hope to bridge the gap that is frequently found between environmental policy and the actual well-being of the environment using photography. Overall, my learning objectives for this project are to further improve my abilities in writing, research comprehension, critical thinking, and photography. This project will allow me to apply my knowledge of both environmental politics and photography to create a coherent project. Utilizing such skills will help me

take my learning and understanding further than regular coursework. This project will also enable me to examine and study specific environmental policies and evaluate them based on their success and where they are lacking. For this project, I will work with my mentor Dr. Peter Longo. I will meet and converse with Dr. Longo frequently in order to complete this project to the best of my abilities. I will present my research at the UNK Student Research Day Conference and additional conferences per Dr. Longo's recommendation.

Essay: This project is important to me because of how I perceive and value the environment. I am someone who spends a significant amount of time in nature because of the impact it has on me. However, when I see the gaps within environmental policy and how it often falls short in effectively producing the necessary results it should, I am left in a state of disarray. There is a gap between policymakers, the public, and the environment in which its policies affect. This vast gap leads to ineffective policy, as well as an intense lack of widespread environmental public awareness and engagement. This disparity can be detrimental, however, I believe that photography, as a powerful visual medium, has the potential to bridge this divide. Images have the ability to not only evoke emotions but also convey the urgency of environmental issues in a way that policy and laws often cannot. By using my photography to document the impactful way I perceive nature and the environment, as well as environmental degradation, pollution, and the consequences of unsustainable practices, I will be able to create a visual narrative that resonates with the public on a deeper level. These images serve as a catalyst for public awareness, advocacy, and, ultimately, policy change. My analysis through writing and photography can humanize environmental issues, making them more relatable and inspiring to those who interact with my work. My visual storytelling through photography is a vital tool in enhancing the impact and reach of environmental policy, fostering a sense of shared responsibility and collective action.

Poster U16 – Brayan Cazares-Enriquez
Mentor: William Aviles
Title: *How Has The North Korean Regime Stayed in Power and Kept Its Totalitarian State?*

Today, North Korea is among the most infamous countries known worldwide for its oppressive totalitarian government. North Korean leader Kim Jong-Un rules with an iron fist. Having succeeded his father Kim Jong-il after he died in 2011, Kim Jong-Un has upheld his family's history of governing North Korea's citizens with the ideology that the Kim family is to be viewed and treated as gods. On top of this ideology, the North Korean Government also operates under a belief that North Korea should remain

self-reliant, often portraying Western nations as the enemy. Failure to abide by this view or follow the plethora of rules and laws in place by the North Korean regime is often met with severe forms of punishment including, but not limited to, imprisonment, placement into labor camps, and public executions. On top of this, the regime has also ensured the North Korean people remain unaware of better opportunities by cutting off access to the outside world in the form of restricting all forms of foreign media and having the only access to news in the country be under the control and supervision of the government. With all this in mind, one can't help but wonder: why is the North Korean regime still standing? Through methods of secondary research, analysis of academic literature and scholarly articles that have addressed the previously stated question will provide insight into different perspectives and help in forming new ideas on the issue.

Poster U17 – Mason Roberts
Mentor: Peter Longo
Title: *Casinos in Nebraska- Impact on Community Life*

This research project examines the legal framework and policy impacts surrounding the legalization of gambling in Nebraska, focusing particularly on its effects within towns that have established casinos. In 2020, Nebraska voters approved a constitutional amendment legalizing casino gambling at licensed racetracks, marking a significant shift in the state's approach to gambling regulation. Prior to this, Nebraska had a relatively restrictive stance on gambling, with only limited forms of gaming allowed, such as the state lottery and some charitable gaming. The passage of the amendment was followed by the creation of detailed regulatory structures to govern casino operations, including the establishment of the Nebraska Gaming Commission to oversee licensing, regulation, and enforcement. This project delves into the legal processes leading up to the legalization of casino gambling, analyzing the political, economic, and social factors that influenced Nebraska's decision to embrace this form of gaming. A key component of the research is an examination of the policy impacts in towns where casinos have been established, focusing on both the positive and negative outcomes. Economic benefits, such as job creation, increased tax revenue, and enhanced tourism, are balanced against concerns over increased gambling addiction, crime, and changes in local culture. Through a review of economic data and policy documents, the research provides a comprehensive understanding of how the legalization of gambling has reshaped local communities. The findings suggest that while there are notable economic advantages for towns with casinos, there are also challenges that must be addressed through effective regulation, public health initiatives, and community engagement.

Poster U18 – Temo Molina
Mentor: Satoshi Machida
Title: *Digital Media and Institutional Trust: The Effect of an Appeal to Education*

Americans today often receive political news digitally on Internet platforms. The proposed research focuses on how Americans decide whether political media on the Internet is legitimate. An appeal to the authority of academic institutions is one way that digital media content may convince readers and viewers of their legitimacy. Citing educated expertise or adopting an 'educational brand' can make political media appear more legitimate by offering a sense of credibility. Online media outlets, then, may seek to enhance the legitimacy of their ideas by incorporating an appeal to an academic institution, e.g., a university. The expected result would be that consumers are more likely to trust such online media. Simultaneously, however, American mistrust of institutions, including educational ones, has increased in recent years. This project seeks, then, to test the following hypothesis: Online political media that appeals to the authority of academic institutions is expected to increase the likelihood of media consumers perceiving the media as legitimate. The test includes conducting a survey experiment and analysis. The survey will present participants with political content that appeals to the authority of educated professionals and content that does not, asking them to evaluate if the content is legitimate. The resulting research may be relevant to broader questions in political behavior such as the magnitude of institutional mistrust.

Poster U19 – Jacob Mueller
Mentor: Chuck Rowling
Title: *Degradation of the International Liberal Order*

The International Liberal Order, international cooperation through multilateral institutions established after World War II, has structured the world we know today. However, its existence is being challenged by a variety of factors which could bring unprecedented consequences. Countries such as China, Russia, and Iran have proven disrupting this system is high on their foreign policy agenda. Furthermore, isolationist domestic rhetoric has been given footholds across the world. This rhetoric is not just unique on the margins. Powerful nations ensuring its survival have increasingly held such rhetoric and elected leaders hostile to this system, Donald Trump, Viktor Orban, and Recip Erdogan being just a few examples. International relations scholars have published numerous journals and essays analyzing this trend in behaviors. There are some barriers to this type of research, however. Much of the work is hypothetical, and determining what system would replace it definitively is nye impossible. Identifying the

root causes of this rhetoric and the present symptoms of this shift as analyzed by a multitude of scholars, however, an educated guess can be made for what kind of system may replace it. The weakening of international institutions such as NATO, the United Nations, and trade organizations is already evident. These consequential symptoms have the potential to bring unprecedented change to the entire international system including the degradation of global peace and therefore require a much firmer analysis by not only international relations scholars, but by the average citizen as well.

Poster U20 – Kennia Garcia-Retana
Mentor: Diane Duffin
Title: *What & Americans Know About Politics*

Understanding the demographics involved in American politics is essential for a variety of reasons. It allows us to pinpoint which groups are actively participating in the political landscape and which might be underrepresented or disengaged. This insight can inform targeted strategies aimed at boosting political awareness and engagement among different demographic segments, ultimately fostering a more inclusive and representative democratic process. Recognizing these trends can be invaluable in helping us direct educational initiatives and resources to the areas where they are most needed. Furthermore, being aware of the political knowledge levels across different demographics can shed light on specific gaps that require focused education and outreach to cultivate a more informed electorate. To explore this further, I already distributed a survey designed to replicate the findings from Michael X. Delli Carpini's 1997 study, What Americans Know About Politics. This survey sought to evaluate current political knowledge and compare it to historical data, providing valuable insights into how political awareness has evolved over time and highlighting potential shifts in demographic engagement. Interestingly as part of one of the many findings, it consistently showed that women often exhibit a greater willingness not only to share their political knowledge but also to demonstrate higher accuracy in their detailed understanding compared to men and much more.

Poster U21 – Ava Lindstrom
Mentor: Chuck Rowling
Title: *Literature Review: United States Foreign Policy and its Impact on the Middle East*

After WWI, the United States' foreign policy decisions have had an evident impact on the Middle Eastern Region. The purpose ofof this project is to compile and analyze literature about the role that United States foreign policy decisions have played in the Middle East. This review shows how the United States has focused on political, rather

than strategical aspects in finalizing their policy decisions, leading to further issues down the road between the residents of the region and the United States. The involvement of the United States, in some cases, has led to violence, uprisings, and regime change. It is evident that the actions of the US, while justified for the benefit of their foreign policy, has led to consequential changes within some Middle Eastern countries. During the Cold War, the existence of the Soviet Union and its ideological differences with the US proved to be a huge motivator for foreign policy decisions made. After the Cold War, the War on Terror filled the vacuum left by the fall of the Soviet Union in 1991. This information is important to understand as every foreign policy decision is perused after the trial of another. In this turbulent region, it is critical to understand how a large actor on the Global stage has played a role in shaping this region today.

Poster U22 – Kimberly Gomez
Mentor: Diane Duffin
Title: *Harmful Headlines: Social Media Behavior and Ideological Identity*

The internet has solidified its position as the main venue for the free exchange of ideas. Social media platforms allow us to receive information from sources and connections of all types. Unfortunately, with a plethora of information in the palm of our hands, real and fake information coexist. This study examines how users different ideological beliefs interact with real and fake news on social media. Prior research suggests users with clear ideological biases are more susceptible to believing fake news that conforms to their beliefs. This study goes beyond an examination of susceptibility to ask whether ideology affects a user's interactions with fake news headlines on social media posts. I test for this by constructing an online survey in which participants are shown examples of real and fake news headlines, mirroring ones found on Facebook, a popular social media site. Participants respond by indicating how they would interact with the post, measured as "share," "comment," "like," etc. Participants then answer a series of questions on political and policy issues, which I use to construct a scale measuring how liberal or conservative a participant is. This scale provides the basis for determining whether liberal, moderate, or conservative respondents interact differently with fake news that contradicts or confirms their biases. Democracy depends on an accurately informed citizenry making rational decisions, which in turn depends on the information available to us. Understanding how personal ideology affects the way users disseminate real and false information may help us combat this threat to democratic practice.

Psychology

Poster U23 – Tessa Malesker
Mentor: Katherine Moen
Title: *First Generation College Students and Stereotype Threat*

The current study aimed to determine if stereotype threat and anxiety impact math performance in first-generation college students. Stereotype threat occurs when individuals are aware of a negative stereotype about their social group, which can negatively affect performance levels in these specific areas. Previous research suggests that women often experience stereotype threat with math tests (Yagan & Avci, 2023). Many women are aware that this stereotype threat exists, but it is hard to find solid evidence that this threat alone contributes to lower math performance for women compared to men. Some research suggests that high general anxiety levels contribute to high math test anxiety in females, decreasing their math performance (Dowker et al., 2016). Extensive previous research has examined this topic in women, but we were specifically interested to see if this effect exists in female first-generation college students. First-generation college students may have a lower math performance due to added pressure to be academically successful (Gehringer et al., 2022). We wanted to determine if first-generation students score lower on math tests than their non-first-generation peers, due to this added pressure. To our knowledge, no previous studies have investigated stereotype threat in first-generation college students or how anxiety impacts first-generation college students' math performance. Our research project combines all three of these factors (stereotype threat, anxiety, and first-generation status) to determine how these factors impact math performance. We hypothesized the group with high anxiety, first-generation status who are told about the stereotype threat will perform the worst overall. We also hypothesize that first-generation students will perform worse than non-first-generation students. Lastly, we hypothesize that students who are told about the stereotype will perform worse than those in the intervention group.

Poster U24 – Kajetan Hubl
Mentor: Megan Strain
Co-Authors: Katherine Moen, Chris Waples

Title: *Scale Validation for a Measure of Parental Dependency in College Students*

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 connected academic entitlement to many aspects of a person's life. It is positively correlated with a person's locus of control (Bertl et al., 2019; Fromuth et al., 2019), extrinsic motivation, and achievement anxiety, but not with academic achievement (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, or 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 one could hypothesize that it could be related to a student's academic entitlement, in terms of their external locus of control. If students are used to more parental control or parental input, they may transfer these expectations to others, namely their teachers. To better examine these relationships, a reliable measure of parental dependency in young adults is required and does not presently exist. In the first phase of this study, we will create items to assess parental dependency. In phase two, we will refine the scale and compare the successful items from phase one to other valid measures. Upon validating the scale, further research will be able to examine the relationship between academic entitlement and parental dependency.

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Poster U25 – Tyler Wong
Mentor: Megan Strain
Title: *My Fellow (Gen-Z) Americans: Modern Media and Civic Engagement in Young Eligible Voters*

Since the advent of home television, political humor has maintained its position as a staple of American entertainment by making cultural waves and influencing generations. However, as media evolves and changes to adapt to its viewers, there has been a notable shift in young audiences toward short form content suitable for a vertical phone instead of a television. In this study, we examine the role of political media content on Generation Z participants' civic engagement. To focus exclusively on Gen Z, 200 participants aged 18 to 27 will be instructed to watch political videos separated by the presence of humor (funny or not), the video length (short form or long form), and proximity to the 2024 presidential election (November 2024 or March 2025). We hypothesize a main effect of media form such that short-form content will influence participants' civic engagement more than long-form with this audience. We predict a second main effect in which short, humorous videos have a greater effect than others. Finally, we hypothesize an interaction such that the effects of both the presence of humor and the media form are amplified for participants close to the 2024 election. Examining these relationships can provide crucial insight into the role political humor and its evolution through modern media plays in civic engagement, potentially shaping decisions made by political parties in their outreach toward younger audiences.

Poster U26 – Maria Gonzalez
Mentor: Katherine Moen
Title: *Memory and Attention for Face with Switching Facial Expressions*

The current study sought to observe the difference in memory and attention when facial expressions change. The facial expression of an individual can impact attention, thus storage of a face in a memory. Previous research suggests that subjects

remember faces expressing positive emotions better than faces expressing negative emotions (Mendolia, 2018). A study conducted by Lui et al. (2014) found that facial expressions influenced how accurately subjects identified faces seen at encoding compared to faces seen at testing. Additionally, previous research suggests that paying attention to different areas of faces impacts perception. A study conducted by Fletcher et al. (2008), found that participants who looked longer at internal features (e.g., eyes, nose, and mouth) were more likely to recognize two pictures as being the same person than participants who looked at external features (e.g., hair, ears, chin, etc.). To our knowledge, no research has examined how attention to different facial features impacts memory for faces with changes in expressions. The goal of the current study was to observe if attention to different facial features impacted memory performance between study and test. We examined memory, accuracy, response time, dwell time, fixation duration, and fixation count. We hypothesize that happy faces during encoding would not be affected by expression change in memory performance, but angry faces would result in lower memory accuracy overall when the expression changes from encoding to test. We also hypothesize that participants will pay attention to different areas of faces, depending on their emotion during study and the expression change between study and test.

Poster U27 – Lacey Broadwell
Mentor: Julie Lanz
Title: *Correlating Nurse Stressor Voice Barriers and Burnout*

The current research continues previous work on a measure development study for nurses. Stressor voice is defined as change-oriented communication about workplace factors that elicit a stress response. Stressor voice barriers (SVBs) are factors that inhibit nurses from speaking up about stress. In previous phases of this project, we held interviews with nurses, collected qualitative data, created an initial measure, piloted items, factor analyzed and revised the scale, tested it for validity, and researched possible interventions. For the current study, it was hypothesized that aspects of individual-level SVBs (expectations of action, expectations of the profession, fatigue, and fear of retaliation) would significantly correlate with aspects of burnout (emotional exhaustion, depersonalization, and personal accomplishment). Data were collected from a sample of 205 nurses across two time points; SVBs were measured at T1 and burnout at T2. All hypotheses were supported, as our measure of stressor voice barriers at the individual level significantly correlated with all three facets of Maslach's burnout inventory. Future work should further explore SVBs as a measure, and examine socio-economic mediators, examining factors such as having dependents.

Poster U28 – Skyler Summers
Mentor: Emily Bartholomay
Title: *Frequencies of sleep behaviors in relation to stress levels and academic degree type*

College years are characterized by increased autonomy, greater flexibility to socialize, and intensified stressors, leading students to experience sleep problems and poor sleep quality (Bolden et al., 2019; Kenney et al., 2012). Poor sleep habits - such as pulling all-nighters or skipping class to sleep - are often referred to as typical among students, but the frequency of these behaviors is poorly understood. The aim of the study is to examine the frequency of these behaviors and to understand how stress may be related.

Participants were 187 college students, Mage = 23.21, SD = 7.24, primarily female (66.84%), and White (63.10%). Participants reported their academic major, the number of credit hours they were taking, the frequency of six sleep behaviors over the last month, and completed the Perceived Stress Scale (PSS; Cohen et al., 1983).

There were significant, positive relationships between both perceived stress and number of credit hours with intentionally skipping class to sleep (rs = .27, .21, ps < .01) and accidentally oversleeping (rs = .19, .22, ps < .01). Perceived stress was also positively correlated with FOMO (r = .17, p = .025 and napping (r = .15, p =.043). One-way ANOVAs revealed significant differences between academic majors with FOMO F(6,174) = 2.786, p = .013, η_p^2 = .09, and napping F(6,175) = 2.322, p = .035, η_p^2 = .07.

The results of this study suggest that students who are more stressed and taking a greater number of credit hours are more likely to skip class to sleep or accidentally sleep in. Staying up later and more often may increase perceived stress, the frequency of skipping class, and napping, though these behaviors could also contribute to each other in the opposite direction. Future research should examine longitudinal relationships between stress and sleep behaviors.

Poster U29 – An Tran
Mentor: Emily Bartholomay
Title: *Exploring the Relationship Between Objective Sleep Measurements, Attention, and Mood*

Insufficient sleep for college students is linked with problems in learning, lower GPAs, and lower cognitive flexibility (Herschner & Chervin, 2014; Grol et al., 2014). Stewart et al. (2018) found sleep disruptions contribute to repetitive negative thinking, linked to mood dysregulation and poor attention. Previous research found that inadequate sleep is associated with worse cognitive functioning (Stewart & Coles, 2021), but little research has examined this using objective measures. We hypothesized that poor objective attention would predict worse affect when controlling for objective sleep.

Participants included 153 college students, Mage = 19.75, SD = 1.78. Most participants were females, 67.80 %, and White/European American, 69.90%. At time one, participants received an actiwatch to measure sleep. At time two, 24 hours after, particpants completed attention tasks (Conners Continuous Performance Test, CPT-3, Conners et al., 2018; Posner cueing task, Posner, 1978), and state affect surveys (ASI, Peterson & Heilbronner, 1986; PANAS; Watson et al., 1988). Sleep variables examined include sleep efficiency (SE), sleep onset latency (SOL), wake time after sleep onset (WASO), and total sleep time (TST).

Hypothesis 1 examined positive affect. A hierarchical multiple regression showed step one was nonsignificant, $F(3,111) = .595$, $p = .620$, $R2 = .016$. The addition of attention variable did not improve the prediction of positive mood, $\Delta F(2,109) = 1.41$, $p = .620$, $\Delta R2 = .025$.

Hypothesis 2 examined negative affect. Step one was non-significant $F(3, 115) = 1.84$ $p = .144$, $R2 = .046$. The addition of sleep variables did not have a significant effect in predicting negative mood, $\Delta F(2, 113) = .632$, $p = .533$, $\Delta R2 = .01$.
The findings indicate that attention did not significantly predict mood when controlling for sleep. Future research should examine moderators between sleep and mood.

Poster U30 – Allie Canas
Mentor: Katherine Moen
Title: *Cognitive Consequences of Accelerated Media: ADHD, Memory, and Mind-Wandering*

The current study aimed to examine how video playback speed and ADHD impact mind-wandering and memory performance. Previous research on video playback speed yields mixed results. Some research suggests that increasing video playback speed leads to better grades and an increased likelihood of finishing lecture content (Lang et al., 2020), provided that the video speed is no more than two times the regular speed (Murphy et al., 2021). However, other research has shown learning detriments associated with faster playback speeds (Song et al., 2018). Mind-wandering occurs

when an individual is not focused on the current task, distracted, zoning out, or daydreaming. Previous research by Murphy et al. (2023) posits that increasing playback speed reduces mind-wandering, especially for young adults. Additionally, Biederman et al. (2019) showed high levels of mind-wandering correlated with more severe ADHD symptoms. Thus, it is possible that individuals with ADHD may benefit more from the decreased mind-wandering associated with faster playback speeds. Therefore, our research project combined work on ADHD and video playback speed to see how these factors impact mind-wandering and memory performance for the presented content. Participants with and without ADHD watched a lecture-style video at 0.75x, 1.0x, or 2.0x speed. Participants were asked about mind-wandering several times during the video. After the video, they completed a memory test. Participants without ADHD showed no change in mind-wandering in each playback speed condition. However, mind-wandering significantly decreased for people with ADHD from 0.75x to 2.0x speeds. Additionally, there was a significant difference in memory accuracy for 2.0x speed, in that people with ADHD had higher memory accuracy than those without ADHD. Overall, these results suggest that faster video playback speeds decrease mind-wandering and increase memory for individuals with ADHD.

Poster U31 – Riley Rose
Mentor: Katherine Moen
Co-Author: Seth Long
Title: *Words for the Pictures We Can't See: The relationship between visual imagery ability and writing*

Previous research suggests that the ability to picture something in your mind's eye is essential for a variety of tasks, including excelling in STEM disciplines (science, technology, engineering, mathematics; Moen et al., 2020) and in creative fields (Chavez, 2016). However, there is less research on the mechanisms of how visualization ability leads to these improvements. Additionally, there are individual differences in visualization ability, and some individuals do not use visual imagery at all, yet they still have normal lives (Zeman et al., 2015). We studied visualization ability to better understand the underlying cognitive mechanisms. It is possible that individual differences in writing ability could be explained by visual imagery ability. For example, students enrolled in Gifted programs in school often use more visual imagery during creative writing than other students (Jampole et al., 1994).

Visualization ability while writing has long been discussed in the context of memory (Sommers, 1980). Specifically, the ability to hold more items in memory at the same time (working memory) is associated with producing more complex writing (McCutchen, 2011). Literary theory focuses on the role visualization plays in the

reader's aesthetic experience, but composition theory emphasizes how that imaginative vision interacts with a writer's visualization of the text itself, from phrase to clause to paragraph and beyond (Brooke, 2009). For many decades, the study of writers' memories and visualization abilities has been theoretical (Long, 2016) or based on interviews with individual writers. More recently, however, eye tracking has been recognized as potentially beneficial tools for collecting data on how writers (and readers) visualize a text (Anson & Schwegler, 2012). Additionally, some aspects of cognition are difficult to study due to variations in metacognition (understanding your own thought processes; Kelemen et al., 2000). Eye-tracking is a unique tool to examine visual imagery in that it can be used to predict attention (Reichle et al., 2010), reading comprehension (Schotter et al., 2014), and memory (Chung et al., 2014).

The goal of the current study was to determine whether visual imagery ability impacts creative writing for fantasy and realistic writing prompts. Participants were presented with two sets of pictures, one at a time. They were told to look at the pictures and write a story about them for 5 minutes. Their eye-movements were tracked while writing, so we could measure their attention to the images while they were writing. One set of pictures were all realistic concepts, such as a dinner table, flowers, people talking, etc. The other set of pictures were fantasy concepts, such as a dragon, fairy, castle in the sky, etc. Participants completed the writing tasks in counterbalanced order. After, participants completed two questionnaires to measure their visual imagery ability.

Our hypothesis was that people with a lower visual imagery ability would use more "descriptor words" such as nouns, verbs, adjectives, and adverbs to help themselves convey their idea, because they are unable to picture information in their minds. Conversely, people with higher visual imagery ability would not feel the need to describe or express visualizations in their entirety, because they can already "see" it via visual imagery.

Each writing sample was analyzed for the number of unique words, nouns, verbs, adjectives, adverbs, and conjunctions that were used. We found that the realistic pictures were associated with more unique words, nouns, and adjectives, as well as longer fixation durations. This suggests that the type of pictures impacted both attention (as indicated by differences in fixation duration) and writing.

In order to examine the role of visual imagery ability, we conducted a backwards stepwise regression to determine which of the parts of speech significantly predicted visual imagery ability. The final model explained 8.9% of the variance in visual imagery ability ($R^2 = 0.14$, Adjusted $R^2 = 0.089$). The model was statistically significant, $F(7,122) = 2.71$, $p = 0.012$. Significant predictors include the number of unique words, nouns, verbs, adverbs, and adjectives. Overall, these results suggest that people's

visual imagery ability is associated with different writing strategies, and the writing prompt impacts attention.

Poster U32 – Haven Zimmerman
Mentor: Julie Lanz
Title: *Military Competency in Mental Health Providers of Nebraska*

Military knowledge among mental health professionals is critical for effectively addressing the unique psychological and emotional challenges faced by military personnel, veterans, and their families. This study explores the levels of military cultural competency among 320 mental health providers in Nebraska and examines how this competency varies by region within the state. Currently there are 6 regions in Nebraska where there are various mental health resources available for those in each region. Each region seeks to extend mental health assistance across Nebraska. Although there are specific resources for each region, this study looks at the competency of the mental health providers, especially when it comes to military knowledge. Utilizing a survey-based approach, we evaluate professionals' familiarity with military culture; and their ability to provide culturally informed care categorized by the region in Nebraska. Participants' military culture competency or MCC was evaluated on things such as their comfortability with veterans, proficiency, prior training, etc. scored on a scale of 0-22. By addressing such potential regional disparities, the state can ensure access to high-quality, culturally informed mental health care for its military-affiliated populations.

Poster U33 – Josee Brunk
Mentor: Emily Bartholomay
Title: *Influence Sleep Has On Next Day Mood and Anxiety*

Getting enough sleep is a critical part of development and the duration of sleep plays a huge role in mental health (Wang et al. 2024). College students experience irregular sleep patterns and shifts in their sleep patterns, which can affect their sleep quality (Castiglione et al. 2023). College students are well known for having poor sleep, with roughly half of students reporting poor quality sleep (Becker et al., 2018). The aim of this study is to understand whether attention predicts next day mood in college students when controlling for sleep.

Participants were 143 college students Mage=19.75 years (SD = 2.61), mostly female (67.8%) and primarily White/European American (69.9%). At time one, participants completed a demographic survey and several self-report sleep measures. At time two,

approximately 24 hours later, participants completed two self-report attention surveys and two surveys measuring mood.

Hypothesis one stated that attention would predict negative affect beyond sleep. Step one was significant, $F(3,118) = 23.94$, $p < .001$, $R2 = .38$. Insomnia and fatigue symptoms predicted negative mood, $\beta s \geq .26$, $ps \leq .032$. Step two, including attention variables, significantly improved model fit, $\Delta F (2,116) = 7.53$, $< .001$, $\Delta R2 = .07$, with self-report shift, $\beta = .27$, $p = .002$, but not attentional control, $\beta = -.04$, $p = .627$, predicting mood.
Hypothesis examined positive affect. The first step was not significant $F(3,116)=.557$, $p=.645$, $R2 = .01$, with none of the sleep measures significant, $ps \geq .223$. Step two did not improve model fit, $\Delta F(2,116) = .05$, $p = .952$, with no attention measures significant, $ps \geq .911$.

The results of this study showed that attention predicts negative, but not positive affect beyond sleep. These findings suggest that sleep and attention are important factors contributing to negative mood and may be appropriate treatment targets.

Poster U34 – Logan Muirhead
Mentor: Krista Forrest
Title: *Understanding Memory for Factual Information*

Our preferences for consuming information from different forms of media (text, graphs, video, speech) may be influenced by how we process information. Several researchers have explained these processes as Field Dependent (FD)/Field Independent (FI) (Witken & Goodenough, 1976) and Holistic/Analytical (Nisbett et al., 2001). Individuals classified as (FD) or Holistic are more likely to have a Gestalt perspective when processing information. Instead of focusing on specific points, they consider how those points relate to one another and the overarching problem. (FI)/Analytical individuals can distinguish specific information from a larger, yet distracting background. Participants first completed the Compound Figure Test 1 which determined the extent to which they relied on holistic and analytic thinking (Lacko et al., 2023). Then they reviewed information on two different topics (crime in the media; popular conversation topics) in graph or text formats. Third, participants completed two types of comprehension questions for each topic. General questions required participants to make inferences about the information and specific questions required participants to identify details. We are currently evaluating the data and expect that FD (Holistic) participants will score higher on general comprehension questions when exposed to information formatted in paragraphs and FI participants (Analytic) will score higher on specific comprehension questions when information is formatted in graphs. Generally, however, across both forms of information (graph or text), we expect FD(Holistic)

participants will score lower than FI(Analytic) participants on the 12-item comprehension measure.

Poster U35 – Grace Dolence
Mentor: Krista Forrest
Title: *The "Unbreakable" Glass Child*

Charlton and Charlton (2023) defined glass child syndrome is a recent TikTok phenomenon suggesting children who grow up in families where siblings have chronic disabilities are often “looked through” rather than supported by their parents. They conducted a recent literature search and found only one article addressing the glass child. Yet as early as the 1960s, researchers investigated the influence of chronically ill children on their families and specifically their healthy siblings. For example, a recent Google Scholar search using “healthy siblings” of chronically ill children yielded 8,510 results. Earlier research on “glass children” focused on healthy (H) siblings of physically ill children and children with intellectual disabilities (NH siblings). According to the website Special Kids, “Glass children are children who grow up in a home with a sibling who takes up a disproportionate amount of parental energy (Anonymous, 2024).” We relied on the expanded definition of an NH sibling to investigate whether growing up in a household where parental support is often divided for the benefit of an NH sibling. Few researchers focused on positive outcomes associated with having an NH sibling. Perenc & Pęczkzkowski (2018) went on to say that college-aged participants (H siblings) who reported providing more personal care for NH siblings appeared more adjusted than their counterparts (H siblings) who did not provide care, and the control group whose participants did not grow up with a disabled sibling. We surveyed 80+ students concerning their family structure (e.g., parent marital status, number of H and NH siblings); how they spent their time (e.g., alone and with others); Fall 2024 GPA, and two psychological measures (e.g., Life Satisfaction Scale; Attachment Scale). In addition to attachment and life satisfaction predicting academic success, having an NH sibling contributes as well. Analyses are still ongoing.

Social Work

Poster U36 – Katherine Chess
ONLINE Student
Mentor: Christina Sis

Title: *Lessons COVID-19 Taught State Public Health Departments to Better Prepare for Future Epidemics*

Couch-surfing is a form of homelessness where individuals frequently "move from one temporary living arrangement to another, without a secure place to be" (McLoughlin, 2013, p. 521). Couch-surfing is an under-researched facet of homelessness, especially among the youth demographic. The lack of research on this topic is demonstrated when searching the literature. When the search-terms, "youth," "couch-surfing and "United States" are searched in the UNK library database, the search returns only 7 peer-reviewed articles. Youth are defined as individuals between the ages of 13 -25 (Morton et al., 2018). Assessing couch-surfing among college students is illustrative; nearly 50% of the youth couch-surfing population is enrolled in or has completed a 4-year degree (Curry et al., 2017). Couch-surfing youth often fall through the cracks because there aren't many services provided to specifically target couch-surfing. They are more likely to report being fully employed than youth experiencing literal homelessness, yet less likely to meet their basic needs (Petry et al.,2022). Because they're fully employed, they likely don't qualify for many income-based government assistance programs but still can't afford stable housing. We need research to better understand couch surfing youths' unique needs so appropriate services and resources can be developed. The purpose of this research project was to evaluate service utilization and gather opinions from couch-surfing college students on the quality and availability of the services they need to meet their needs. Surveys were emailed to over 5,000 undergraduate and graduate UNK students over the age of 18. Questions inquired about experiences couch surfing, adequacy of services to meet basic needs, and recommendations for service improvement.

Sociology

Poster U37 – Crista Manning
Mentor: Sandra Loughrin
Title: *Lessons COVID-19 Taught State Public Health Departments to Better Prepare for Future Epidemics*

COVID-19, a pandemic that rapidly spread across the world, tested the preparedness of global, national, state, and local health departments. This study aimed to assess the preparedness of state health departments for future epidemics and emphasize the importance of using multidisciplinary approaches – incorporating both sociological and biological perspectives – to develop effective, evidence-based practices that address

the needs of all citizens. In doing so, the research contained a content analysis of various sources, applying themes to Émile Durkheim's theories of collective consciousness and social solidarity. The study aimed to evaluate the lessons that state health departments learned from the COVID-19 pandemic. The findings of this study can aid in proposing better policy implications that could better prepare the public for potential future outbreaks, ultimately helping to reduce mortality rates compared to those seen during COVID-19.

Natural & Physical Sciences

Biology

Poster U38 – Theo Huber
Mentor: Keith Geluso
Co-Author: Keith Geluso
Title: *Notes on Natural History of Striped Bark Scorpion in Franklin County, Nebraska*

Numerous studies have focused on scorpions, primarily concentrating on their behaviors in deserts or other arid regions. However, scorpion inhabit other terrestrial ecosystems, such as grasslands and woodlands, and have not been well studied in such systems. The Striped Bark Scorpion (Centruroides vittatus) commonly inhabits grasslands. The objectives of this study were to examine activity patterns, density, feeding habits, and other observable behaviors of this scorpion in Franklin County, Nebraska, where it has not been previously observed. Fieldwork was conducted at Ash

Grove Wildlife Management Area (WMA) In 2023, scorpions were active between April 13th and October 17th. In 2024, their activity spanned from April 6th to October 20th. Observations revealed that scorpions predominantly occupied rocky areas or at the bases of grasses during nighttime activity. This study reports on of the first records of this scorpion in Franklin County, Nebraska, contributing knowledge from its northernmost distribution. Understanding behaviors of this scorpion in grassland ecosystems is crucial for exploring its ecological role, particularly in how it influences energy flow and trophic interactions in these environments. By addressing this understudied aspect of scorpion ecology, our study provides a foundation for future research.

Poster U39 – Theo Huber
Mentor: Melissa Wuellner
Co-Authors: Alexandria Keiler-Klein, Keith Koupal, Melissa Wuellner, Alex Engle
Title: *How Different are Lake Ogallala Zooplankton Communities Before and After Rotenone Application?*

Chemicals such as rotenone are used to remove undesirable fishes from lakes and promote the establishment of more desirable, recreationally important species. However, the application of piscicides can directly or indirectly impact zooplankton in both positive and negative ways. Lake Ogallala, a 263-ha reservoir directly below Lake McConaughy, has had several rotenone treatments dating back decades, with the most recent application in October 2023. Here, we compare taxa richness and densities from the zooplankton community in Lake Ogallala before and after the 2023 renovation. Zooplankton were collected monthly from April to November 2023 and from April to October 2024 at nine locations throughout the reservoir using an 80-µm Wisconsin net towed vertically, beginning 1 m from the bottom at each site. For each sample, four 1-mL subsamples were drawn, and zooplankton were identified to the lowest possible taxon and enumerated. Mean total density (number/L) and mean density by taxon were calculated across all sites for each month. In 2023, 14 taxa were found, and densities were highest among cyclopoids, Daphnia, and rotifers. In 2024, 13 taxa were identified, with densities highest for cyclopoids, Bosmina, and rotifers. Two taxa (harpacticoids and Diaphanosoma) were only present in 2023, and one taxon (Leptodora) was only present in 2024. This research adds to what has been found on the impacts that piscicides may have beyond those for fish. Understanding these changes is important in deciding whether to apply piscicides, given the possible benefits, costs, and drawbacks may be.

Poster U40 – Bryce Sutton

Mentor: Brian Peterson
Co-Authors: David Zorn, Brian Peterson
Title: *Novel Metrics to Assess Antler Asymmetry in White-tailed Deer (Odocoileus virginianus)*

White-tailed deer (Odocoileus virginianus) antlers are perennial, costly to produce, paired appendages that are genetically coded to have perfect bilateral symmetry. Environmental stressors and injuries that may occur at the individual level may result in increased asymmetries between antler sides. The objective of this study was to develop novel non-traditional metric protocols and modify methods previously developed by the Boone and Crockett Club for naturally cast antlers to better quantify phenotypic growth through fluctuating asymmetry between antler sides and age groups. We investigated 15 antler metrics to evaluate relative fluctuating asymmetry (RFA). Of the metrics evaluated, 9 were newly developed protocols such as point of tine branching, tine basal circumference, and antler tine branching angles. Additionally, we modified standard, historical protocols to better capture symmetry of antler pairs including unbroken main beam lengths, unbroken tine lengths, and total developed typical tines. We hypothesized that the new, non-traditional metrics would have a lower RFA value than traditional metrics, and that the older age group (≥2.5-years-old) would have a lower RFA value than the youngest age group (1.5-years-old). We found total developed points, branching point of tines, and the first three tine basal circumferences had the lowest RFA values of all metrics evaluated. We found that RFA values decreased an average of 25% when comparing only unbroken tines and main beam lengths along with total developed points. We found that older individuals had lower RFA values than younger individuals. Our findings suggest that non-traditional protocols can be used in conjunction with standard methods to better evaluate and quantify phenotypic antler growth and development between antler sides and age groups in white-tailed deer.

Poster U41 – Eri Watanabe
Mentor: Surabhi Chandra
Title: *Comparison of Python and ImageJ in Analyzing Fluorescent and Phase-Contrast Images of Breast Cancer Cells*

Python is a programming language widely used for data analysis, including image processing. Unlike ImageJ, which processes images individually, Python offers a powerful approach to processing multiple images simultaneously. In this study, we used Python libraries, including scikit-image and NumPy, to analyze fluorescent and phase-contrast images of breast cancer cells treated with different conditions. Fluorescent images were obtained using a fluorescent microscope after treating cells

with low and high glucose concentrations and black seed oil. Phase-contrast images were captured via a phase-contrast microscope following the transwell assays of breast cancer cells that were treated with thymoquinone. Fluorescent images were read and converted to grayscale in Python, and background regions were turned off before calculating pixel intensities in the cell regions. The final fluorescent intensity values were calculated by dividing the total pixel intensities by the area of the cells in each image. For phasecontrast images, Connected Component Analysis (CCA) was applied to count individual cell numbers in each image. This operation assigns a unique label for each cell in the image, allowing us to count the total number of the cells. Our results will compare two data sets from image analysis using Python versus ImageJ. While Python facilitates batch processing and improves efficiency, ImageJ provides higher accuracy in image analyses.

Poster U42 – Ran Hirosawa
Mentor: Letty Reichart
Title: *Development of a citizen science project to better understand nest site characteristics of Eastern Screech-Owls (Megascops asio) in south-central Nebraska*

Eastern Screech-Owl (*Megascops asio*) is a species native to Nebraska that prefers to nest in tree cavities and can be observed in areas with open understories, such as farms, suburban landscapes, and city parks. Thus, this makes the Eastern Screech-Owl a great species for developing a citizen science program to study nest site characteristics within a suburban community. Our study took place in Kearney, Nebraska where we initiated a citizen science program to request owl sightings from the public. We used social media to encourage individuals to report local sightings which allowed us to locate screech-owl nests. Once nests were located, we identified nest site characteristics. In addition to studying nest site characteristics, we also developed educational lesson plans, for use in schools and community centers, to raise awareness about screech-owls. With assistance from local sightings and sightings reported on eBird, we identified at least three nest sites with the following characteristics: an approximate height of 3m, an entrance diameter of 7.62cm, and a preference for hackberry trees (Celtis occidentalis) in Kearney, Nebraska. Future research will use eBird to analyze historically recorded nest locations. Lesson plans will be disseminated in educational programs in Kearney and surrounding areas. By fostering community participation, we anticipate increased engagement with the public, and a better understanding of a species able to exist in both human dominated-landscapes and native habitat. Specifically, we will gain a better understanding of Eastern Screech-Owl nesting behavior in south-central Nebraska and encourage the public to learn more about a native species in Nebraska. (253 words)

Poster U43 – Tyler Matrangos
Mentor: Letty Reichart
Title: *Nest site characteristics of Great Horned Owls in Nebraska*

The Great Horned Owl (*Bubo virginianus*) is a top avian predator in much of North America known for its diverse diet and its adaptability to different environments. Despite its broad distribution across North America, many nest site characteristics remain unknown due to the species being nocturnal and to the species nesting in other species nests. They are known to occupy a wide variety of nesting sites including old nests of other species, cavities in trees or on cliffs, barns, and man-made structures. This research project investigates the nest site characteristics of the Great Horned Owl in central and eastern Nebraska. The objective of this study focuses on identifying the characteristics of nesting sites including tree species, nest height, and diameter breast height (dbh) measurements for the nesting tree compared to a non-nesting tree. We have found no correlation for nest site characteristics of the nests found to this point. This could be due to not knowing the species of the bird that made the original nest, and nests were found in many different environments. Thus, we need a larger sample size to describe nest site characteristics across varying habitat types. By continuing to document nest site characteristics, this research can contribute to better understanding habitat use by the population of Great Horned Owls in Nebraska.

Poster U44 – Clare Plachy
Mentor: Nicholas Hobbs
Title: *The Role of Androgen Receptors on Scent Marking Behavior in Mice*

Scent marking, a behavior observed in various mammalian species, plays a vital role in communication, territory establishment, and social dynamics. While hormones, such as testosterone, influence scent marking, the specific role of androgen receptors (AR) in organizing the brain for this behavior remains unclear. Male mice possessing a mutation which produces a dysfunctional androgen receptor (AR), known as testicular feminization mutant (tfm), exhibit a decreased interest in the scent marks of female mice relative to wildtype (wt) male mice, which possess functional AR, suggesting that other olfactory behaviors may be altered as well. As such, we tested the hypothesis that the presence of AR affects the scent marking behavior of male mice in response to scent marks provided by wt female mice. Ten scent marks from the wt female scent donor were placed on 1 side of a paper, that was then dried and marked with pencil

under UV light to identify the bottom-scent donor's marks. Then either a wt male or tfm males was placed on the paper in a scent marking arena and allowed to explore freely for 10 minutes. Following this, the paper was dried and marked again under black light using red ink. The number and location of these over-marks were recorded and analyzed to determine the differences in scent marking behavior that exists due to differences in AR. Preliminary findings suggest potential differences in scent marking between wt and tfm male mice, laying way for ongoing analyses, including the collection and chemical analysis of pheromones from tfm males, wt males, tfm carrier female, and wt females. This research contributes to a deeper understanding of the connection between hormonal signaling and scent marking behavior in rodents.

Poster U45 – Conner Brown
Mentor: Yipeng Sui
Title: *The Effects of Cannabidiol on Cholesterol Uptake Mediated by Pregnane-X Receptor*

Cannabidiol (CBD) is a medication commonly used in treating pain, anxiety, inflammation, and insomnia. It has been implied that CBD is associated with lipid metabolism, but it is unclear how exposure to CBD influences pro-atherosclerotic events in cardiovascular system, such as dyslipidemia. Our data suggest that CBD is an agonist for human Pregnane X Receptor (PXR), a xenobiotic nuclear receptor, which plays a known role in atherosclerosis and hyperlipidemia in rodents. In the current study we use human intestinal cells and hepatic cells, and mouse models to study if CBD affects lipid metabolism through a PXR-mediated pathway. Our data suggest that CBD activates PXR in a dose-dependent manner. The key amino acid residues within PXR's ligand binding pocket were identified to be necessary for the agonistic effects of CBD. The presence of CBD induces increased cholesterol uptake by human intestinal LS180 cells, but not in PXR inhibitor-treated cells, indicating a PXR-dependent mechanism. Wild-type mice fed CBD display increased circulating total cholesterol levels in a PXR-dependent way. Our study is the first to explore the cellular and molecular mechanisms by which exposure to CBD activates human PXR and increases the risk of dyslipidemia.

Poster U46 – Dawson Kosmicki
Mentor: Keith Geluso
Title: *Monthly Distribution of Male and Female Evening Bats (Nycticeius humeralis) in North America*

The Evening Bat (Nycticeius humeralis) is a cavity-roosting tree bat that occurs throughout the eastern United States. Although migratory, little information is known about movements and seasonal distribution patterns. We amassed specimen data and plotted coordinates of localities across the eastern United States and northern Mexico. By splitting records into 12 monthly maps, distinguished by sex, we discerned areas occupied seasonally. Results suggested that adult females dispersed farther north from wintering grounds whereas adult males do not disperse as far. For these specimens, males and females shared a similar wintering distribution, covering 1.2 million km2. In warmer months, females dispersed to 3.1 million km2 while males only dispersed to 2.2 million km2. In the southeastern U.S., some adult females occur year-round, as not all adult females appear to migrate. Such findings indicate that migration in Evening Bats is not universal for all individuals. A genetic investigation of females across their distribution might show an underlying divergence. The migratory subset of the population will likely succumb more often to wind-energy fatalities than non-migratory individuals. Further understanding migratory patterns will help conserve this and other migratory species.

Poster U47 – Belle Turk
Mentor: Kim Carlson
Co-Authors: Amanda Macke, Darby Carlson, Alexis Hobbs
Title: *Characterization of Nuclear Localization Signals (NLSs) of ORF1 of Nora Virus*

Nora virus is a picorna-like virus that is endemic in *Drosophila melanogaster* and referred to as *D. melanogaster* Nora virus (DmNV). The genome of DmNV contains four open reading frames (ORFs) known as ORF1, ORF2, ORF3, and ORF4. ORF1, the focus in this study, has a role in RNA interference, RNAi, suppression through inhibition of the RNA induced silencing complex, RISC. This allows Nora virus to remain persistent in its host. Sequence analysis of ORF1 shows not one, but four potential putative bipartite nuclear localization signal (NLS) sites. The NLS 2 and 3 sites overlap and are considered together as one NLS or NLS 2. Knockout mutations for NLS 1, 2, 3, 1 & 2, 1 & 3, 2 & 3, and all three knockout mutations together (1, 2, & 3), were created and cloned into the *pCR-TOPO* vector. DNA sequencing verified that the intended mutations were created. The verified mutants were subcloned into *pEGFPN3* for transfection into S2 cells. The S2 nucleus will be stained with DAPI, and cells visualized using confocal microscopy. This study will let us determine the identity of the ORF1 NLS responsible for translocation of DmNV to the nucleus.

Poster U48 – Sunayn Cheku
Mentor: Kim Carlson

Co-Authors: Blasé Rokusek, Haishi Cao
Title: *Use of fluorescent biosensors for detection and characterization of physiological Hydrogen Sulfide in Drosophila melanogaster*

Endogenous hydrogen sulfide (H2S) is an integral component of normal cellular functioning, regulating key processes such as cell signalling, cellular stress response, and physiological processes such as vasodilation and inflammation. Previous studies have observed a dysregulation of hydrogen sulfide mediated pathways in neurons to be a characteristic feature of neurodegenerative diseases such as Parkinson's disease (PD) and Alzheimer's disease (AD). However, studies on endogenous hydrogen sulfide activity have been limited due to lack of effective techniques. This study attempted to use fluorescent hydrogen sulfide sensing compounds to detect endogenous H2S within PC 12 cells, S2 cells and D. melanogaster brain tissue. We further compared fluorescent signals between healthy drosophila brain tissue and drosophila PD model brain tissue to evaluate the utility of the fluorescent sensors as a potential diagnostic tool for PD.

Poster U49 – Kael Kingery
Mentor: Kim Carlson
Title: *Reactive Nitrogen Species and Reactive Oxygen Species in S. aureus*

Staphylococcus aureus is a highly virulent, gram-positive strain of bacteria associated with many forms of infections. These infections are commonly associated with foreign devices and can vary from sepsis to infective endocarditis. A large concern is relapsing infections endured due to these pathogens. This is better than others. When in large clusters, persister cells can form biofilms, an extremely adherent colony of bacteria surrounded by a protective matrix of extracellular materials. This causes extreme difficulty in treatment with antibiotics due to the inability of drugs to reach the bacteria. The mechanism of persister cells is thought to be partially caused by dormant-like activity exhibited by bacteria, something previously examined. It was found that this mechanism is partially mediated by the Citric Acid Cycle, as previous work demonstrated that interruption of the fumC gene increased the number of persister cells, thus resulting in better survival of bacterial colonies. It has previously been found that persister cells exhibit increased survival to antimicrobial peptides (AMPs), molecules found within macrophages that are part of the cells' innate immunity. Given this, we suggest that persister cells exhibit increased survival to other parts of the environment within macrophages, namely reactive oxygen species (ROS) and reactive nitrogen species (RNS). Preliminary research has shown that persister cells have demonstrated increased survival to RNS, when challenged with 96mM $NaNO_2$, the fumC knockout strain demonstrated one log difference in survival compared to the

wild-type strain (HG003). To further understand this interaction, we will challenge persister strains of bacteria with increased concentrations of NaNO_2 and H2O_2, to reveal the increased survival of several components of the cell's innate immune system.

Poster U50 – Carlos Hernandez
Mentor: Alexis Hobbs
Co-Authors: Addie Buhlke, Joseph Dolence, Kim Carlson
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 U52 – Maddie Wocicki

Mentor: Joseph Dolence
Co-Authors: Marissa Hoover, Roseph Roeder, Zane Carlson
Title: *Characterizing the innate immune response to peanut following vaping*

Much remains to be learned about the impact of vaping on innate immune responses, specifically those that stem from the lungs. We have data that shows that vaping negatively regulates the ability of B cells to respond to peanut (PN). In this study, we examined whether vaping influences the ability of two common innate immune cells to respond to PN. Specifically, we exposed mice to PN in the context of electronic conditioned media (ECM) for three consecutive days. To make ECM, we bubbled vapor into media used to expose the mice to PN and ask whether vapor itself altered innate immune responses to PN. We are currently developing a model to measure the macrophage and neutrophil responses to PN using flow cytometric analysis of lung tissue. This knowledge is important because to date, little is known about how vaping influences the response of these cells to PN. Since our data suggests adaptive immune responses to PN are compromised due to vape exposure, characterizing how innate immune responses are impacted by inhalation of vape represents a logical next step in our analysis of how vaping impacts immunity.

Poster U53 – Joe Paysen
Mentor: Keith Geluso
Co-Author: Dawson Kosmicki
Title: *Notes on Reproduction and Roost Sites for Silver-haired Bats (Lasionycteris noctivagans) in Western Nebraska*

Silver-haired Bats (Lasionycteris noctivagans) are a migratory bat species that occur across most of the United States and Canada. Silver-haired Bats roost in trees in both coniferous and deciduous trees throughout their range. In Nebraska, Silver-haired Bats are a Tier 1 species of concern, and knowing their roosting habits in the state is vital for future conservation efforts. In late May 2024, we captured Silver-haired Bats at Ash Hollow State Historical Park in Garden County. We attached radios to 5 bats (4 females and 1 male) of which 2 females and 1 male were tracked to roost trees the following week. For day roost, we recorded the tree species, DBH, % dead, % cover, height, and distance to nearest neighboring tree. We also recorded trees (species, DBH, and life status) in plots around roost and random trees in the forest. Compared to the average reference tree, the average roost tree had a greater DBH, lower % dead, lower % canopy cover, greater height, and was closer to nearest neighboring tree. Compared to the average reference plot, the average roost plot contained more trees with similar average DBHs. We detected a significant difference between roosts and reference trees with roost trees having larger DBHs and taller heights. No roost and

reference plot measurements were significantly different. All roosts were located in Eastern Cottonwoods (Populus deltoides) and signal strength suggested that all bats were roosting under exfoliated bark or in cavities on dead or dying parts of these trees. Our findings suggest maintaining old growth Cottonwood forests along riparian corridors in western Nebraska may be important for maintaining summer reproductive sites for Silver-haired Bats.

Poster U54 – Megan TenBensel
Mentor: Jayne Jonas-Bratten
Co-Author: Bryan Drew
Title: *Native plants benefit from wildfire in a grazed semi-arid grassland*

Grassland ecosystems are adapted to and maintained by periodic fire and grazing. However, management efforts in working lands often focus on cattle grazing despite the potential benefits of occasional prescribed burning for restoration of native plant species. In late April 2022, the Road 702 Wildfire burned an estimated 18,000 hectares of privately owned semi-arid grasslands in northwestern Kansas and southwestern Nebraska. Although characteristics of wildfire can differ from those of prescribed fire, this study was initiated in fall 2022 to monitor impacts of the Road 702 wildfire on plant recovery over time in a system subject to long-term fire suppression. Specifically, this study compares three sites: an overgrazed burned pasture, an ungrazed burned pasture, and a control pasture that was not burned and has not been grazed in at least 20 years. Twenty permanent 1-m2 sampling plots were randomly located on each site and plant species cover monitored annually through 2024. The site that was both burned and grazed tended to have higher species richness than ungrazed sites (both burned and unburned) by 2024. In addition, the proportion of native species in the burned-grazed site also tended to be higher than in the ungrazed sites. This study demonstrates the possible benefit of fire for increasing native plant diversity in a semi-arid rangeland where fire is not widely used as a management or restoration tool.

Poster U55 – Abhi Srivastava
Mentor: Surabhi Chandra
Title: *Anticancer Effects of the Water Extract of Ashwagandha Leaves in MDA-MB-231 Cells*

The research on phytochemicals as treatments for various ailments is gaining momentum due to their proven effectiveness in age-old traditions with minimal adverse effects. Currently approved anticancer therapies can also be used in combination with

phytochemicals. To this effect, our proposal is to investigate the anticancer properties of ashwagandha (*Withania somnifera*) in triple negative breast cancer cells (MDA-MB-231), which are the most resistant to treatment. Since I started my URF project in the spring semester this year, I have been reading articles and learning basic cell culture techniques. From my background research so far, one of the studies examined *Withania somnifera* (WS) and Asparagus *racemosus* and their anticancer effects in a three-dimensional breast cancer culture. The results found that the spheroid size of the 3D cultures was significantly reduced after treatment, suggesting potential anticancer activity. In another study, the effect of the water extract of Ashwagandha leaves was tested on the proliferation of glial cells. It was reported that the expression levels of mortalin, glial fibrillary acidic protein, and neural cell adhesion molecule showed changes supporting the anti-proliferation and differentiation-inducing effects in the water extract of Ashwagandha leaves. We plan to test the anticancer effects of the water extract of Ashwagandha leaves in MDA-MB-231 cells and determine the molecular mechanism of action.

Poster U56 – Ella Buhlke
Mentor: Kim Carlson
Co-Authors: Blase Rokusek, Darby Carlson, Sunayn Cheku
Title: *One Hot Paradox: HSP90 Inhibition Reduces Nora Virus Load in Infected Adult Drosophila melanogaster, but the Heat Shock Response is Antiviral*

The heat shock response (HSR) was discovered and has been extensively studied in Drosophila melanogaster. This organism should serve as a good model in which to study the interaction of viral infection and the HSR. Yet, very little research involving this interaction has been conducted in D. *melanogaster*. The purpose of the present investigation was to validate the antiviral effect of pharmacological inhibition of HSP90 in vivo in a D. *melanogaster* model, which has never before been shown. Further, we sought to explore other aspects of the relationship between the HSR, heat shock factor (HSF), and viral infection. Specifically, we explored the affect that pharmacological HSP90 inhibition with 17-allylamino geldanamycin (17-AAG) and 17-desmethoxy-17-N,N-dimethylaminoethylamino-geldanamycin (17-DMAG) on estimates of viral load at 24 and 72 hours after persistently infected stocks of D. melanogaster received treatment. We are also examining the ratio of the negative, replicative strand of the virus to the positive strand to understand replicative efficiency. Also tested was the treatment with Direct Targeted HSF-1 InhiBitor (DTHIB) on persistently infected stocks with heat shock treatment at 36.5°C for one hour to examine the relationship between the two. We also report a trend whereby a line of D. melanogaster carrying a mutant HSF tended to have higher estimates of viral load relative to genetic controls with wild type HSF. Finally, we found that DmNV infection leads to significant elevation of

HSP83 (HSP90; P = 0.029) and DNAJ-1 (HSP40; P = 0.001), 24 hours after infection. Our data suggest a prominent role for the HSR and associated inducible HSPs during DmNV infection *in vivo*.

Poster U57 - Drake Anderson
Mentor: Nicholas Hobbs
Title: *Effect of Age and Chronic Food Insecurity on Anxiety-like Behavior in Peripubertal Mice*

Food insecurity (FI) is an increasing problem in the US and the world, especially in the post Covid pandemic time. FI is related to a number of diseases like diabetes and hypertension, but has also been shown to affect one's mental health in the form of anxiety. Hormones are a biological factor that also play a role in behavior regulation. For example, testosterone, working via the androgen receptor (AR), helps to reduce anxiety-like behavior in rodents. This is shown by wild-type (wt) male mice exhibiting lower anxiety-like behaviors compared to the wt female mice and testicular feminization mutant (tfm) mice. Tfm mice are chromosomally male mice but have mutated AR's that do not bind testosterone, making them phenotypically female. Hormones are known to be affected by the age and nutritional state of the organism leading us to hypothesize that FI in juvenile mice will induce more anxiety-like behaviors in the mice, as these mice do not produce as much testosterone compared to adult mice. Mice will be weaned at 3 weeks of age and be housed individually for the remaining period of the experiment to avoid the influence of social interactions. Blood samples will be taken 5 days before the testing begins. At about 4-5 weeks of age, each group (wt male, wt female, tfm male) will get split into 2 further groups; 1.) control group of continuous access to food and 2.) period of FI on a 24-hour schedule (24-hour FI, then 24-hour feed, then 24-hour FI etc.). Next, testing of anxiety-like behaviors will be performed using several tests, including the elevated plus maze (EPM). We will measure the time spent on the open arms, closed arms, and the middle of the maze to determine if FI increases anxiety-like behavior in mice, and if such an increase is related to the lack of testosterone signaling via AR.

Poster U58 – Chayton Kumpost
Mentor: Austin Nuxoll
Title: *Investigations into Benzyl Isothiocyanate as a potential alternative to fluoride*

Fluoride has long been a cornerstone in the prevention of dental caries; however, concerns regarding its overuse and potential toxicity have driven the search for

alternative antimicrobial agents. Benzyl isothiocyanate (BITC), a naturally occurring compound with known antibacterial properties, presents a promising candidate for oral health applications. This study evaluates the antimicrobial efficacy of BITC by determining its minimum inhibitory concentration (MIC) against key oral and pathogenic bacteria, including Staphylococcus aureus, Streptococcus mutans, Streptococcus sobrinus, and Streptococcus oralis. Additionally, BITC is tested in combination with conventional antimicrobial agents using a checkerboard MIC assay. The following antimicrobial agents were used, amoxicillin, cephalexin, clindamycin, chlorhexidine, and fluoride, to assess potential synergistic or antagonistic interactions against S. mutans and S. aureus. The MIC value obtained from the MIC assay against S. aureus, S. mutans, S. sobrinus and S. oralis were 125, 125, 250 and 125µg/ml respectively. The Fractional Inhibitory Concentration (FIC) index value obtained from the checkerboard MIC assay against S. mutans, and S. aureus were indifferent when BITC was tested with chlorhexidine and clindamycin while being antagonistic when combined with amoxicillin and cephalexin. These results suggest that while BITC can inhibit growth of many bacteria, it interferes with amoxicillin and cephalexin mechanisms of action. More testing is needed to see if BITC is a viable replacement for fluoride in dental applications.

Poster U59 – Carter Cochran
Mentor: Austin Nuxoll
Co-Authors: Barry Cheung, Kylie Schuelke
Title: *Determining the efficacy of plasma activated antibiotics against Staphylococcus aureus biofilms*

Staphylococcus aureus biofilms are notoriously challenging to treat, and pose a large threat in healthcare. With rapidly increasing instances of antibiotic resistance, it is crucial to search for alternatives to conventional antibiotic therapy. Plasma activation of solutions results in the generation of antimicrobial compounds such as a number of different 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 and plasma-activated

vancomycin were stained individually with concanavalin A to measure polysaccharides, 4',6-diamidino-2-phenylindole-DAPI to measure the amount of extracellular DNA, SYPRO ruby biofilm matrix stain to determine protein concentrations, and crystal violet to measure overall biofilm matrix. The only significant difference found between the treatments was with the DAPI stain. A greater amount of extracellular DNA was indicated in the plasma-activated vancomycin-treated biofilms, suggesting greater occurrence of cell lysis. Next, the efficacy of PAAB was investigated in Zophobas morio. In initial trials, the bacteria concentration was not sufficient to cause a sustained infection in Z. morio. Further Z. morio infections are currently ongoing to test whether PAAB is suitable during in vivo infections. While further experimentation is needed, initial studies indicate plasma-activation has the potential to increase antibiotic potency.

Poster U60 – Joseph Roeder
Mentor: Joseph Dolence
Co-Authors: Marissa Hoover, Zane Carlson
Title: *Examining how vaping impacts B and T cells responses to peanut*

The impact of vaping on immune responses that originate in the lung remain unclear. We have compelling data that exposure to either vape juice or electronic conditioned media (ECM) (made by bubbling vapor into media) during exposure to peanut (PN) inhibits the generation of PN-specific antibody responses and leads to milder anaphylactic challenges upon PN challenge. In this study, we examined whether ECM influences the ability of B and T cells to respond to PN. We exposed mice to PBS, PN, ECM, or PN in ECM using the 14-day inhalation model that showed ECM stifled PN-specific IgE and IgG1 responses. On day 14, lung draining lymph nodes were harvested and processed for flow cytometric analysis of B and T cells. Tfh cells, but not Th2 cells, displayed reduced reactivity to PN due to exposure to ECM. B cells appeared similar between mice exposed to either PN or PN in ECM. Overall, our data suggests vaping suppresses PN-specific immune responses by inhibiting the response of Tfh cells. This knowledge is important because failure to mount response against PN suggests that vaping may inhibit immune responses against common respiratory infections. More studies are needed to understand how vaping influences immune responses against PN.

Poster U61 – Joelle Gilmore
Mentor: Catherine Johnson
Co-Author: Tanner Theis
Title: *The Effects of Enzalutamide on Osteoblasts*

The focus of this project was to observe the effects of cancer therapy treatment on bone cells once the cancer has metastasized. There are over a million cases of prostate cancer a year. Prostate cancer is the second leading cause of death among men, killing over 300,000 men a year, and one of the top five leading causes of death worldwide. Prostate cancer is so deadly, in part due to the cancer cells becoming therapy resistance. Androgen Deprivation Therapy (ADT) is the primary treatment for prostate cancer, it worked by blocking androgen, male growth hormones from being produced by triggering the brain to stop producing them. However, there are other pathways that can be triggered to produce androgens, or the cancer cells themselves, in some cases, can produce androgens. Our research focused specifically on osteoblasts because the bone is the most common place for metastasis, 84% of cancer metastasizes to the bone. Our project aimed to understand the effects of a specific type of ADT, enzalutamide, on healthy osteoblasts. Enzalutamide works as a competitive inhibitor to the androgen receptors and has a very high binding affinity for androgen receptors. Enzalutamide has been approved by the FDA for both individuals who have and have not undergone previous cancer treatments. We started by testing different concentrations of enzalutamide on the MC3T3 osteoblast cells, observing which concentrations produced viable cells, and at which levels is the treatment fatal.

Poster U62 – Shawn Peterson
Mentor: Roderick Bartee
Title: *Exploring the Relationship Between Suicidal Ideation and Mental Health Resources Help-Seeking Behavior among College-Aged Students.*

Background: Suicide is the second leading cause of death among individuals 10 – 24 years of age in Nebraska. Suicide ideation is when an individual has thoughts about or contemplates self-harm or ending one's life. Help-seeking behavior is when someone actively seeks help from others to address a problem or difficulty they are experiencing. The objective of this research project is to describe help-seeking for mental health services and examine the relationship between suicidal ideation and mental health help-seeking behavior among college-aged students. Methods: Secondary data from the Fall 2024 American College Health Association-National College Health Assessment was analyzed, focusing on suicidal ideation, mental health help-seeking behavior, and sociodemographic variables among UNK students (n = 326). Descriptive statistics were used to describe mental health services' help-seeking behavior. Odds ratios were used to examine the association between seeking mental health services and selected demographic variables. Results: Male students reported receiving mental health services in the past year the least (12.8%). Members of a fraternity or sorority were among those who reported receiving psychological or mental

health services in the last 12 months most (39.3%). In the last year, 42.7% of students that experienced suicide ideations sought services, compared to 23.8% who never experienced suicide ideation. The analysis revealed that males had 70.7% lesser odds of seeking mental health services than females (OR = 0.293, CI: 0.147-0.585). Students who experienced suicide ideation had more than double the odds of seeking mental health services compared to those who never experienced suicide ideation (OR 2.388, CI: 1.409-4.048). Discussion: The data supported existing research that as suicide ideation increased, so did help-seeking behavior. Results can be used to implement evidence-based practices such as implementing peer-led workshops and destigmatizing campaigns, while also creating partnerships with fraternities to address male students' reluctance in seeking mental health resources.

Poster U63 – Anna Lindstrom
Mentor: Surabhi Chandra
Co-Author: Hernan Vargas
Title: *Effect of thymoquinone in modulating the structure of actin in breast cancer cells*

Actin is a protein within the cytoskeleton of human cells that functions as a structural unit that assists in upholding cell shape and movement throughout the body. F-actin, or filamentous actin, is a specific form of actin that is polymerized into helical filaments which serves as an integral part of cell metastasis and division. In cancerous cells, such fundamental units of structure and motility are unable to control their growth rate. Therefore, cells under cancerous conditions are understood to influence F-actin's role in cancer cell movement and metastasis from primary to secondary tumor locations. This study aims to determine if thymoquinone, a known anti-cancer compound found in Nigella sativa or black seed oil, affects the stability of actin in MDA-MB-231 breast cancer cells. The study was performed by treating the cancer cells with varying amounts of thymoquinone in the presence of different concentrations of glucose. After a 24-hour period, the cells were stained for the nucleus using DAPI and for actin using ActinRed 555 ready probes reagent. The cells were then imaged using fluorescent microscopy to check for differences in actin filaments. The studies are still ongoing, and we expect to see significant changes with thymoquinone treatments.

Poster U64 – 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 pre-human 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 are currently building a CRISPRa construct that contains all three gRNAs. We plan to test the CRISPRa construct with transient expression in tobacco, then perform stable transformation in poplar clone 717-1B4 and measure how the enhanced expression of UGT71L1 ortholog affects the production of salicinoids. This research approach aims not only to shed light on the intricate workings of salicinoid biosynthetic pathways but also to pave the way for engineering popular species with enhanced medicinal properties.

Poster U65 – Samuel Thede
Mentor: Roderick Bartee
Title: *Strength Training Participation Among University of Nebraska at Kearney Students*

Background: Physical activity has been shown to have numerous health benefits relating to both physical and mental wellbeing. Strength training, a form of physical activity involving increased force on the body relative to normal daily activity, has independent health benefits compared to general physical activity. Physical activity, including strength training, is especially important for college students. Current estimates show that approximately 46% of college students meet the recommended aerobic physical activity levels while only 35-40% meet the strength training guidelines of at least 2 or more days doing muscle-strengthening exercises per week. The purpose of this study is to determine the level of strength training among University of

Nebraska at Kearney students. Methods: Data from the American College Health Association National College Health Assessment was collected at the University of Nebraska at Kearney in fall 2024 (n = 324). Descriptive statistics were used to describe the level of strength training among UNK students. Odds ratios were used to examine the association between strength training and demographic variables. Results: Males reported meeting the strength training guidelines the most (51.8%), whereas married/partnered students reported meeting the guidelines the least (25.0%). The analysis revealed that students who met the strength training guidelines had 39.5% lesser odds of seeking mental health services, compared to students who did not meet the guidelines (OR = 0.605, 95% CI: 0.368-0.995). Discussion: Results suggest there is an opportunity to promote and increase strength training among UNK students with less than half of nearly every student demographic meeting the strength training guidelines. Strength training also appears to be a protective factor toward mental health issues among UNK college students.

Poster U66 – Eva McCreery
Mentor: Haiwei Lu
Title: *Promoting Science-Based Understanding and Perception of Genetically Modified Plants*

Genetically modified (GM) plants hold tremendous promise for plant breeding. Yet the public tends to perceive risks towards releasing GM plants into the environment and consuming food products derived from GM plants. While some of these concerns are legitimate, many are false claims rooted in misconceptions about why and how GM plants are produced. Aimed at promoting the understanding of biology and biotechnology behind GM plants and to facilitating science-based evaluation of GM plant safety, our project consists of both survey- and laboratory-based elements. We are designing survey questions to explore the current landscape of GM plants and the public perceptions surrounding them, focusing specifically on the views of residents in Western and Central Nebraska. Example topics on the survey include the perceived benefits and risks of GM crops, the influence of biotechnology on farming practices, and the importance of government regulations in approving GM plants for commercialization. To ensure a comprehensive understanding of public sentiment in this region, we plan to reach out to individuals from diverse backgrounds, including farmers, consumers, and educators. The survey is in its early stages, with data collection to be started shortly. In parallel, we work in laboratory to develop educational videos on transferring green fluorescent protein (GFP) encoding gene into tobacco plants, using Agrobacterium tumefaciens-mediated transformation. Agrobacterium tumefaciens is considered a "natural genetic engineer" due to its natural ability to transfer a part of its DNA, called T-DNA, into the plant

genome. Studies have shown that many cultivated sweet potato varieties contain Agrobacterium T-DNAs with expressed genes. By recreating this naturally occurring process in a laboratory setting, we aim to discuss the science behind GM plant production and thus help alleviate concerns over GM plants.

Poster U67 – John Placke
Mentor: Yipeng Sui
Title: *The Potential Impacts of Sweetener Metabolite Steviol on Dyslipidemia*

Background: 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. There is a growing concern about the adverse effects posed by stevioside usage. Stevioside, which is not absorbed in the digestive tract, is hydrolyzed into the aglycone steviol 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. 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 cardiovascular system, such as dyslipidemia.

Objective: Our study aims to explore the cellular and molecular mechanisms by which exposure to steviol activates human PXR and increases the risk of dyslipidemia.

Methods: Both human hepatic and intestinal cells were used to test if steviol was a PXR agonist via cell-based transfection assay. The key residues within PXR's ligand-binding pocket that steviol interacted with were investigated using computational docking study together with site-directed mutagenesis assay. Human intestinal cells were treated with steviol and/or PXR antagonist resveratrol (RES) to estimate the functions of steviol in cholesterol uptake.

Results: Steviol was identified as a selective agonist of PXR with higher activities on human PXR than mouse PXR. In the presence of steviol, human PXR dissociated from its nuclear co-repressors in a dose-dependent way. The key amino acid residues that were essential for the agonistic effects of steviol within PXR's ligand binding pocket were established. Mechanistically, steviol induced the gene expression of key

intestinal cholesterol transporters, which led to the increased cholesterol uptake by intestinal cells. Future studies in mice are needed to explore if exposure to steviol alters the plasma lipid profiles in a PXR-dependent manner. Our study provides potential evidence for the future risk assessment of steviol on cardiovascular disease, such as dyslipidemia.

Poster U68 – Matthias Becker
Mentor: Melissa Wuellner
Title: *Thermal Tolerance of Plains Topminnow*

Plains Topminnow (Fundulus sciadicus) are native to the Platte and Loup River systems in Nebraska. Across the Great Plains, this species has declined in its distribution and abundance due to habitat loss and introductions of non-native species. In Nebraska. this species is listed as a species of concern. The state of Nebraska comprises >60% of the distribution of Plains Topminnow and currently lists the species as a Tier 1 at-risk species. Conservation of existing population and reintroduction of Plains Topminnow into historical waters requires an understanding of their habitat requirements, including appropriate water temperatures. Previous research has indicated that this species can tolerate a wide range of temperatures; however, prairie streams are expected to become warmer under climate change projections. Understanding the upper lethal limits of temperatures can be important for identifying stream segments where Plains Topminnow are expected to persist as well as segments where reintroductions may be possible. The objective of the study is to determine the thermal tolerances of plains topminnow. I will use a series of tank experiments to determine the critical thermal maximum (CTmax) of Plains Topminnow, where I will slowly raise the water temperature by 1 degree Celsius every 10 minutes before loss of equilibrium is observed in the fish. Then, the fish will be replaced in a recovery bath of water to observe whether recovery. If the fish recovers, then the maximum temperature of the test tank will be recorded. At least 20 fish will be used for this experiment. Results from this research can be used by the Nebraska Game and Parks Commission and other state agencies where Plains Topminnow occur to inform rearing, conservation, and reintroduction efforts.

Poster U69 – Emma Dowhower
Mentor: Bryan Drew
Title: *Flora of the Willa Cather Memorial Prairie*

The Willa Cather Memorial Prairie, near Red Cloud, Nebraska, is one of the largest extant tallgrass prairies in the state. The flora of the prairie not been surveyed since a

series of surveys ending in 1978. This research aimed to conduct a floristic survey on the Willa Cather Prairie and compare the current findings to the previous surveys. Our goal was to investigate the ecological changes that have occurred in the 48-year span since 1978. Additionally, we looked at the impact of management practices on the species composition of the prairie, with special interest on how invasive species frequency has changed. The initial phase of the project involved collecting specimens in the field throughout the growing season. The second phase, which is ongoing, involves identifying each specimen to species. A total of 220 specimens were collected from the prairie, with the most frequently encountered families being Asteraceae (sunflower family), Poaceae (grass family), and Fabaceae (legume family). Given that less than 1% of the original tallgrass prairie remains in Nebraska, the Willa Cather Memorial Prairie provides a valuable opportunity to study the historical and ecological processes of this endangered ecosystem. By comparing current data to that of 1978, this research contributes to our understanding of biodiversity, management practices, and conservation of native species within prairie landscapes.

Poster U70 – Emily Flowers
Mentor: Surabhi Chandra
Title: *Inhibition of Metastasis of Triple Negative Breast Cancer Cells by Black Seed Oil and Thymoquinone*

Patients with breast cancer have a higher chance of cancer metastasis throughout the body, including to bones, lymph nodes, lungs, liver, and brain. Diabetic individuals experience a 10-20% higher risk of breast cancer development and subsequent metastasis. There has been limited success in finding methods of reducing this metastatic behavior of cells. We studied black seed oil (BSO) as well as its active compound, thymoquinone which have been used as over-the-counter health supplements with anti-cancerous properties. Thymoquinone is active as an anticancer agent, and BSO can reduce inflammation and diabetes, therefore we hypothesized that both will reduce migration and metastasis of breast cancer cells. To test this hypothesis, scratch wound assays were performed with MDA-MB-231 cells (late-stage metastatic triple negative breast cancer cells), treated with thymoquinone or BSO. After 24 hours, the area of the scratch wound was analyzed and compared to a control group. Transwell migration assays were also performed with cells after 24 hours of treatment, and migratory cells were counted and compared to a control group. Normal glucose (5G) and elevated glucose (25G) media were used to simulate non-diabetic and diabetic environments. The scratch wound healing assay showed limited inhibition of metastasis using Black Seed Oil at 6µg/ml and 12µg/ml. Total cell death was observed at 10µM Thymoquinone treatment. Findings of the transwell migration assays showed a limited inhibition of metastatic ability of cells with 1µM Thymoquinone

in 5G and 25G environments, but further investigation is necessary to determine the extent of the inhibition. Although our final results are not conclusive, treatment with black seed oil and thymoquinone has not yielded results to support that they significantly reduce triple negative breast cancer cell metastasis.

Poster U71 – Hailey Fuqua
Mentor: Jayne Jonas-Bratten
Co-Authors: Letty Reichart, Gregory Pec
Title: *Evaluation of plant and soil characteristics to identify changes needed to increase usefulness of existing waterfowl habitat*

In south-central Nebraska waterfowl are common migrants, during spring and fall, and some species also breed here. Some landowners along the Platte River would like to modify existing habitat to better serve waterfowl needs. Specifically, this project focuses on a location along the Platte River where waterfowl have been observed. The objectives of this study are to identify current plant species and soil characteristics for this location. We conducted plant surveys and collected soil cores at 30 sites. Plant surveys showed there were 30 different plant species observed. We are currently in the process of analyzing soil cores for root biomass, soil type, soil moisture, pH, and nitrogen. Results from this study will be used to create a habitat management plan that will allow us to recruit more waterfowl to this location. Future goals for this location are to provide food resources and habitat for use by both migratory and breeding waterfowl.

Poster U72 – Jordan Carfield
Mentor: Jayne Jonas-Bratten
Title: *The Extent of Defoliation in Native and Non-Native Grasses to Trigger a Response Mechanism*

Defoliation can trigger significant responses in plants. We asked 2 questions in our research project- What extent of defoliation must happen for a significant grass response to occur? And does grass response differ between smooth brome (non-native invasive) and four native grass species used in grassland restoration? We have one cool season non-native invasive- smooth brome, Bromus inermis. Two cool season grass natives were also used- Canada wildrye, Elymus canadenisis and western wheatgrass, Pascopyrum smithii. The warm season grass natives used include big bluestem, Andropogon gerardii and indian grass, Sorghastrum nutans. We subjected 12 individuals of each of the five grass species to one of four levels of defoliation (0% defoliation, 25% defoliation, 50% defoliation, or 75% defoliation). There were also 12 plants of each species to serve as a baseline for determining the amount

of leaf area to remove for each defoliation treatment. After allowing 3-4 weeks for plants to regrow, we will determine the leaf area and biomass of each grass individual. We will present our preliminary results and discuss whether our findings suggest a threshold level of herbivory at which grass growth switches from being able to compensate for loss of leaf area to being unable to recover from herbivory. We will also examine if the non-native grass has a higher threshold than the native species.

Poster U73 – Tanner Theis
Mentor: Catherin Johnson
Co-Author: Joelle Gilmore
Title: *Androgen Deprivation Therapy-Induced Osteoblast Changes*

Prostate cancer (PCa) is one of the most prevalent cancers among men. PCa is typically treated with androgen deprivation therapy (ADT), which includes androgen receptor inhibitors like Enzalutamide, however these treatments can be problematic. Due to the development of Enzalutamide resistance and the eventual metastasis of the cancer, PCa has a high mortality rate. Bone is the most frequent site of PCa metastasis, and the interaction between cancer cells and the bone environment contributes 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, osteoblasts in this case, has not been. Osteoblasts were chosen for this study because they are the cells that form bones. Osteoblasts' reaction to Enzalutamide is important because it could explain the patient's loss of bone. The changes that Enzalutamide causes in the osteoblasts could also lead to formation of an environment that favors tumor progression. This study examined the effects of Enzalutamide on osteoblast viability and differentiation using the cell line MC3T3-E1. We treated osteoblasts with differing concentrations of Enzalutamide and measured cell viability using Trypan blue. Alizarin red was used to determine the differentiation of the osteoblast cells. Understanding the impact of Enzalutamide on osteoblasts is crucial for assessing bone related side effects of ADT and its role in metastasizing PCa progression. Our findings may provide insight into the implications of using AR-targeted therapies on the bone environment and help to make new strategies that reduce complications in PCa patients.

Poster U74 – Emma Flanders
Mentor: Nicholas Hobbs
Title: *Effect of Food Insecurity on ULK4 Expression in Mice*

Mammals can experience symptoms of anxiety through different stress-induced situations. One such potential factor is food insecurity. Currently, there are many studies correlating expression of different genes with anxiety-like behavior, such as ULK4. However, it is unclear if anxiety-like behavior resulting from food insecurity is associated with changes in ULK4 expression. The overall goal of this research is to determine if ULK4 expression differs between mice that had constant access to food and those that were food-deprived for 24 hours. Brain tissue was collected from mice after testing them for anxiety-like behavior using the elevated plus maze following these treatments. We will use qPCR to determine if significant differences exist in the expression of ULK4. This study will allow us to determine if anxiety-like behavior caused by food insecurity is associated with changes in ULK4 expression.

Poster U75 – Bernadette Fulton
Mentor: Bryan Drew
Title: *Lamiaceae and phylogenetic relationships between Nepeta, Heterolamium, Drepanocaryum, and Lophanthus*

The plant family Lamiaceae (mints) are a large and economically important group of flowering plants, widely known for their importance in horticulture and medicinal properties. Nepeta is one the largest genera within Lamiaceae, with about 260 species. This genus ranges from montane regions in East Asia to the Mediterranean region. However, there are questions surrounding the phylogenetic classification of Nepeta: Should this genus be considered monophyletic? Should certain species within Nepeta retain their nomenclature? This research project aimed at answering these questions. We used DNA sequencing from both chloroplast and nuclear gene regions to investigate relationships within Nepeta. Our results indicate that Nepeta should not be monophyletic as currently classified. There are other genera (Lophanthus and Drepanocaryum) that are embedded within Nepeta. The results indicate there need to be nomenclature changes within Nepeta. Further study is required to determine specific nomenclatural changes and to extend the findings of this research project.

Poster U76 – Hernan Vargas
Mentor: Surabhi Chandra
Title: *Analyzing the Effects of Glucose & Focal Adhesion Kinase Inhibitor on the Cytoskeletal Structure of Breast Cancer Cells through Fluorescence Microscopy*

Breast cancer progression is influenced by metabolic factors, including glucose levels, which can alter the cytoskeletal structure and promote metastasis. This study investigates the effects of glucose with focal adhesion kinase (FAK) inhibition on the

cytoskeletal structure of breast cancer cells, with a focus on actin filaments. MDA-MB-231 breast cancer cells were cultured in DMEM/F12 media supplemented with 5% fetal bovine serum and treated with either low glucose (5 mM) or high glucose (25 mM) in the presence or absence of a FAK inhibitor (10 μM). Cells were fixed with formaldehyde and analyzed using fluorescence microscopy to assess actin filament organization. Fluorescence intensity was calculated using Corrected Total Cell Fluorescence (CTCF). Our findings show that high glucose levels weaken the cell's cytoskeletal structure and this is achieved through the FAK pathway. Inhibiting FAK helped prevent these changes, suggesting that FAK is a key component in how glucose affects the shape and structure of breast cancer cells. These results support the hypothesis that diabetes promotes cancer progression by altering the cytoskeleton and highlight FAK as a potential treatment for limiting metastasis in breast cancer patients.

Poster U77 – Darcey Taylor
Mentor: Jacob C. Cooper
Title: *Vocal variation in Hylia prasina*

The Green Hylia (*Hylia prasina*), one of only two members of the family Hyliidae, is a taxonomically unique bird found throughout Afrotropical forests. Despite limited morphological variation between populations, there are only two known subspecies located on Bioko Island, an island of Equatorial Guinea, and mainland Africa. Genomic evidence shows major genetic breaks suggesting long periods of isolation, indicating that there is unrecognized diversity within Hylia, with populations within *Hylia* prasina exhibiting deep divergences – including up to 5% total mitochondrial sequence divergence. In light of this discordance, I performed the first-ever species-wide analysis on songs in *Hylia* to gauge regional variation. Evolutionarily, sound can be classified as a prezygotic barrier which can aid or inhibit organisms from mating successfully. In avian species, this can be seen in individuals who are attracted to specific songs and calls from individuals of the opposite sex, ultimately acting as a form of species recognition in contact zones. All populations of *Hylia* appear to have a distinct whistle-like "kee-kee" song and a rattle-like trill call. I analyzed over 50 recordings from Xeno-Canto and the Macaulay Library using RavenPro 1.6 and R 4.4.2 to see whether vocal differences align with known genetic breaks. These data will help clarify biogeographic breaks between different *Hylia* populations and provide more information on the diversity within Hylia.

Chemistry

Poster U78 – Linus Borer
Mentor: Haishi Cao
Title: *Investigate the photophysical properties of 1,8-naphthalimide driven by photoacidity*

Photoacids exhibit unique photophysical properties that are primarily based on excited-state proton transfer (ESPT) in various solvents. We recently synthesized five derivatives of 1,8-naphthalimide as photoacids. These derivatives demonstrated a significant Stokes shift and prolonged emission due to ESPT in different solvents. The conjugation and substituents of the photoacids play a crucial role in influencing ESPT. These findings offer a novel strategy for the preparation of fluorescent dyes with extended emission, utilizing 1,8-naphthalimide as a foundational structure.

Poster U79 – Tobias Kraft
Mentor: Hector Palencia
Title: *Breaking Through the Barrier: Silver-NHC Complexes as Powerful Biofilm Fighters*

Antibiotic resistance is a growing medical concern, with the potential for a pandemic and limited resources to combat it. Overuse and misuse of antibiotics in humans and animals accelerate resistance, while pharmaceutical companies invest little in new antibiotics. This gap is filled by academic researchers exploring alternative treatments. Silver and gold, used since ancient times, are non-toxic and effective antimicrobials. Silver, widely used as a disinfectant, inspired the development of topical antibiotics. In the early 2000s, silver-N-heterocyclic carbenes (NHCs)
emerged as transfer agents in metal complex formation. Later, they were found to have catalytic and antibiotic properties, with biological activity influenced by NHC structure. As demonstrated in our group, stable silver complexes show high activity against bacteria like E. coli and Staphylococcus aureus, including biofilms.
Biofilms are resilient bacterial communities forming polymeric barriers that block antibiotics. They contribute to bacterial vaginosis, UTIs, catheter infections, middle-ear infections, dental plaque, gingivitis, and more severe conditions like endocarditis and infections in cystic fibrosis. Their resistance makes them particularly challenging in a pandemic. Our research has identified NHC-silver complexes capable of significantly reducing biofilm populations—an exciting breakthrough given their resistance to conventional antibiotics.

Poster U80 – Haley Hernandez-Sandoval

Mentor: Haishi Cao
Title: *Investigating the 1,8-naphthalimide-based fluorescent probe for H2S detection*

Hydrogen sulfide (H_2S) is an important gasotransmitter and endogenous signaling molecule involved in various physiological and pathological processes in the human body. Due to its critical biological roles, accurately detecting and quantifying H_2S is essential for understanding its functions in biological systems. However, current detection methods often suffer from limitations such as poor selectivity, slow response time, and interference from other biological thiols or other complications. In our research group, we have developed a family of reaction-based fluorescent sensors utilizing dinitrobenzenesulfonate as our main component. These sensors exhibit high selectivity and sensitivity toward H_2S, enabling rapid detection in various aqueous environments. Our results demonstrate that upon reaction with H_2S, the sensors undergo a significant fluorescence enhancement, allowing for real-time monitoring with minimal background interference. The fast response time of these sensors makes them promising candidates for further biological and medical applications, particularly in investigating H_2S-related signaling pathways in our body. Future work will focus on optimizing the sensor design to enhance stability, improve detection limits, and expand their applicability in complex biological samples such as cell cultures and tissue models. This study contributes to the development of reliable tools for H_2S detection, advancing our understanding of its roles in human health and disease.

Poster U81 – Trey Schuyler
Mentor: Frank Kovacs
Title: *Characterization of ligand binding to the human fatty acid binding protein form 5 (FABP5) 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 FABP5, 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 U82 – Francisco Cantillo
Mentor: Christopher Exstrom

Co-Authors: Scott Darveau, Norkazu Igusa, Graham Kaufman, Daniel Egbebunmi, Jeffery Shield, Craig Zuhlke
Title: *Embedding of fluorinated xerogels into femtosecond laser processed Al-2219 metal: Surface penetration and impact on physical properties.*

The femtosecond laser surface processing (FLSP) of metals produces surfaces with micro- and nanoscale features that can have subsurface nanoporosity to depths on the order of microns. Structural stability of this porous region and potential thermal and wetting property control can be achieved through the embedding of silica xerogels. We report the embedding of xerogels, prepared from triethoxy(3,3,3-trifluoropropyl)silane in an ethanol/water solution using sequential HCl and NH3(aq) catalysts, into FLSP Al-2219 metals. Reaction sols were wicked into the metals prior to gelation, and the samples were dried in air at room temperature. Scanning electron microscopy, transmission electron microscopy and energy dispersive x-ray spectroscopy analysis on sample cross sections revealed that xerogel penetrated through most of the nanoporous region. Some excess gel was observed on the surface, and the maximum peak-to-valley surface roughness was reduced from 41.2 to 20.29 mm as a result of the xerogel embedding. However, there is evidence that over time, roughness increases due to gel pore shrinking. The hydrophobic nature of the gel (water contact angle = 132o on gel films) significantly reduces capillary stress and surface cracking compared to FLSP metals with embedded tetraethoxysilane-based xerogels. Effects on wetting properties of the FLSP metal samples are in progress and will be discussed.

Poster U83 – Samantha Bursaw
Mentor: Kristy Kounovsky-Shafer
Co-Authors: Jade Salgado, Esmeralda Mendez Ortiz
Title: *Using 3D printed devices to elute and concentrate S. cerevisiae DNA*

Identifying large variations in a genome can be cumbersome. However, using large DNA molecules that span the genomic variations aids in assembling the variation. Due to the DNA molecule's large size, routine molecular biology techniques can break DNA. Therefore, a method was required to prevent the breakage of DNA during cell lysis and be able to concentrate DNA. S. cerevisiae cells were embedded in an agarose insert, the cells were lysed open, and the DNA remained behind in the agarose. To help elute the DNA from the insert and concentrate the DNA in the solution, a bis-acrylamide roadblock was cured in the 3D-printed device to concentrate DNA at the interface between the roadblock and solution. The agarose insert with S. cerevisiae DNA was loaded into the 3D-printed device, and a voltage was applied. The S. cerevisiae DNA was stained with YOYO-1 dye to track the progression of DNA through the device. Different voltages and run times were tested to determine how

much DNA could be eluted and concentrated in the 3D-printed device. Additionally, the DNA inserts were run on a pulsed-field gel to determine how much DNA remained in the insert and which size of molecules eluted from the insert.

Poster U84 – Noah Shackelford
Mentor: Michael Moxley
Co-Authors: Brandon Hollister, Allen Thomas
Title: *Targeting the lipoamide binding site of pyruvate dehydrogenase kinase (PDK) to treat metabolic disease*

The pyruvate dehydrogenase complex (PDC) is a complex of three enzymatic units that links two pathways of central metabolism, glycolysis and the tricarboxylic acid cycle. PDC activity is regulated in part by its inhibitor, pyruvate dehydrogenase kinase (PDK), with overexpression of PDK being associated with numerous metabolic disorders including various forms of cancer, type 2 diabetes mellitus, and heart disease. An extensive virtual screen was performed, in which chemical structures from the Enamine database were docked with the lipoamide binding site of the isozymes PDK 1-4. Chemical structures with high docking scores by screening were then purchased commercially or synthesized in house and tested for their activity against PDK via a PDC-coupled assay. Compounds that demonstrated significant inhibition of PDK underwent further concentration-dependent testing to determine half-maximal inhibitory concentrations (IC50) as an estimate of potency. Hit compounds identified by the enzymatic assay would be studied with more complex parameter computer simulations in order to identify important noncovalent interactions within the lipoamide binding pocket. These efforts led to the purchase and synthesis of additional chemical analogs of hit compounds to better elucidate the structure-activity relationship (SAR) of PDK lipoamide site inhibitors. Further research into these compounds and related structures is ongoing, with the goal of yielding compounds useful in the treatment of metabolic disease.

The project described was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under Grant # 5P20GM103427 as well as NIH NIGMS Grant # 1R15GM152925-01.

Poster U85 – Nate Lilla
Mentor: Michael Moxley
Title: *Virtual and Experimental Mycobacterium tuberculosis E3 Lipoamide Inhibitor screening and MD simulations*

Tuberculosis (TB), caused by *Mycobacterium tuberculosis* (Mtb), remains a major global health challenge, with millions of new infections annually. Lipoamide dehydrogenase (E3) is a key enzyme in Mtb metabolism, but it is also a part of an enzyme complex (PNR/P) responsible for reactive nitrogen species neutralization required for evading the host immune system. Therefore, targeting E3 with small-molecule inhibitors is a promising therapeutic approach to kill Mtb. In this study, we performed a virtual screening of 15 million drug-like compounds from the ZINC database using molecular docking to identify potential inhibitors of Mtb E3 that are selective for the Mtb enzyme over the human version. From the initial screen, 62 commercially available compounds were purchased and tested in *in vitro* kinetic assays. While the first round of screening did not show inhibition at the tested concentrations, molecular dynamics (MD) simulations of known Mtb E3 lipoamide site inhibitors were able to test a hypothesis regarding inhibitor/E3 interactions. These simulations showed that subsequent generations of lipoamide site inhibitors interacted more often with Arg-93 than earlier generations, confirming the importance of Arg-93 for more effective inhibition. MD simulations of lipoamide site inhibitor/Arg-93 interactions provide further support for future lipoamide site inhibitor design targeting this interaction.

Poster U86 – Riley Grieser
Mentor: Haishi Cao
Title: *Understanding the Solvation Effect for 3-hydroxyl-1,8-napthalimide*

The solvation effect of 1,8-naphthalimide, a prominent organic compound, plays a pivotal role in various chemical processes and applications. Due to its unique molecular structure, characterized by a rigid naphthalene backbone fused with imide functionalities, 1,8-naphthalimide exhibits intriguing solvation behavior. In solution, the molecule undergoes solvation by surrounding solvent molecules, leading to changes in its electronic structure, photophysical properties, and reactivity. The solvation effect influences its fluorescence emission intensity, quantum yield, and excited-state dynamics, making it a valuable fluorophore in diverse fields such as fluorescence sensing, bioimaging, and materials science. Understanding the solvation behavior of 1,8-naphthalimide is crucial for tailoring its properties and optimizing its performance in various applications. In this project, we synthesize 3-hydroxy-1,8-naphthalimide and investigate its solvation effect in various solvents.

Poster U87 – Martin Lopez
Mentor: Kristy Kounovsky-Shafer
Co-Authors: Breyer Menke, Charlie Polen, Esmeralda Mendez Ortiz

Title: *Inverted agarose inserts: A novel method to protect large DNA molecules during cell lysis*

Large DNA molecules allow for easier assembly of large variations. However, the DNA molecules' fragility means they must be protected during cell lysis to keep the molecules full length. This method demonstrates a great way to protect DNA and allows easy access to the solution by inventing inverted inserts. The agarose gel acts as a container for DNA in a liquid state and allows for the diffusion of chemicals but not the escape of large DNA. A dynamic range of DNA sizes was tested to determine what sizes of DNA remain in the inserts. The DNA concentrations were measured using the DeNovix DS-11 FX+ and ran on an agarose gel. The results show that the inverted insert successfully protects the large DNA. This innovation allows for a reliable method for safekeeping large DNA molecules during cell lysis, critical for longer read lengths in sequencing.

Poster U88 – Tanya Midzi
Mentor: Frank Kovacs
Title: Characterization of ligand binding to the human fatty acid binding protein form 7 (FABP7) 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 FABP7, a form that was initially associated with the brain. 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 U89 – Ben Mathis
Mentor: Mahesh Pattabiraman
Co-Author: Caleb Munson
Title: Optimizing Cucurbit[8]uril Synthesis

Cucurbituril (CB) is a molecule that functions similarly to cyclodextrin but has not been researched to the same extent. Both macrocyclic molecules have uses in the pharmaceutical world for drug delivery and catalysis, but CB has the potential to work better than cyclodextrin in certain areas. This research ultimately aims to study the possible applications of cucurbit[8]uril (CB8) because of its ability to orient multiple molecules within its cavity and its potential for drug delivery; however, there were a

couple issues that had to be resolved first. First, we had to develop a standard method of identifying and quantifying the CBs that resulted from the standard reaction (glycoluril reacts with formaldehyde in an acid-catalyzed reaction). We chose to use Nuclear Magnetic Resonance (NMR) for this purpose. Second, the standard reaction forms primarily CB6 (~85%), with hardly any CB8 being synthesized (<1%).1 We attempted to alter the reaction to produce more CB8, using NMR to identify how the product quantities changed. Previous research changed substrate and acid concentrations, so our research will build off of these ideas.1 Our research was unable to reach the stage of testing CB8 applications, but our standardized identification methods and research of the reaction can be used to begin understanding the potential of CB8.

Poster U90 – Caleb Munson
Mentor: Mahesh Pattabiraman
Co-Author: Ben Mathis
Title: *Optimizing Cucurbit[8]uril Synthesis*

Cucurbituril (CB) is a macrocyclic molecule that has many applications in the pharmaceutical and industrial worlds, specifically for drug delivery and catalysis. Due to CBs hydrophobic internal cavity, It is a host molecule that can house other ions and molecules, even constraining them to a specific orientation. While CB6 and CB7 have applications in this regard, CB8 has even more potential applications as it has room to fit multiple molecules within itself, making it useful for controlling specific multimolecular reactions. In the standard reaction of CB, glycoluril undergoes an acid-catalyzed condensation with formaldehyde: the primary yield is majority CB6 (~85%), some CB5 (~14%), and CB7 and CB8 are barely formed.1 Due to the many potential applications of CB8, maximizing its yield is an important area of research. Therefore, this research aims to modify the reaction in an attempt to maximize the production of CB8 while minimizing others. Previous research has used different acids at various concentrations, as well as different reactant concentrations. Building upon these ideas, we aim to expand this research by further changing the reaction parameters to maximize the yield of CB8. For this research, we utilize Nuclear Magnetic Resonance (NMR) for accurate differentiation of the products after separation.

Poster U91 – Bhavya Sharma

Mentor: Mahesh Pattabiraman
Title: *Predicting Molecular Properties Using Machine Learning*

This project focuses on using machine learning to predict important molecular properties like solubility, boiling point, and toxicity from publicly available chemistry datasets found on GitHub. These datasets cover a wide variety of chemical structures from different scientific sources, making them highly relevant for pharmaceutical research and materials science. The project involves detailed steps such as cleaning the data and generating meaningful features like molecular weight, LogP values, hydrogen bond donors/acceptors, and molecular fingerprints using popular tools like RDKit. Exploratory data analysis will be performed to identify key patterns and relationships between these features and the molecular properties we're interested in. Several machine learning models—like linear regression, random forests, support vector machines, and neural networks—will be carefully developed, trained, and fine-tuned using methods such as cross-validation and hyperparameter optimization. We will measure their performance using metrics like root mean square error (RMSE), mean absolute error (MAE), and R^2 to ensure the models are accurate and reliable. The best models will then be validated on new datasets that weren't part of the training to check their predictive power and ensure they work well in real-world situations.

The goal of this project is to gain valuable insights into how best to predict molecular properties using computational methods, which can significantly speed up and improve the efficiency of drug discovery, materials development, and environmental safety assessments. By using these computational techniques, we aim to make the prediction process faster, more accurate, and cost-effective, which is crucial for rapidly identifying and optimizing molecules for various scientific and commercial use.

Poster U92 – Prajna Das
Mentor: Mahesh Pattabiraman
Co-Author: Joydip Chatterjee
Title: *Analysis of Mint Chemical Composition through Distillation*

Nebraska's climate and soil conditions are conducive to the cultivation of peppermint and spearmint, making it a promising region for mint oil production. In collaboration with the University of Nebraska-Lincoln , different mint cultivars grown at the Scottsbluff extension campus are analyzed for oil yield and chemical composition. This study explores the impact of various additives on the distillation process to enhance oil quality and composition. Additives such as sodium chloride, potassium chloride, sodium nitrate, potassium nitrate, and co-solvents like dimethyl sulfoxide and

cyclohexanol have been tested. Preliminary results indicate notable variations in yield and the relative abundance of key aromatic compounds. This poster presents our findings resulting from the presence of these additives in the distillation mixture as analyzed by GC-MS method. Understanding these effects will help us optimize extraction efficiency and improve the commercial viability of mint oil production. Further studies will refine the selection of additives to enhance oil purity and maximize desirable constituents.

Poster U93 – Ethan Brockman
Mentor: Frank Kovacs
Title: *Measurement of binding constants of Fasciola hepatica fatty acid binding protein (Fh-V) for potential drug molecules*

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 dollars. This organism depends on fatty acid binding proteins for lipid metabolism, which are a potential target for drug development against the parasite. In this work, we have initiated a study to characterize the binding of different ligands to an F. hepatica fatty acid binding protein known at form V (Fh-V). 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 binding results for a drug that is used to treat parasitical infections

Mathematics & Statistics

Poster U94 – 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 systems of equations:

$$\begin{bmatrix} x_{n+1} \\ y_{n+1} \end{bmatrix} = \begin{bmatrix} ax_n + by_n + c \\ lx_n + my_n + n \end{bmatrix}$$

$$\begin{bmatrix} x_{n+1} \\ y_{n+1} \end{bmatrix} = \begin{bmatrix} \frac{ax_n+c}{y_n} \\ \frac{my_n+c}{y_n} \end{bmatrix}$$

A fixed point is where the input of a function results in an equal output. Our research question is the following: Given a function that takes a number from the Cartesian plane to itself, when does this occur and what is the behavior of the points surrounding the f ixed point? Taking the systems above, we find where f(⟨xn+1,yn+1⟩) = ⟨xn+1,yn+1⟩ when a, b, c, l, m,n ≥ 0. To find these fixed points, we rely on the fact that the matrix A – I is invertible if det(A–I) is invertible, investigating both when det(A–I) is invertible and when it is not. Then we examine the other points in these systems to determine the properties of the fixed points, that is, if they are stable or unstable. Finally, we test in an attempt to see if we can find fixed points of these systems if negative parameters are allowed, generalizing them to all four quadrants of the Cartesian plane. This project builds off the work Weiss's On the Equilibria of a Four-Parameter Rational Planar System of Difference Equations.

Physics, Astronomy, & Engineering

Poster 95 – Barrett Lee
Mentor:
Joel Berrier
Title: *Investigating Galactic Evolution Through Computer Generation of High Redshift Galaxies Utilizing IllustriusTNG and EAGLE Simulated Data II. Developing an Artificial Intelligence Model to Facilitate Organization and Classification of Galactic Spiral Structures*

In this work, we explore two approaches to understanding galaxy morphology. First, we adapt a pre-existing code to construct synthetic galactic images. The second refines

data for an AI algorithm to utilize and identify spiral structures in galaxies. Utilizing data from the IllustriusTNG and EAGLE simulations, we aim to visualize galaxy formation over cosmic time by focusing on high-redshift galaxies. We are employing a raytracing code to simulate observations of these galaxies and are adapting pre-existing computational code to build galactic images particle by particle. The code incorporates Stellar Population Synthesis models, the FIREFLY ray-tracing model, Smoothed Particle Hydrodynamic simulations, and mimics observational properties of telescopes to create realistic mock images for direct comparison with the Sloan Digital Sky Survey (SDSS) and Apache Point Observatory data. Our goal is to adapt the code for JWST higher redshift capabilities. In addition, we are training an Artificial Intelligence (AI) model to identify and map spiral structures of galaxies. We are taking the greyscale images from the Carnegie-Irvine Galaxy Structure Survey (CGS) and removing all background stars within the images. The model is designed to find galactic spiral structure, so the removal of background stars refines the input data to smoothly run the generative model in the following steps of our group's workflow. We intends to train the AI model to map the spiral structure and furthermore, measure individual pitch angles in the next phase.

Professional & Applied Studies

Accounting Finance & Economics

Poster U96 – Rina Matsumoto
Mentor: Constance Li
Title: *The value relevance of sustainability disclosure*

There is a global trend towards requiring disclosure of information related to the environment, social, and governance (ESG). However, the U.S. Securities and Exchange Commission (SEC) Regulation S-K has not kept up with this trend. The main reason for this gap is the lack of evidence for the relationship between improved ESG performance and improved financial performance of entities. Although there have been many studies attempting to analyze the relationship between ESG information and financial performance, the ESG information's part has been inconsistent, and it cannot be said that an integrated conclusion has been reached. The purpose of this research is to provide insight into the value relevance of sustainability disclosure and to consider the ESG information that entities should disclose in the future. To do this, I first clarify the differences between ESG, sustainability, and corporate social responsibility (CSR), which are often used interchangeably. Next, by reviewing and organizing existing literature on the relationship between ESG information and financial information, I clarify the points that affect financial performance in ESG information disclosure. I also focus on comparability, which is often a problem in ESG disclosure. ESG scores are commonly used as comparable indicators, but they are calculated using different methodologies across various rating agencies. This research contributes to the debate on ESG disclosure by identifying the important factors of ESG disclosure that are useful for stakeholders and providing insights into the role of it in corporate reporting.

Business & Technology

Poster U97 – Anh Ho
Mentor: Ngan Chau
Title: *Short-form video marketing on social media*

Social media marketing is important in shaping an influencer's image and increasing their visibility. This study examines main factors contributing to the popularity of short-form videos on social media, with a focus on TikTok and Instagram platforms. By reviewing existing research and analyzing collected data, this study aims to understand how influencers use short-form videos to attract and engage their audience.

The study collected data from over 700 TikTok and Instagram videos using Apify, a third-party cloud-based web scraping platform. These videos were created by influencers across four categories: mega, macro, micro, and nano influencers. By examining characteristics of authors, video attributes, platform specific features, the study identified important factors influencing the performance of a video, such as engagement levels and audience interactions.

The findings from this study provide practical insights into the effectiveness of various tactics employed by influencers. As a result, this research offers practical recommendations for marketers and aspiring influencers to optimize content strategies for brand growth.

Communication Disorders

Poster U98 – Megan Wells
Mentor: Jane Roitsch
Title: *Perceptions of Male Speech Language Pathologists' Professional Identity, Barriers, Mentorship and Careers: Survey Report*

Speech-language pathology (SLP) is a field traditionally dominated by women. However, as the profession evolves, there is growing interest in understanding the experiences and challenges faced by male SLPs (McCullough et al., 2011; Azios & Bellon-Harn, 2021). A research project that surveys male SLPs through the American Speech-Language-Hearing Association (ASHA) special interest groups (SIGs) offers valuable insights into this underexplored demographic. This research project involves a survey distributed to male speech-language pathologists through various ASHA Special Interest Groups (SIGs). The survey will aim to gather qualitative and quantitative data on the professional experiences, challenges, and perceptions of male SLPs, both in clinical practice and in educational settings. By targeting SIGs, the survey can reach a broad spectrum of male practitioners, including those working in different areas such as pediatrics, adult rehabilitation, or school settings.
The survey will address key topics such as:

Professional Identity: How male SLPs perceive their role in a female-dominated profession.

Barriers and Challenges: Gender-related obstacles, stereotypes, or biases they face in the workplace or in professional interactions.

Career Advancement: Opportunities for career growth and development compared to their female counterparts.

Mentorship and Support Networks: The presence or absence of male mentors and peer support in the field.

Data collected will be analyzed to identify trends and common themes, which will then be used to inform recommendations for fostering a more inclusive and supportive work environment for male SLPs.

Poster U99 – Jamie Lintel

Mentor: Philip Lai
Title: *Variability in Gestures in Children with Autism Spectrum Disorder during a Social Task and the Social Responsiveness Scale-2*

The Social Responsiveness Scale-2 (SRS-2) is a 65-item questionnaire designed to measure the severity of social and affective impairments. This study used the Total T-Score, which provides an overall measure of autistic behaviors based on parent or caregiver observations in natural social settings. Children with Autism Spectrum Disorder (ASD) have significant social communication impairments that interfere with everyday life skills. The disorder affects an estimated 1 in 36 children in the U.S. according to the Centers for Disease Control and Prevention (CDC; 2024). One area gaining attention in ASD research is the parent's role and their effectiveness in providing interventions and treatments to their child with ASD. This study examined communicative hand gestures among children with ASD during a parent-child social interaction task. Participants included 32 children aged 4–8 and their parents, with 16 in the typically developing (TD) group and 16 in the ASD group. The free-play task lasted 25 minutes using researcher-provided toys: *Mr. & Mrs. Potato Head* and *Little People Animal Sounds Farm*. Parents were instructed to "play with your child as you normally would at home." Child gestures were video-recorded and coded using Eudico Linguistic Annotator (ELAN) software for detailed analysis. The TD group had an average SRS-2 T-score of 49.56, which falls within normal limits. Gesture counts in the ASD group showed notable variability: one participant produced 94 gestures, while two others produced only 8, with corresponding T-scores of 71, 80, and 84. Results indicated that fewer gestures were associated with severe impairments ($T \geq 76$), whereas higher gesture counts correlated with moderate impairments ($T = 71$). These findings highlight heterogeneity in nonverbal communication among children with ASD, emphasizing the importance of assessing gestures in social communication. Future research will examine verbal communication patterns to further explore their interaction with nonverbal behaviors in ASD.

Poster U100 – Noelle Abels
Mentor: Ladan Ghazi Saidi
Co-Author: Moriah Gilman
Title: *The Effects of Reading in Native Language on Cognition in Older Adults*

Aging comes with cognitive decline. The literature on cognitive interventions to boost cognition at aging is controversial. However, there is evolving evidence that suggests engagement in activities that activate parts of the brain involving cognition can improve or close the regression of cognitive health with aging (Stern, 2003; 2019)

Previous studies in our lab suggest that learning involves parts of the brain involved with each cognitive process (I.e., attention, memory, reasoning, auditory and visual processing, and processing speed) (Ghazi Saidi, et al., 2013; 2017; 2019). In this study, we are investigating the effects of reading in the native language on cognitive performance.

This is a longitudinal pre-post-intervention study. Older adults are recruited via social media, websites, and flyers. A series of cognitive assessments are administered to participants before and after the start of the reading intervention. This allows researchers to assess the neurocognitive effect of reading intervention. Participants agreed to complete at least 60 minutes of reading each day on their tablet for five days a week over the duration of 4 months. Cognitive performance is assessed using a series of cognitive tasks and tests including Montreal Cognitive Assessment (MoCA, Verbal Fluency, Stroop Tasks, Simon task, non-word repetition, and Symbol Digit Test. Results: This is an ongoing study. To date, we have recruited 37 participants, 23 of whom have completed Pre-assessment, and 11 have completed the intervention and the post-assessment. The adherence analysis shows that participants spent a minimum of 4,660 minutes and a maximum of 32,285 minutes on Reading.

Data collected at pre and post-intervention will be compared using spss. The results will be analyzed in the context of the literature on cognitive stimulation and cognitive reserve in older adults and healthy aging.

Poster U101 – Kinley Helmer
Mentor: Ladan Ghazi Saidi
Co-Author: Moriah Gilman
Title: *Exercise as an Intervention for Cognitive Health in Older Adults*

As humans progress in their lives, so does the risk of cognitive deterioration and dementia in the older population (Lam, 2011). With no immediate treatments for Alzheimer's disease, researchers and scientists must 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 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 researching a less strenuous physical activity or anaerobic exercise (stretching and toning) (Anderson-Hanley, 2010).
Our ongoing study tests how anerobic exercises (stretching and toning) affect the cognitive health of adults aged 60-80. Potential candidates are recruited via flyers/social media and then take a survey to gauge their qualification. We assess participants pre and post intervention. The pre and post assessments include verbal fluency, nonword repetition, digit symbol task, the Simon task, the Stroop task, MMSE, and MOCA. Participants are asked to exercise 30 minutes a day, 5 days a week, for 4 months. I work first-hand with the participants and communicate with them through emails, phone calls, and zoom. I then monitor their progress and record their data in an Excel sheet. Upon completion, they are given the same assessments and receive a $20 gift card for partaking in the study.

We currently have 10 active participants, four participants have dropped the intervention, and four participants have completed the study. Data collected before and after the intervention will be analyzed using SPSS. The findings will be interpreted in relation to existing literature on cognitive stimulation, cognitive reserve in older adults, and healthy aging.

Cyber Systems

Poster U102– Alexis Bernthal
Mentor Adam Spanier
Co-Author: Klayton Pagel
Title: *Note Generation for Therapists using Innovative Technology*

Medical billing and notetaking are burdensome and time consuming activities for caretakers. As counseling gets more popular, paperwork and note taking for therapists evolves. We aim to create a software solution that therapists can use for easy MSE, TX, and SOAP note generation. We have (1) Found patterns in the SOAP note methodology, (2) Created useful games/questionnaires that can acquire data, (3) Put together a software platform that can generate data. Steps that have been taken include: Learning to acquire a domain name, writing newsletters, outreaches, and reviews, investigation into specific notetaking methodologies used, research into the aesthetic look and feel of software, and analysis of survey results. During this process,

we have undergone a customer discovery process, completed market research, worked with programming tools like PyCharm, React, and Django, and competed in the Nebraska Governor's Challenge of 2025. Adjustments to this research and the next iteration of software have been based on feedback and experience.

Poster U103– Klayton Pagel
Mentor: Adam Spanier
Title: *Software for Physical Therapists in Rural Areas*

Rural mental health professionals have several tasks that they need to take care of. Everything from the listening and assisting their patients to the notetaking and billing. On top of these requirements they are doing it alone and running their own businesses. Our goal is to stream line this process for them starting with the notetaking. We currently have found ways to create interactable game like questionnaires for patients to use that generate notes using the SOAP note methodology, and an interface for the therapist to access this data and integrate it with their current health record solution. To get to this point we have done ample amounts of market research and testing, building up prototypes of our software. Along the way we have learned and utilized tools such as, React, Django, Proxmox, Git, and Ansible. We have gained tremendous amounts of knowledge and experience with concepts such as database design, software development and software infrastructure. We are continuing to make iterations of this software to best make a software that can be used to help mental health professionals help others.

Counseling, School Psychology & Family Studies

Poster U104 – Delaney Olmer
Mentor: Tami Moore
Title: *Survey of UNK Undergraduate Females Measuring Baseline Knowledge of Medical Contraceptive and Natural Fertility-Based Awareness Methods*

Medical contraceptives and natural family planning are heavily debated and often misunderstood. These two subjects are hypersensitive when applied to the college aged audience of women, especially when their knowledge of this topic may come from many different sources. Medical contraceptives and natural family planning are prevalent in women's health, and it affects each woman on an intimate level. It is important to educate young women on issues surrounding their own body's. The intended purpose of this study was to gain insight on the undergraduate female students' knowledge on the topic of medical contraceptives and natural family planning.

Data gathered from participants from a mid-western university is presented and analyzed.

Poster U105 – Daniel Pelemo
Mentor: Sharon Obasi
Title: *Social Media and Diabetes Education: A Cross-Cultural Analysis of Nigeria and the U.S.*

Diabetes is a growing global health challenge, affecting millions in both Nigeria and the U.S. As social media increasingly shapes health communication, it plays a crucial role in diabetes education, self-management, and health outcomes. However, the ways in which diabetes-related information is shared and received vary across cultural and healthcare contexts. In Nigeria, where access to healthcare services is often limited, social media serves as a critical source of health education. In contrast, in the U.S., online health messaging is frequently integrated with formal medical systems, influencing both patient engagement and trust in digital health resources. This exploratory study examines how social media is used in both countries to educate individuals about diabetes, comparing communication strategies, audience engagement, and overall effectiveness. Through semi-structured interviews with physicians who work with diabetic patients in Nigeria and the U.S., the study explores professional perspectives on the role of social media in diabetes education. Findings from this research will provide insights into best practices for digital health communication, aiming to enhance the accessibility, accuracy, and cultural relevance of social media-based diabetes education across diverse healthcare settings.

Industrial Technology

Poster U106 – Abby Meyer
Mentor: Dana Vaux
Title: *What are the Psychological Impacts of Aquariums on Human Behavior and Overall Well-Being?*

The purpose of this study was to expand on the knowledge of the impact of aquariums, particularly on human behavior and well-being. Previous research has shown that viewing marine life can reduce stress, anxiety, and promote relaxation. Additionally, people choose to interact with an aquarium when given the opportunity. To gather further intel on these aspects, observations were done at Henry Doorly Zoo and Aquarium in Omaha, Nebraska. Responses on an online survey were collected as well which gathered information like participants' self reported feelings after aquarium visits,

what can enhance their experiences, and their favorite parts of an aquarium. Through observation, I found that most people will spend longer in the places that draw more attention like Doorly's shark tunnel. In the survey, most people reported feelings of happiness, calmness, and awe. They also noted that their prior experiences were improved by the design and lighting of the space as well as attention on certain animals like sharks, sea turtles, and jellyfish. Knowing information like this helps designers to build for the human experience, and create an attraction that will make core memories for visitors.

Poster U107 – Grayson Brummer
Mentor: Dana Vaux
Title: *What Elements of Place Attachment are Needed to Support the Child Placement Community?*

The purpose of this study was to understand the needs of the child placement community and how a specific place could create a sense of belonging using third place attachment. The child placement community has needs that are specific that could benefit to have a specific support center. It is found that more families increase connection when parents are willing to support their child and struggling behaviors decrease, (Goodwin et al. 2024). Although Oldenburg says that third places are public areas, a space specified to a certain demographic can also be a third place because all members have an experience they can relate and empathize with (Glover and Parry, 2008). This study was qualitative and included third place studies from Oldenburg. The researcher held open ended surveys with a variety of groups within the child placement community ranging from ages 20-50. Additionally, reading case studies and observing environments that deemed third place were noted in how people interact with each other and the surrounding space. It was found that most adoptees had trauma and mental health needs growing up and are more prevalent in their young adult years. There were a few participants that turned the interview down due to the emotions it incited. These findings confirmed that a design is needed to accommodate mental health services, training rooms, and social gathering spaces for this community. These results can help designers understand that community centers can be specified to a certain demographic. It can be possible when the design is informed and strategized in a way that benefits a community.

Poster U108 – Abby Mieras
Mentor: Dana Vaux
Title: *Winning the War at Home: How Interior Design Can Support Veterans Struggling with Mental Health and Homelessness*

Veterans face disproportionately high rates of mental health struggles and homelessness, often exacerbated by stigma and lack of resources. This study examines how strategic interior design can support veterans by fostering mental well-being and a sense of community while providing support for homeless individuals. A mixed-method approach was used, including literature review, interviews with experts, floor plan analysis, and site observations at the Kearney Veterans' Home and Crossroads Mission Apartments.

Findings highlight key elements that enhance veterans' experiences, including natural light, accessible layouts, privacy, and meaningful symbolism. At the Kearney Veterans' Home, wayfinding through color and pattern, ADA accessibility, and integration of personal artifacts foster a supportive environment. Crossroads Mission Apartments prioritize autonomy with private living spaces and access to essential resources. The research illuminates the importance of balancing communal and private spaces to encourage engagement while promoting independence.

By applying human-centered design, this study informs best practices for creating spaces tailored to veterans' unique needs. Thoughtful design strategies can improve mental health, support homelessness, and create environments where veterans feel at home—empowering them to rebuild their lives with dignity.

Poster U109 – Avery Day
Mentor: Dana Vaux
Title: *Designing for Development: The Impact of Nature-Inspired, Play-Based Environments on Early Childhood Learning*

This study investigates the role of pre-kindergarten to first-grade environments in learning environments that incorporate nature, outdoor play, and play-based learning in supporting children's cognitive, emotional, and environmental development. Research emphasizes how early childhood environments play a crucial role in shaping cognitive, social, and emotional outcomes (Inan, 2009), fostering a strong foundation for lifelong learning and development. Sensory engagement, which includes natural lighting, interactive materials, and sensory-rich elements, plays a key role in boosting attention, memory, and social interaction, all of which contribute to a well-rounded learning experience (Prins, 2022). Additionally, play-based learning and outdoor environments nurture creativity, problem-solving skills, and social development while also fostering emotional regulation and a deeper understanding of the environment (Kahn, 2018; Rigolon, 2022). This qualitative study utilized site visits, case studies, and interviews

with design professionals to examine the relationship between learning environments and developmental outcomes. Findings emphasize the importance of adaptable, inclusive spaces that support children's individuality and provide a sense of belonging. Holistic, flexible design elements, including biophilic features and optimized indoor-outdoor ratios, were identified as key factors in promoting creativity, engagement, and well-being. The research contributes to advancing design knowledge by demonstrating how intentional learning environments can foster optimal development. By addressing gaps in the design and implementation of nature-integrated, play-based learning environments in schools, the study provides strategies for enhancing early childhood education. Furthermore, its findings have broader applications in healthcare, public spaces, and senior living environments, where sensory-rich, inclusive design promotes long-term well-being. This study offers insights into creating dynamic, supportive spaces that enhance lifelong learning, creativity, and social connection across diverse settings.

Poster U110 – Lisa Miyahara
Mentor: Dana Vaux
Title: *Cultural Differences in Psychological Responses to Colors and Materials in Interior Spaces*

This study investigates cultural differences in psychological responses to colors and materials in interior spaces. In previous literature, cultural differences not only in color and material, but also in interior design elements such as the complexity of interior design and the color and brightness of lighting were revealed. In today's globalized world, where cultural diversity is increasingly important, it is even more essential to understand how design elements affect emotions and perceptions across cultures. A mixed-methods approach incorporating questionnaires and interviews was employed to assess psychological responses to color palette contrasts and materials. The survey analyzed participants' responses to six rendered images of varying value, chroma, and hue contrasts, and to a variety of materials such as wood, stone, and metal. One-on-one interviews provided greater insight into material perceptions through direct interaction with the physical samples. The results revealed that chroma and hue contrasts have a significant impact on spatial perception, with particularly strong effects from hue contrasts observed in Eastern cultures. Preferences for materials such as wood and stone also varied by cultural background. Furthermore, discrepancies in material perception were observed between image and real samples, underscoring the importance of tactile experience in material evaluation. Despite limitations regarding sample demographics and cultural influences, this study highlights the need for understanding cultural preferences for designing spaces that feel comfortable and appealing to the target audience.

Poster U111 – Jenna Balkovec
Mentor: Dana Vaux
Title: *What Design Factors Can Be Utilized In A Space Promoting Action-Oriented Learning and Interaction Between Children?*

This study investigates design factors that enhance children's growth in learning and social interactions. This research was a response to the continual need for such spaces. Past research has correlated the design environment with a learning environment for children however has lacked evidence of design environments that support children's learning and interaction. Additional research has aimed to bridge design environments and interaction but not specifically with children. Utilizing a mixed method approach through interviews and non-participant observation, this study helps to bridge this gap in design research. Interviewing both design professionals and experts in child learning facilities and observations at children's museums provided a foundation of first hand insight into identifying children's behavior and interaction patterns as well as design approaches to consider. Findings involving children's learning behaviors included types of play most and least enjoyed, activities and their targeted age, and types of physical and action oriented learning techniques children adapted well with. During observation of interactions it was noted children preferred independent play most, parental to child play secondary, and child to child interaction least. Within parental to child play, parents most commonly allowed the children to take control of the interactions. Four main classifications of design factors were found as being prioritized in the children's learning facilities: space planning, wayfinding, safety, and material selections. These findings were used as guidelines in designing a new space for a children's museum relocating in a city downtown. In recognizing children as being the most impressionable of humans it is important that designers understand the physical and social environments they accommodate. This study highlights behavioral psychology and design application, allowing it to be utilized in both areas. Additionally, this research offers guidelines for future designers that are functional and promote growth in a stimulating way, such as schools, community spaces, exhibits, children's doctor or counseling offices, and other general areas of play for children.

Poster U112 – Brittany Schlager
Mentor: Dana Vaux
Title: *The Influence of Architecture on Fashion Design*

The purpose of this research was to discover the reciprocal relationship between architecture and fashion design through analysis. Significant historical events correlate with a trend in style of design. In addition, research suggests a distinct correlation between architecture and fashion design as early as the sixteenth century. Popular architectural details such as the Gothic Arch and Ionic Column have appeared in fashion throughout history (Laver, 1949). While similarities are assumed to be coincidental, research suggests that architecture purposefully influences fashion design.

The researcher analyzed the elements and principles of design in architecture and how these elements and principles are present in fashion and then examined twenty fashion pieces, each inspired by architecture. The researcher furthered the analysis of three pieces by developing a design taxonomy using the elements and principles of design. To further understand the use of elements and principles, the designer applied the analysis to a chosen architectural piece and created a full-scale wearable fashion piece inspired by the architecture.

The researcher found multiple trends in architecture and fashion design analysis using the elements and principles. Pattern, line, proportion, and balance displayed nearly identical features. Others, including contrast, color, value, and texture, varied. The findings suggest the correlation between architecture and fashion design is not a coincidence, but rather a useful tool for designing.

When designers are developing a new design, it is useful to analyze an existing design using the elements and principles. Understanding that every new design is based off precedents is useful in assisting the development of new and effective ideas. Understanding the existing correlation between fashion and architecture expands on the method of analysis and presents a new tool for design students and those in the design field.

Poster U113 – Kambree Mockenhaupt
Mentor: Dana Vaux
Title: *Creating Calm Classrooms: How Thoughtful Design Can Address Bullying, Stress, and Anxiety in Elementary Schools*

This research examines how elementary school design can mitigate bullying, stress, and anxiety by fostering safer, more supportive learning environments. While studies highlight the benefits of natural lighting, vibrant colors, and open spaces for student well-being, there is limited research on how design actively prevents bullying and reduces stress. Visibility, ergonomic furniture, and biophilic elements contribute to comfort and mental health, but their direct impact on social interactions and emotional well-being remains underexplored.

Using a mixed-method approach, this study incorporates interviews with educators and surveys of school professionals and parents. Findings suggest that teachers recognize the value of classroom windows, as natural light and outdoor views enhance student engagement. Exposure to nature helps students feel more connected and focused, while small responsibilities, such as classroom tasks, improve productivity. Additionally, ergonomic furniture designed for different age groups enhances comfort and concentration. Flexible seating arrangements and designated quiet spaces further support students' emotional regulation and focus, creating an inclusive environment that accommodates diverse needs.

By identifying key design strategies that promote safety, inclusion, and emotional well-being, this research provides actionable recommendations for shaping school environments that support both academic success and mental health. These insights contribute to a growing understanding of how thoughtful design choices can create positive and inclusive learning spaces. By prioritizing intentional design elements, educators and designers can collaborate to create environments that nurture social-emotional development and foster a sense of belonging among students.

Poster U114 – Chaehong You
Mentor: Heather Meyer
Title: *Does people's emotion to AI media influences on consumer's buying behavior after watching AI advertisement*

This study aims to explore whether consumers' feelings about AI affect their desire to purchase AI when they encounter AI-generated advertisements. The main research questions are perceptions of AI, perceptions of AI advertisements after encountering AI advertisements, and whether these two perceptions affect the purchase of the product. The use of AI technology is also increasing in advertising strategies with the advancement of technology. In addition to the psychological response of consumers, this study provides important implications in that it can determine whether the response affects product purchases.

Specifically, I would like to start the research by establishing a hypothesis first. The hypothesis is approximately like this. Hypothesis 1) People who are against AI images will also be against AI advertisements. / Hypothesis 2) People who have positive perceptions of AI images will also have positive perceptions of AI advertisements. / Hypothesis 3) People who have positive perceptions of AI images are less likely to have negative perceptions of AI advertisements. / Hypothesis 4) People who have negative feelings about AI images are less likely to have positive perceptions of AI advertisements. Through a survey for this, we will collect consumer reactions to AI images and AI-generated advertisements and analyze the effect of basic emotional attitudes toward AI on purchase intentions. We will also make a hypothesis about purchase intentions. Hypothesis a) People who have negative perceptions of AI advertisements will have low purchase intentions. / Hypothesis b) People who have positive perceptions of AI advertisements will have high purchase intentions. / Hypothesis c) It is unlikely that a person who has a negative perception of AI advertisements will have high purchase intentions / Hypothesis d) It is unlikely that a person who has a positive perception of AI advertisements will have low purchase intentions. etc. Starting from the perception of AI images to the consumer's perception of AI advertisements, and finally, does the perception from AI images and advertisements affect the consumer's purchase intention.

Kinesiology and Sports Sciences

Poster U115– Elizabeth Herll
Mentor: Kazuma Akehi
Title: *The influence of the athlete's mindset on return-to-play after musculoskeletal injuries*

Context: Anterior cruciate ligament (ACL) tears are a common sports injury that requires a 9- to 12-month recovery. An ACL tear is physically and mentally challenging, as these components go hand in hand with each other for the best athletic performance. When an athlete's physical readiness is weak and unhealthy after injury, their mental confidence will also be low due to fear of reinjury, lack of self-efficacy and confidence, and heightened emotion. Purpose: The purpose of the study is to examine the relationship between an athlete's physical performance and mental confidence to predict their readiness to return to play in their competitive sports. The hypothesis is that an athlete's physical performance strongly correlates with mental confidence. Study Design: A factorial design. Subject: High school and college-aged competitive

athletes who have undergone the 4- to 12-month post-ACL reconstruction rehabilitation will be recruited. Procedure: Subjects will perform the lower body exercise using the 3D motion capture system to obtain joint kinematics data and complete the return-to-play readiness questionnaire. The lower body exercise and questionnaire will be conducted every 4 weeks to track their progress and compare physical and mental performance. A higher score on the questionnaire will indicate greater psychological readiness to return to sport. The results from the 3D motion capture system and the questionnaire will be examined to see how each correlates. Statistical Analysis: A linear regression with the physical performance and mental readiness data will be performed to evaluate their relationship across time. Clinical Application: This study may highlight the importance of mental readiness and confidence in dynamic athletic movements. This can help clinicians determine rehabilitation progress and readiness to return to play strategies.

Poster U116– Bridgett Jensen
Mentor: Elena Dille
Co-Author: Jordan Dille
Title: *Athletic Trainers' Perceived Self-efficacy in Pre-Participation Cardiac Risk Assessment for Athletes*

Context: Sudden cardiac arrest (SCA) is the leading cause of death in athletics, yet it may be prevented by using a pre-participation exam to identify cardiac lesions or abnormalities. Athletic Trainers (ATs) are expected to identify various risk factors of SCA with skills such as history taking and physical assessment. Self-efficacy, one's belief in their ability to perform certain tasks, can be crucial to ATs' ability to successfully complete such skills. However, research hasn't examined ATs' self-efficacy in cardiac risk assessment. This study assessed ATs' self-efficacy in performing various cardiac risk assessment tasks.

Methods: A mixed-methods cross-sectional research design was used and 1500 participants were recruited through the National Athletic Trainers' Association (NATA). Participants were included if they were a NATA member, practicing as an AT, and 21 or older. The survey contained 6 demographic items, 6 self-efficacy items on cardiac risk assessment tasks, and 1 open-ended question on continuing education methods. Face validity was determined through expert panel feedback on the self-efficacy items. The survey, distributed through QualtricsÒ (Provo, UT), was open for 6 weeks with bi-weekly reminders. There were 57 responses (3.8%) of which 52 completed (91.2%) the survey. Cronbach's alpha for the scale was 0.74 (n = 6), indicating acceptable internal consistency.

Results: Pearson's correlation was ran to assess linear relationships among participant demographics and self-efficacy ratings. We found a significant negative correlation between entry-level bachelor's degree and recognizing Marfan syndrome, $r = -0.27$, $p = 0.056$. Significant positive correlations were found between entry-level master's degree and performing auscultations, $r = 0.29$, $p = 0.039$, and between highest degrees earned and assessing peripheral pulses, $r = 0.28$, $p = 0.047$.

Conclusion: Most demographics did not significantly affect perceived self-efficacy. Entry-level and terminal degrees had the most influence on self-efficacy

Poster U117– McKenzie Clark-Brownlow
Mentor: Kate Heelan
Title: *Validity of Artificial Intelligence Apps to Measure Body Composition*

The prevalence of obesity in the United States continues to rise and significant proportions of Americans are interested in weight loss and fitness to combat obesity and enhance personal health. Body composition assessments are used to evaluate changes in muscle and fat mass with exercise, weight changes and for health risk assessments. An analysis of body composition allows individuals the ability to regularly monitor measurements and track changes over time. However, valid body composition assessments require expensive equipment and trained personnel and are not readily available to consumers. The gold standard for body composition analysis is Dual Energy X-ray Absorptiometry (DXA). It provides detailed measurements of body fat, fat mass, fat-free mass, and bone density. However, DXA is expensive and requires specialized software to analyze body composition. Recently, visual body composition (VBC) estimates generated from smartphone applications and the use of artificial intelligence have become popular. They are user-friendly, convenient, relatively inexpensive and many provide additional behavior modification tips and applications. One particular app is the "Spren Body Fitness Tracker ©". The app claims that it can estimate one's body fat using a phone camera scan equivalent to a DXA. Another particular app is the "MeThreeSixty ©". This app claims that it provides the benefits of a DXA scan all from the comfort of your own home without the hefty cost. Whether or not these apps accurately estimate body composition is questionable. The purpose of the current study is to compare two VBC apps that are readily available in the Apple App Store to the gold standard assessment of body composition (DXA) to determine

validity. This study will compare total body fat, fat mass, and fat free mass between each app and the DXA scan.

Poster U118– Clare Coniglio
Mentor: Patricia Philippi
Title: *Sink or Swim: Adolescence Access to Aquatic Facilities*

The method of research was conducted through a literature review utilizing the University of Nebraska at Kearney's online library, searching and finding articles about negative swimming lesson experiences in children, parental influences, and college efforts to offer swimming lessons for students. A Google Drive folder was used to keep track of the read articles along with an Excel document to take notes about key takeaways. An underlying theme from the articles showed that a lack of access to aquatic facilities influences the swimming abilities of young adults. There is still a lot we do not know about drowning risks for adolescents, even though accidental injuries are the leading cause of death for this age group. Every year in the U.S., an estimated 3,960 people lose their lives to unintentional drowning, that is about 11 people every day. With such a staggering total, it is crucial to understand the risks better and find ways to prevent this public health concern. No research has considered the impact of a rural environment on the swimming proficiency of young adults. Location plays an important factor in obtaining how rural communities have fewer opportunities to develop swimming abilities, increasing their risks of drowning. The next steps include creating and implementing a survey to gather data on how geographic location influences swimming proficiency and water safety education.

Poster U119– Carley Damme
Mentor: Rachel Silverman
Co-author: Scott Unruh
Title: *Athlete Perceptions of Risk Management at Collegiate Sports Events*

The purpose of this study is to explore athletes' perceptions of risk management at collegiate sports events. There is a vast amount of research on risk management of spectators at sporting events, but there is a lack of research on athletes' perceptions of risk management for participating in sports. Every sporting event should come with a specific risk management plan and procedures. The main function of risk management is to determine any potential safety risks and find a solution to minimize them (Physiopedia contributors, 2023). It is impossible to eliminate all risks from sports, but it is crucial to eliminate the extraneous ones. The recent spike in court-storming is just one example of things that student-athletes worry about because over half of the

NCAA DI conferences do not have policies or plans in place when this happens (ESPN, 2024). This lack of risk management results in athletes such as Caitlin Clark being hurt after colliding with a fan during court storming. More research must be done to protect athletes because there have been many lawsuits, personal injuries, and unfortunate situations due to poor risk management. Student-athletes need to be protected from risky situations on the field, in the locker rooms, while traveling, and before, during, and after events. Research has shown how poor risk management can negatively affect athletes and lead to lawsuits (Sport Law contributors, 2002). A Qualtrics survey, consisting of 27 Likert-scale questions, was sent to 472 athletes at a DII institution. 175 responses were received and analyzed to understand how safe athletes feel participating in their respective sports. One result was that 55.6% of male athletes, and 43.4% of female athletes strongly agreed that they stay in safe areas when traveling. There were four sports where zero athletes said their coach had them practice an emergency action plan.

Poster U120– Cady Young
Mentor: Elena Dille
Co-author: Jordan Dille
Title: *Evaluation of Nebraska Physical Therapists' Perceptions of Youth Athlete Sport Specialization*

Context: Sport specialization is increasing among youth athletes and has various benefits and concerns with the overall health of athletes. Previous research has focused on the perspectives of parents, athletes, coaches, and healthcare providers such as athletic trainers and physicians, but not PTs. Since physical therapists are a common education source to those impacted by sport specialization, it is important to understand their perceptions of the topic. The objective of this study was to examine the perceptions of sport specialization among PTs of various backgrounds.

Methods: This study followed a cross-sectional design and consisted of an online survey sent to 2232 PT emails attained through public records from the Nebraska Department of Health and Human Services. Participants were included if they were a licensed PT practicing in Nebraska, 21 years of age or older, and provide care to pediatric/ youth athlete population. The survey consisted of 6 demographic items and 3 sport specialization perception questions and was distributed through QualtricsÒ (Provo, UT) and available for 6 weeks with 5 reminders. The survey reached 2173 PTs, with 250 completed responses (13.16%).

Results: Pearsons's correlation was used to compare linear relationships between the participant demographics and perception questions. We found a significant positive correlation between level of degree and perception of improved athletic ability, $r = 0.21$, $p = 0.005$. A weak negative correlation was found between years of experience and perception of improved athletic ability, $r = -0.13$, $p = 0.087$. Lastly, there was a significant negative correlation between location (i.e., rural vs. non-rural) and perception of sport specialization being problematic, $r = -0.158$, $p = 0.045$.

Conclusions: Most of participants' perceptions did not significantly vary with consideration to the various demographics. Level of education, years of experience, and setting of practice had the most influence on sport specialization perceptions.

Poster U121– Shyann Hollingsworth
Mentor: Elena Dille
Title: *The Effects of Dry Cupping Therapy Styles on Hip Range of Motion*

Context: Dry cupping involves the noninvasive use of cups that are suctioned onto areas of the body for treatment of painful or restricted tissue. There are two primary applications of dry cupping: moving and static cupping. Both styles have proven to have several benefits such as increase in circulation, release of muscle tension, and improvements of range of motion (ROM). While most studies have shown the individual effects of each method, there is a gap in research when comparing the methods to each other to determine if one has a greater effect on ROM.

Objective: The aim of this study is twofold. First, we want to determine if the use of multiple cupping therapy sessions on the hamstring muscle group better affects hip ROM. Second, we want to compare the effects of static versus moving cupping styles on hip ROM.

Design: Within-subjects design with a repeated-measures.

Subjects: We will recruit a sample of 15 subjects. Subjects must be 19-30 years old, recreationally active, and not meet any of the exclusionary criteria or conditions that will be reviewed with them.

Intervention(s): This study includes three cupping therapy sessions over two weeks. Cupping therapy will be done on both left and right hamstring muscle groups. The right leg will get 5 minutes of moving cupping, and the left leg will get 5 minutes of static cupping.

Main Outcome Measures: A goniometer will be used to measure three pre-and-post hip flexion ROM measures during each cupping session. The average ROM will be used to compare left versus right hip flexion improvements as well as hip flexion changes over the three cupping sessions.

Results: A one-way ANOVA will be used to assess differences of pre and post hip ROM measurements within subjects, over multiple cupping sessions.

Poster U122– Lance Haberman
Mentor: Gregory Brown
Title: *Comparing Transient Hypertrophy of the brachium in males and females due to biceps curl resistance exercise at 60%, 70%, and 80% of 1-repetition maximum*

Background: Transient hypertrophy refers to the temporary increase in muscle size that occurs during and immediately following a single exercise session due to fluid movement from the blood plasma into the interstitial and intracellular spaces of the muscle. This phenomenon is commonly observed in resistance training, where repeated muscle contractions lead to muscle swelling. Transient hypertrophy is technically termed “muscle hyperemia” but it is colloquially referred to as being “pumped” or “swole”.

Purpose: The purpose of this study is to examine the effects of different intensities of resistance during biceps concentration curls on acute increases in upper arm circumference in 10 college-aged males and females.

Methods: Muscular strength of the right arm will be assessed via a submaximal 2–20 repetition to fatigue seated biceps concentration curl, with the weight lifted and number of repetitions completed used to predict one repetition maximum (1-RM) using the equation of Adams (2002). Then, on three different occasions separated by at least 24 hours, in a randomized cross over manner, participants will complete three sets of seated biceps concentration curls performing repetitions to fatigue at 60%, 70%, and 80% 1-RM with 60 seconds of rest between sets. Upper arm circumference will be measured at baseline and after each set using a circumference tape measure and the techniques for brachium circumference set forth by the American College of Sports Medicine. The circumference after each set will be compared to baseline circumference to determine the magnitude of increase after the first, second, and third set. To account for possible differences in hydration, which could affect transient hypertrophy, participants will have their total body water assessed via bioelectrical

impedance analysis before each testing session. Data will be evaluated using a three way (sex X intensity X set) repeated measures analysis of variance to determine if sex, percent 1-RM, or set number influence the magnitude of transient hypertrophy caused by seated concentration biceps curl resistance exercise.

The present data will provide insight into the effects of resistance training intensity on transient hypertrophy, which could help inform bodybuilders on how to maximize their muscle size immediately prior to being judged on this aesthetic aspect of competition.

Poster U123– Isaiah Miller
Mentor: JP Rech
Title: *SUNRISE Project*

Previous research has shown that sleep and executive functions are positively correlated. However, this relationship has not been widely examined among preschool-aged children. Analyzing early childhood development and health is made accessible by the SUNRISE study. Throughout the data collection, I have grown interested in the development of children throughout the night and sleep's impact on function throughout the day. My research question is, "How does the total average daily sleep impact executive function scores for inhibition control and working memory?" I plan to answer this question using a cross-sectional approach with the data I collected in my research at preschools around Kearney, Nebraska. I will look at both average daily sleep of children during the night compared to scores on iPad games that intel concentration and intelligence. These scores may show evidence of whether sleep is beneficial to the executive functioning of children throughout the day at school. I will further explore this relationship considering children's sex, socioeconomic status, and rurality, among other factors. These various demographic factors may help to further determine children's development of executive functioning. After discovering children's sleep and function habits, I want to compare my results to studies of grade-school children, along with high school and college-aged students. Discovering the importance of sleep on development will be helpful for all students who are working to succeed in and out of the classroom. This study will give more input on the importance of sleep and its effects on daily life.

Poster U124– Jackson Farias
Mentor: Nita Unruh
Title: *Beyond Basketball: Miles Bridges and the NBA's Response to Domestic Violence*

The NBA has positioned itself as the gold standard among professional sports leagues when it comes to social justice initiatives, advocating for racial equality, criminal justice reform, and community safety. However, its handling of recent domestic violence cases has come under scrutiny, particularly the Miles Bridges case. Bridges was arrested in June 2022 on multiple domestic violence charges, later pleading no contest and receiving a three-year probation sentence. The NBA suspended him for 30 games, but he was only required to miss 10 games in the 2023-24 season due to his absence the prior season as a free agent. This lenient punishment has raised concerns about the NBA's disciplinary approach to domestic violence. This research examines the NBA's Domestic Violence Policy and compares it to policies on other forms of player misconduct, such as steroid use, DUI, and personal misconduct. By analyzing punishment severity across different offenses, this study shows potential inconsistencies in the league's disciplinary measures. Additionally, studies, such as Sailofsky and Shor (2020), provide insight into how arrests for violence against women impact an NBA player's career trajectory. A key factor influencing the NBA's response is the Collective Bargaining Agreement (CBA), which provides guidelines for player discipline while balancing player rights and accountability. This study explores the legal and contractual complexities within the CBA that shape how domestic violence cases are handled. Furthermore, a comparison with other major sports leagues' domestic violence policies offers a perspective on how the league lives up to its reputation. Through literature reviews and an analysis of NBA policies, this research aims to examine the fairness, consistency, and effectiveness of the NBA's disciplinary process regarding domestic violence.

Poster U125– Blake Mulinix
Mentor: Nick Lamoureux
Title: *Perceived Risk in Falls*

Introduction: Falls in older adults are a leading cause of injury among older adults. Fear of falling and functional limitations are the primary modifiable risk factors for falls, however older adults may not participate in interventions if they are not aware of their risk status. This study was designed to help examine the accuracy of fall risk perceptions in older adults aged 50 and older.

Method: Participants completed a survey which included the question "Do you believe you have an elevated risk for falls?" along with STEADI functional tests which consisted of a 4-Stage Balance Test, Timed Up and Go, 30-Second Sit-to-Stand. Based off scores from the questionnaire and functional test scores participants were given a fall risk classification of low, moderate or high risk.

Results: 33 participants were included in the analysis. 3 participants were classified as a high fall risk with all 3 participants correctly perceiving their elevated risk. 27 fell in the moderate category with only 55% recognizing that they have risk factors for falling. The remaining 3 participants fell into the low risk category with 2 of the 3 incorrectly perceiving that they have an elevated risk of falling which was not detected on the questionnaire and functional tests.

Conclusion: We found that when it comes to older adults, perception of fall risks are not accurate which can result in future falls. To try and prevent future falls and educate the population we can use this information to try and get clinics and community living centers to participate in running STEADI functional tests to inform the population of their risk level.. This can result in future falls or avoidance of preventative interventions. Approaches to fall prevention should include strategies to educate individuals on their risk status. Use of STEADI in clinical and community centers can help to inform the population of their risk level and correct inaccurate perceptions.

Poster U126– Lauren Kantaras
Mentor: Kaiti George
Title: *The Relationship Between Preschoolers' Food Insecurity and Food Diversity and Their Gross Motor Skills Based on Rurality*

This research project aims to analyze the relationship between preschoolers' (3-4 years of age) food insecurity and food diversity, and their gross motor skills, with a focus on rurality. Food insecurity is characterized by limited access to nutritious food which has been linked to developmental delays, including challenges in gross motor skills. Rurality will be a key factor in understanding these relationships, as rural areas often face limited access to food, healthcare, and early education programs, which can affect developmental outcomes. The international SUNRISE research project aims to collect data on preschoolers' physical activity, sedentary behaviors, sleep, and dietary habits along with developmental factors, such as motor skills, that influence each or all the listed focuses. My analysis will explore how food insecurity and diversity levels correlate with preschoolers' gross motor skill development, and how these relationships differ in areas rurality. The research will examine data collected in rural and urban areas of Nebraska as part of the SUNRISE Nebraska study, and use past research articles on socio-economic status, food insecurity rates, motor skills assessments, and demographic diversity to identify potential patterns and trends. The findings may provide valuable insights into the broader implications of rural Nebraska living on early childhood development, with potential implications for policies and

interventions aimed at improving access to nutritious food and developmental resources in rural areas. Ultimately, this analysis may contribute to a deeper understanding of the environmental factors that impact and can potentially increase the risk of disrupting young children's peak growth leading to life-long consequences.

Poster U127– Allison Merrill
Mentor: Kaiti George
Title: *Effects of Rurality on the Relationship Between Preschool-Aged Children's Food Insecurity, Food Diversity, and Executive Functions*

Food insecurity and diversity are critical factors in childhood development, yet their relationship with executive functions in children aged 3-4.9 years remains underexplored, especially concerning rurality. Food insecurity in children has been linked to worse general health and a higher likelihood of some acute and chronic health problems. Additionally, inadequate food diversity has been shown to cause vitamin deficiencies, higher frequencies of illness, and overall increased healthcare costs for families. The present study aims to examine the impact of rurality on the relationship between food insecurity, dietary diversity, and executive functions (e.g. working memory and inhibition control) in preschool-aged children. This study will utilize data previously collected in rural (Kearney) and urban (Omaha) settings of Nebraska as part of the SUNRISE Nebraska study. SUNRISE is an international study that collects data on preschool-aged children's movement behavior, motor skills, executive function, and dietary habits. Using the data gathered on executive functions and dietary habits, a cross-sectional analysis will be performed to determine the potentially significant relationships between executive function outcomes of working memory and inhibition control and food insecurity/diversity in our population of interest. The differences, if any, will also be determined between rural and urban locations in Nebraska. These findings may provide a better understanding of how dietary and environmental factors could influence the development of executive functions in young children. Additionally, the insights gained could help inform future policies and programs aimed at improving children's dietary well-being and cognitive development in areas such as rural Nebraska. By advancing understanding in this area, this research contributes to the broader efforts in public health to help reduce childhood chronic and acute health problems which may help to lower healthcare costs for families.

Poster U128– TJ Roe
Mentor: Cameron Munger

Co-Author: Trevor Baird
Title: *Effects of High-Load Low Rep, Low-Load High Rep, and Myo-Rep Sets on Transient Hypertrophy and Muscle Growth Precursors*

Background. Hypertrophy-based resistance training has gained recent popularity, this is due to information being shared both scientifically and on social media platforms. Resistance training leads to many physiological benefits in athletic performance and aesthetics. Regardless of the reason, many people engage in resistance training in the pursuit of adapting their bodies. When resistance training in pursuit of muscular hypertrophy, an individual is attempting to gain both new muscle tissue and muscle mass. Building new muscle tissue is a long-term process that compounds over multiple resistance training sessions, and it can take as long as 12-16 weeks to build new tissue (1). There are acute muscle growth precursors that an individual can manipulate to ensure they are progressing toward new muscle tissue. These precursors consist of 1.) tension placed on the muscle both concentrically and eccentrically, 2.) metabolic stress produced by measuring the byproducts of the metabolic pathways from the muscle to complete exercise, and 3.) acute cellular swelling of the muscle tissue due to exercise (2). Meeting these three muscle growth precursors, an individual can ensure they are meeting the demands for the long-term process of muscle hypertrophy within a single exercise session. Along with the gain in popularity of hypertrophy-based resistance training, many protocols to achieve muscular hypertrophy have surfaced as well. Common protocols consist of using a high-load and low-rep (HLLR) scheme to complete an exercise. HLLR consists of using a relatively high load, 80-85% of one repetition maximum (1RM), and completing 6-10 repetitions of the selected exercise. When using this protocol, an individual can push the boundaries of muscle strength and hypertrophy. Another common protocol is the inverse of HLLR, using a low-load and a high-rep (LLHR) scheme (3). LLHR consists of using a relatively low load, 60-70% of 1RM, and completing 16-25 repetitions of the selected exercise. This protocol pushes the boundaries of muscle hypertrophy and exhausts the working muscle with aspirations of a muscular adaptation. The last protocol that has become very common is the myo-rep set scheme (4). Using the myo-rep set involves using a relatively moderate load, 60-80% of 1RM, and completing repetitions until muscular fatigue. Then the individual lowers the load 10-30%, takes a brief resting period, and completes another set of repetitions and repeats the process. This protocol aims to metabolically exhaust the muscle by taking an exercise to absolute muscle failure. These three protocols are commonly practiced in individuals who participate in hypertrophy-based resistance training.

Purpose. The purpose of this study is to measure the acute effects on the biceps brachii, using the barbell biceps curl, across HLLR, LLHR, and Myo-rep set protocols. Examining the acute effects on the biceps brachii will determine a superiority of the

protocols and allow an individual to engage in optimal hypertrophy-based resistance training.

Methods. Study participants will complete each protocol in randomized order. Each subject will ensure proper mechanical tension is placed on the eccentric and concentric phase of the barbell biceps curl throughout the exercise. Anthropometric measurements of the upper arm, arm circumference, will be taken both pre- and post-exercise to examine cellular swelling. To measure metabolic stress, blood lactate, both pre- and post-exercise, will be measured to understand which protocol caused the greatest amount of metabolic stress to complete the exercise. Results. It is hypothesized that the Myo-rep set protocol will show the greatest difference from pre- to post-exercise when completing the barbell biceps curl. Thus indicating that the Myo-rep set protocol may be the optimal training protocol for hypertrophy-based resistance training. It is also hypothesized that the LLHR protocol will show significant differences from pre- and post-exercise measurements due to the demands it puts on the muscle. Lastly, it is also hypothesized that HLLR will show differences from pre- and post-exercise but will be inferior due to Myo-rep and LLHR placing a greater metabolic demand on the working muscle.

Conclusion. With the gain in popularity and the mass amounts of information available to the layperson, hypertrophy-based training is a relatively new domain in the resistance training world. There are many protocols that were not mentioned, all with the same goal of increasing muscle mass and building new tissue. Understanding the acute effects and measuring muscle growth precursors of HLLR, LLHR, and Myo-rep set protocols will allow for a foundational understanding of the most commonly used protocols when in pursuit of muscle hypertrophy.

Poster U129– Trevor Baird
Mentor: Cameron Munger
Co-Authors: T.J. Roe, L Samuel, Cameron Munger
Title: *Transient effects of Low Load High Rep, High Load Low Rep, and Myo-Repetition Hypertrophy Protocols on muscle size and lactate*

Growing skeletal muscle mass and attaining strength is an aspiration for many individuals due to its significance in sports, fitness, and aesthetic purposes. Training for hypertrophy (skeletal muscle growth) has been a popular training style since the 60’s and 70’s, recently this style of training has experienced a boom with the help of social

media and open-source information from hypertrophy experts1. Three popular training methods include using low loads, with high repetition count (LLHR); high loads, with low repetition count (HLLR); and doing drop sets with lower loads and short rest time [myo-repetitions (MRep)]. While there are many ways an individual can influence training factors to optimize growth, there are three important precursors to muscle growth: 1) tension, 2) metabolic stress 3) and cellular swelling. Muscle tension is when an external load is applied to the muscle through bones and tendons2. It acts as a pulling force; however, muscle can lengthen and shorten during that applied force. Two factors that are important to consider for tension are the total load and the duration for which the tension is applied. (Time under tension).3 Metabolic stress is when muscle accumulates high quantities of byproducts from contraction9. These include a decrease in pH, an increase in H+ ions, ADP, AMP, and other metabolic byproducts associated with anaerobic energy resynthesis.4 Cellular swelling is not exclusive to metabolic stress but also consists of large amounts of blood being pumped into the working muscle9. It also involves the extended inflammatory response, which leads to tissue remodeling5. In order to get a profound understanding of cellular swelling we used ultrasound imaging to observe the hypertrophic effects of our specific protocols. The ultrasound uses sonography to provide us with cross sectional images of our participant's biceps before and after they perform one of our hypertrophic protocols10. This will show us which training protocol recruits the most muscle fibers as well as how much cellular swelling is produced. The number of muscle fibers engaged in an exercise corresponds to the increase in the metabolic stress and swelling, in turn producing muscle hypertrophy5. Resistance training causes anabolic stimulus that contributes to muscle growth, due to increase in protein synthesis.6 The accumulation of muscle tissue occurs over extended time periods, and cannot be detected for at least 6 weeks at the ultrastructural level7, however experiencing and bearing witness to muscle tension, metabolic stress, and cellular swelling can signal that a hypertrophy workout is likely to be stimulative.

Question and Purpose

Most people who train for hypertrophy try multiple different methods and programs to grow muscle. Many do not train the most optimal way to accomplish the goals they strive for. Our question is what exactly the most optimal hypertrophy workout protocol is. The purpose of this study is to compare three popular hypertrophy workout protocols. HLLR and LLHR workouts have been shown to increase hypertrophy in literature 8, however, myo-rep sets have not been as deeply studied as the other hypertrophy methods. Therefore, this study aims to compare the novel MRep protocol to HHLR and LLHR protocols through acute measures of Metabolic stress and cellular swelling.

Methods

Statistical Analysis
Multiple 3x2 (condition x time) repeated measures ANOVAs will be conducted on the following dependent variables: blood lactate (mmol/dl), arm circumference (cm) and muscle thickness (cm), measuring the pre and post workouts. Ultrasound imaging provided us with accurate bicep thickness measurements.
Participants
University of Nebraska Kearney Students ages 18-25 who train at least twice a week and are free of musculoskeletal injuries to the upper extremities.

Procedures
Bicep curl protocols will be performed by subjects. Each subject will complete one protocol each day in randomized order. The MRep protocol comprised of 4 moderately loaded sets with 90 seconds rest between each set, followed by an immediate reduction in weight with 4 additional sets to failure and 10 seconds rest between each set. HHLR and LLHR consisted of 4 sets each with 90 seconds rest between each set with high loads and low loads respectively. Each participant will perform a bicep curl with a barbell. The load everyone uses will depend on the hypertrophy protocol they are randomly assigned and on their strength level.

Hypothesis
It is hypothesized that the MRep protocol would result in the highest increase between pre and post test measures for muscle thickness, lactate and circumference. It was hypothesized that LLHR would follow in second for magnitude of difference between pre and post-test measures6. Finally we hypothesize that HLLR will produce the lowest differences in pre and post-test measure8.

Poster U130– Michelle Koenig
Mentor: Kazuma Akehi
Title: *Ashwagandha Supplementation in Resistance Training: Strength Gains Attributed to Training, Not Supplementation*

Background: Ashwagandha (Withania Somnifera) supplementation is a growing trend in the performance industry and is known for its potential health benefits, such as

reducing depression, anxiety, and insomnia. Research also suggests it may enhance muscle size and strength, making it a possible supplement for resistance training. However, most of the literature has been tested and published in Asia, highlighting the need for further research on muscle strength to ensure safe practice.

Purpose: The purpose of this study was to examine the effects of eight weeks of Ashwagandha supplementation on quadriceps muscle strength in collegiate males. The hypothesis was that a significant improvement in quadriceps muscle strength would be seen in the Ashwagandha supplementation group compared to the placebo.

Methods: Eleven recreationally active male participants (age=22.09±1.57 years, height=183.57±2.10 cm, body mass=83.55±7.86 kg) completed an eight-week supplementation regimen of either 500 mg of Ashwagandha or a placebo (a general vitamin supplement) while following a standardized lower-body exercise program. Quadriceps muscle strength was measured at the beginning and end of the study using an isokinetic dynamometer.

Results: No interaction between the supplementation groups and time was found ($P>0.05$). There were significant main effects of peak torque (155.03 to 165.80 Nm, $P=0.02$) and time to peak torque (0.50 to 0.39 s, $P<0.01$).

Discussion: This study found no significant difference in muscle strength gains between the Ashwagandha and placebo groups, though both improved with training. Notably, Ashwagandha participants reported feeling calmer, supporting its known stress-reducing effects. Future research should explore its psychological benefits and long-term impact on performance.

Practical Application The findings showed that the supplementations did not differ in muscle strength characteristics. However, both groups exhibited significant improvements in quadriceps muscle strength characteristics after eight weeks of weight training. Future studies are recommended to examine its long-term effects on athletic performance.

Poster U131– Isaac Haselhorst
Mentor: Gregory Brown
Co-Authors: Alex Korte, Kylee Bober
Title: *Changes in Predicted Maximal Oxygen Consumption in Women Due to Fitness Testing in the Heat*

Background: Due to the effects of exercise in the heat on heart rate, ventilation, oxygen consumption, and the possibility of heat related illnesses, fitness testing recommendations indicate that fitness testing should be performed at normal room temperatures or in a cool environment. However, sometimes fitness testing must be performed in hot environmental conditions due to problems with indoor environmental controls. Similarly, variations in seasonal weather can affect the environmental conditions when fitness testing is performed outdoors. Furthermore, females may be more affected by exertional heat illness than males.

Purpose: The purpose of this study is to measure how a 20-degree Fahrenheit (11 C) increase in environmental temperature affects ventilation, oxygen consumption, and heart rate in recreationally trained women at rest and during a submaximal treadmill exercise graded exercise test, and determine how these changes affect predicted maximal oxygen consumption.

Methods: Ten college aged women who are free from contraindications to exercise and who habitually engage in recreational aerobic exercise will be recruited as participants. The participants will have ventilation, oxygen consumption, and heart rate measured at rest and during a submaximal treadmill graded exercise test at normal room temperature (72-75 f; 22-24 C) and in an elevated temperature (95 f; 35 C). Measurements will be taken using a metabolic cart. The data will be analyzed for statistical significance using a two factor (temperature X stage) repeated measures ANOVA. Percent differences in ventilation, oxygen consumption, and heart rate will also be calculated.

The present data will increase our understanding of how fitness testing in a hot environment influences predicted maximal oxygen consumption and the associated assessment of aerobic fitness.

Poster U132– Kylee Bober
Mentor: Gregory Brown
Co-Authors: Isaac Haselhorst, Alex Korte

Title: *Exercise in the Heat*

Background: During physical activity blood flow to exercising muscles increases to supply oxygen and other nutrients to the active muscles and to also clear metabolic wastes. However, when the environmental temperature is high blood flow to the skin needs to increase to facilitate adequate thermoregulation. Thus, during physical activity in the heat there can be competition between the active muscles and the skin for adequate blood flow, which can negatively affect athletic performance while also impairing adequate thermoregulation.

Purpose: The purpose of this literature review was to explore the current state of scientific knowledge regarding the effects of physical activity in high environmental temperatures on athletic performance and thermoregulation.

Methods: A literature review was conducted using position stands from the American College of Sports Medicine (ACSM), the National Athletic Training Association (NATA), and keyword searching of the National Library of Medicine database (PubMed) to identify how much of an experimental increase in environmental temperature is necessary to elicit changes in the physiological response to exercise, and what variables are most commonly measured in this experimental setting. These resources will also be used to obtain data for a sample size calculation to determine the number of research participants necessary for identifying changes in the physiological response to exercise in the heat.

This literature review will help formulate research questions and methodology for an undergraduate research project exploring some of the physiological responses to exercise in the heat.

Poster U133– Alex Korte
Mentor: Gregory Brown
Co-Authors: Isaac Haselhorst, Kylee Bober
Title: *Effects of Exercise in the Heat on Ventilation, Oxygen Consumption, and Heart Rate in Recreationally Trained Men*

Background: Engaging in physical activity increases body temperature necessitating dispersal of this heat into the environment, primarily through the evaporation of sweat. However, when exercise is performed in environmental temperatures that are higher than those to which an athlete is accustomed ventilation and heart rate are elevated with negative effects on maximal oxygen consumption and athletic performance. While

exercise testing recommendations indicate that the testing should be performed at normal room temperature it is unclear how much exercise in the heat impacts predicted oxygen consumption when a submaximal test is performed.

Purpose: The purpose of this study is to measure the changes in ventilation, oxygen consumption, and heart rate in recreationally trained men at rest and during submaximal treadmill exercise at normal room temperature and in the heat to evaluate how heat can impact predicted maximal oxygen consumption.

Methods: Ten college-aged men who are recreationally engaged in regular aerobic exercise will be measured for ventilation, oxygen consumption, and heart rate at rest and during a submaximal treadmill-graded exercise test at normal room temperature (72-75 f; 22-24 C). The participants will then be tested again for the same variables at rest and during a submaximal treadmill-graded exercise test in elevated temperature (95 f; 35 C). Measurement will be taken using a metabolic cart. The data will be analyzed for statistical significance using a two-factor (temperature X stage) repeated measures ANOVA. Prior to engaging in this study, all participants will complete a Physical Activity Readiness Questionnaire to ensure they are free from any contraindications to exercise testing.

The present data will provide insight into how exercise testing in a hot environment influences predictions of maximal oxygen consumption and the associated evaluation of aerobic fitness.

Poster U134– Gracyn Jozsa
Mentor: Nick Lamoureux
Title: *The Use of Music and Physical Activity to Manage Anxiety*

Introduction: Anxiety has become one of the most common and talked about mental health concerns, with increased rates since the COVID-19 pandemic. There are many available treatment options, oftentimes found in costly medical prescriptions. Both physical activity and music have been found to be beneficial in the management of depression and depressive symptoms, and similar effects for the management of anxiety are possible.

Method: This experiment will compare the effects of music and physical activity to reduce feelings of anxiety. Participants will fill out a general information survey, regarding their current physical activity and anxiety levels, as well as music

preferences. They will then perform in three different trials in a random order. One trial participants will sit in silence for thirty minutes, another trial will consist of walking on a treadmill for thirty minutes at a moderate pace set by the participant, and participants will sit and listen to music for thirty minutes. At the start of each trial participants will be given a sheet of paper with a 10cm line on it, where they will then mark how anxious they are feeling from a scale of 0-100 mm. After each trial participants will be given a new sheet of paper with the 10cm line and will be asked again to mark how anxious they are feeling from a scale of 0-100mm.

Discussion: Due to a previous literature review we conducted, we do know that people with high physical activity levels are 26% less likely to develop anxiety related conditions compared to people with low physical activity levels. This study will help inform strategies to alleviate symptoms of anxiety in the short term.

Poster U135– Benjamin VanDiest
Mentor: JP Rech
Title: *Relationship between preschoolers' dietary habits and executive functions by biological sex and socioeconomic status*

Previous literature has shown malnutrition may have a significant negative impact on working memory and other cognitive aspects. Similarly, I want to expand on that idea and apply it to preschool-aged children. Throughout data collection, my interest has grown in the role nutrition plays in preschoolers' executive functions, specifically inhibition control and working memory. My research question is, "How do parent-reported nutrition and eating habits relate to preschoolers' inhibition control and working memory according to biological sex and socioeconomic status?" I will answer the question by cross sectionally assessing the collected data from the preschools around Kearney and Omaha. I will look at the parent-reported data on executive functions and compare to parent reported dietary habits of preschool children. I hypothesize that their diet may lead to improved inhibition control and working memory, which may show evidence that a healthier diet has a direct correlation. I will also further explore preschoolers' relationship regarding their biological sex, and socioeconomic status. These various factors may help further understand why a child's diet is a certain way, and its role in inhibition control and working memory. With the findings, I want to compare them to different age groups, and not just preschoolers. Discovering the importance of a healthy diet will be useful for all ages in inhibition control and working memory.

Poster U136– Ashlyn Krohn
Mentor: Nick Lamoureux
Title: *Motivators and barriers to different types of physical activity in older adults*

Introduction: Aerobic exercise and strength training provide different benefits, so it is important for older adults to engage in both types of exercise as they age, yet most older adults do not participate in sufficient physical activity of either type. The purpose of this project is to identify the motivators and barriers to aerobic exercise and strength training in adults over the age of 50, which will be helpful in designing behavioral interventions.

Method: Individuals over the age of 50 self-reported the relevance of common motivators and barriers to aerobic exercise and strength training separately using an online survey. Each motivator and barrier was rated on a scale from one (not at all) to five (always). Participants also reported their participation in activities to allow for stratified analysis to evaluate the impact of participation on motivators and barriers.

Results: Responses were received from 71 individuals (76.06% Female, 63 +/- 10 years). 38.03% of responses met the aerobic guidelines, 45.07% met the muscular strengthening guidelines, and 26.76% met both guidelines. Positive impacts on mental and physical health, particularly on self-confidence and mental health were the most commonly reported motivators, while lack of enjoyment, fatigue, and lack of social support were the most common barriers regardless of activity status. Across aerobic and muscular activities, individuals who participated in activity reported higher relevance of activity benefits, while barriers related to knowledge, ability, and enjoyment were less relevant.

Discussion: Insights into motivators and barriers to activity provide important insight into designing effective interventions. Results show that interventions focusing on expanding social support could be particularly helpful in increasing physical activity levels in older adults. Also, because mental health effects were a highly reported motivator among people that met either activity guideline, promotional material emphasizing positive mental health effects may also be beneficial.

Poster U137– Danielle Houlden
Mentor: Bryce Abbey
Title: *Vitamin D and its Effects on Female Athletes*

Background: Female athletes of different sports face various degrees of stress upon their bodies during their athletic activities, leading to an increased risk of injury. Most injuries are linked to musculoskeletal strain caused by overexertion and a lack of supporting elements within the body to support these activities. Vitamin D (Vit D) is an important factor to musculoskeletal and nervous system health. Vit D promotes calcium uptake which is a primary component of bone material. It is necessary in specific amounts in extracellular fluid around neurons to perform normal neural function. "...the active form of vitamin D, has a direct regulatory role in skeletal muscle function, where it participates in myogenesis, cell proliferation, differentiation, regulation of protein synthesis and mitochondrial metabolism through activation of various cellular signaling cascades, including the mitogen-activated protein kinase pathway(s)" (Montenegro, et al. 2019). Education of the importance, dietary needs, and benefits of supplementation of Vit D will allow female athletes to decrease risk of injury and elevate athletic ability through its effects in protein synthesis and neuromuscular function.

Purpose: Evaluate the importance of Vitamin D on female athletes to improve health and performance of athletes by decreasing injury and promoting muscle function.

Methods: A future IRB will be submitted for the assessment Vitamin D blood levels in female athletes and their body composition through DEXA scanning. Educational material will be provided to the athletes, and a secondary assessment and survey will be made to analyze the effects of changes in data on performance and health.

Results: Currently, a literature review is being completed on vitamin D and athletes. The literature review will be used to inform methods developed for an IRB submission.

Poster U138– Rebekah Paulsen
Mentor: Kaiti George
Co-Authors: Hope Nienhueser
Title: *Educating Female Athletes on Vitamin D and Calcium Deficiency: Improving Bone Density and Reducing Injury Risk*

Background:

Vitamin D and calcium are essential for bone health, yet many female athletes may not consume adequate amounts, increasing their risk for low bone density and injuries. Future studies aim to assess the bone density and vitamin D levels of female collegiate athletes at the University of Nebraska at Kearney (UNK) and examine differences between athletes in impact versus non-impact sports.

Purpose:
Assess the significance of Vitamin D in female athletes, focusing on its role in enhancing health and performance by reducing the risk of injury and supporting muscle function and performance.

Methods:
Currently a literature review is being completed. A future IRB will be submitted for the assessment Vitamin D blood levels in female athletes and their body composition through DEXA scanning. Educational material will be provided to the athletes based on their results. By identifying potential deficiencies and educating athletes on proper nutrition, the research aims to promote better bone health and injury prevention, in order to enhance athletic performance and ensure long-term health.

Results:
The literature review will provide insight into how sport type influences bone density. The literature review will be used to inform methods developed for an IRB submission.

Poster U139– Hope Nienhueser
Mentor: Kaiti George
Co-Authors: Rebekah Paulsen
Title: *The Correlation Between Vitamin D and BMD in Female Athletes*

Background:
This study investigates the correlation between vitamin D deficiency and bone mineral density (BMD) in collegiate female athletes. Comparing the results of each test will provide information on these women that can help them improve their quality of performance in their specified sport.

Purpose:
Given the differing physical demands of athletic training between weight-bearing and non-weight bearing athletes, vitamin D levels may play a crucial role in maintaining bone health and preventing injuries such as stress fractures.

Methods:
Future research aims to examine how vitamin D levels, correlate with BMD, assessed via dual-energy X-ray absorptiometry (DEXA) scans. A possible study design would include a sample of female athletes from female soccer and female swimming with the goal of identifying whether vitamin D deficiency is associated with reduced bone mineral density and which athlete group is most affected. Data may be analyzed to determine any significant correlations between these two factors. We are also

intending to do a review of their results with them to provide nutrition education over Vitamin D and bone mineral density related topics.

Results:
Currently, relevant literature is being reviewed for possible study design and methods. A future IRB will be submitted for review.

Poster U140– Gabriel Ruiz
Mentor: Rachel Silverman
Co-Author: Scott Unruh
Title: *Nebraska Residents' Perceptions of Online Sports Gambling*

Nebraska law only allows in-person sports gambling at authorized gaming operators while bordering states, Kansas and Iowa, offer online sports gambling services (AmericanGaming.Org, 2024). The Professional and Amateur Sports Protection Act (PASPA) was passed in 1992 outlawing sports gambling nationwide, except for states such as Nevada, Oregon, Delaware, Montana, and New Jersey (Meer, 2011). Sports gambling sites have been taking the internet and mainstream television by storm since the abolishment of the Professional and Amateur Sports Protection Act in May of 2018. Today nearly 40 states have legalized online sports betting, but Nebraska has yet to legalize it after years of trying to get it passed. Nebraska only allows in person sports gambling in four locations throughout the state. The purpose of this research study is to explore Nebraska residents' perceptions of legalizing online sports gambling. Participants were recruited via email, social media, and paper flyers to participate in a Qualtrics survey. 106 completed survey responses were obtained and analyzed using Qualtrics and SPSS. Demographic questions included gender, income status, race, and education. Participants used a 5-point Likert scale to rate statements about perceptions of online sports gambling and their opinions on the legalization of online sports gambling. Approximately 32% of participants believed online sports betting should be legal in Nebraska. Also, approximately 32% felt the federal government should aggressively regulate online sports betting to protect customers from compulsive gambling specifically.

Poster U141– Samantha Wells
Mentor: Kazuma Akehi

Title: *The Effect of the Upper Extremities and Trunk Functional Asymmetries on Softball Pitching Performance and Injury*

Context: Youth and collegiate softball pitching places significant stress on the throwing shoulder. While each pitcher develops a unique style during the early development of their pitch, certain kinematic patterns may lead to higher injury rates. Previous research has shown that a pitcher's ball speed can indicate shoulder distraction, elbow distraction, and peak elbow flexion. These actions place considerable demand on the biceps brachii, ultimately causing arm and shoulder discomfort. Additionally, research shows that greater trunk flexion improves ball control, suggesting that enhanced trunk flexibility improves performance when throwing a rise ball.

Purpose: The purpose of this study is to evaluate the youth softball pitching motion to identify common asymmetries that may eventually lead to injuries in athletes.

Methods: Softball pitchers aged 14 to 25 will be recruited for the study. They will undergo a warm- up session before each trial begins and be asked to perform 10 full-speed fastball pitches and 10 full- speed change- up pitches. Data will be collected on each pitch using 3 D motion analysis and the pitch analysis system. After completing all 20 pitches, the other 3 D motion capture system will evaluate joint kinematics and asymmetries. The pitchers will perform motions such as shoulder abduction, shoulder internal and external rotation, shoulder flexion and extension, trunk rotation, trunk flexion, right and left forward lunges, lateral lunges, overhead squats, and vertical jumps.

Clinical application: Understanding how certain joint kinematics present in the developmental stages of the youth softball pitch can assist coaches in spotting motions that should be corrected. Addressing these potentially harmful motions will likely reduce the injury rate in this population and support healthy shoulder mechanics. Proper shoulder mechanics contribute to the longevity of the muscles, allowing athletes to perform at their best potential for an extended period.

Poster U142– Brenden Sloup
Mentor: JP Rech
Title: *Impacts of Sleep and Nutrition in Early Childhood on Executive Function Development in Ages 3 to 4.9*

Executive functioning, a set of cognitive processes essential for goal-directed behavior, is influenced by various physiological and environmental factors. Among these, sleep

and nutrition play crucial roles in maximizing cognitive performance, particularly in areas such as inhibition control and working memory. Previous research suggests that sleep variance negatively impacts inhibitory control, leading to impulsive decision-making, while poor nutrition, particularly diets high in processed foods and low in essential nutrients, is associated with cognitive decline. Conversely, high-quality sleep and balanced diets rich in micronutrients may enhance cognitive flexibility and memory retention. This study investigates the relationship between sleep quality, dietary habits, and executive functioning in a sample population of preschool students. The data collected is part of the ongoing international SUNRISE study on preschool-aged children's movement behaviors and development. Using standardized cognitive assessments, preschool children's inhibition control and working memory were assessed in addition to accelerometer-measured sleep duration and parent-reported sleep quality and dietary intake. The data analysis aims to determine whether sleep and/or nutrition correlates with executive functioning outcomes for working memory and inhibition control. By examining these relationships, this research may contribute to the growing body of evidence linking lifestyle factors to cognitive health within early childhood. Findings may have implications for improving academic performance and mental well-being in young children through targeted interventions, such as sleep hygiene education and nutritional counseling for parents. This study may help to inform parents, and begin to teach young kids, the importance of sleep and nutrition for individuals to grow.

Poster U143– Steven Groeber-Disney
Mentor: Rachel Silverman
Title: *The Impact of Recreational Cooking Classes*

The purpose of this study is to explore the impact of recreational cooking classes on peoples' daily lives. The National Library of Medicine researched recreational cooking and stated, "in-patient and community-based cooking interventions yielded positive influences on socialization, self-esteem, quality of life, and affect" (Farmer et al., 2018). I want my study to be inclusive to all people and discover information regarding the positive benefits of cooking for people with dementia. "Cooking and eating are typically very social experiences for most people. Preparing a meal is a great way to bring friends and family together. This is particularly valuable for seniors with dementia, as the process of cooking and baking can do wonders to elevate their moods" (Bria Contributor, 2019). Charles Mott did a case study through the University of Michigan and found a chef who helped teach kids the importance of cooking. "We didn't know whether any kids would show up when the program was introduced. Not only did we have full classes, but the kids showed up consistently" (Vodrasek, n.d.).

I am in the process of interviews and have learned quite a few interesting things so far. I think this project is giving me insight into why cooking has been so important in my life but also how it can help others. The people I interviewed showed me that there is a lot more to cooking than just eating. The complexity of this project has been exciting because it shows me a whole new side to myself that I didn't know I wanted. I'm excited to share my findings at the end of this and plan on gaining more research on this in the next few semesters.

This study has helped me gain skills in data collection, data analysis, and critical thinking. I will complete CITI training, learn how to write an IRB application, learn how to code interviews, write a research paper, and present at a conference.
This is important to me because I have been a cook most of my life. Previously, I was a dietary aid at a care home. I learned how cooking can detrimentally impact the residents' lives. After this job I worked at the Lodge in Kearney. I learned how important the act of cooking was when you want to show love and support for the people around you. Currently, at Alley Rose, I learned how to find joy in my own life and love what you do. There are not many places around Kearney that offer recreational cooking. This research study can encourage more recreational organizations to offer cooking classes.

Marketing, Agribusiness & Supply Chain Management

Poster U145 – Juyeon Ahn
Mentor: Ngan Chau
Title: *The Impact of the US-China Trade War on U.S. Import Patterns*

Since 2018, the United States and China have been engaged in a prolonged trade confrontation, featured by multiple rounds of retaliatory tariffs. The purpose of this study is to understand the impact of these trade policy changes on U.S. import patterns. In particular, the research examines changes in import patterns before and after 2018 in different areas, including (a) import value, (b) China’s import share, and (c) the import share of China and other beneficiaries identified in the literature, such as Vietnam, Taiwan, the European Union, Mexico, India, Thailand, South Korea, Cambodia, and Indonesia, across industry sectors.

To address the research questions, the study used trade statistics from the U.S. Census Bureau covering the period from 2011 to 2024. The findings show that, although import value tended to increase over time, China's import share decreased after tariffs were imposed. However, the changes in China's import share were not consistent across industry sectors, with some of these shifts providing opportunities for beneficiary countries to gain a greater share. In general, this research enhances the understanding of U.S. policy changes toward China and their impact not only on China but also on multiple other trade partners. It empirically demonstrated how these policy changes could create significant shifts in the global trade landscape.

Poster U146 – Jimin Chae
Mentor: Frank Tenkorang
Title: *Optimizing Supplier Performance: A Data-Driven Approach for Supply Chain Management*

In supply chain management, evaluating supplier performance is crucial for making informed decisions and minimizing risks. This study explores data-driven decision-making by analyzing supplier performance using a bibliometric approach and quantitative evaluation methods.

Initially, we planned to conduct Delphi-based sentiment analysis on Scopus research articles to identify trends in supplier quality management. However, due to challenges in gathering expert input and implementing Python-based sentiment analysis within the semester, we decided to incorporate this objective into our Summer Student Research. Instead, we applied bibliometric analysis, a method we successfully used in our previous Undergraduate Research Fellowship, to examine the popularity and evolution of data-driven decision-making in supplier chain management.

To complement this qualitative analysis, we collected real-world supplier data from Data.gov and Kaggle to evaluate supplier performance quantitatively. Using Excel, we processed and analyzed the data to extract key insights. We then applied a Balanced Scorecard, introduced by Kaplan and Norton, to assess supplier performance based on lead times, defect rates, costs, and inspection results. Through this evaluation, we ranked suppliers based on their overall performance, with Supplier 1 achieving the highest rank, followed by Supplier 2, Supplier 5, Supplier 3, and Supplier 4. This approach allowed us to break down the results by product type (e.g., cosmetics,

haircare, skincare) and calculate average scores for each supplier to understand their relative strengths and weaknesses.

To enhance decision-making with clear, data-driven insights, we visualized the results using Tableau. This allowed us to present supplier rankings, product category breakdowns, and overall supplier performance trends in an intuitive and interactive format. By combining bibliometric analysis with real-world data evaluation, this study provides a comprehensive framework for supplier assessment, enabling businesses to make informed, data-driven decisions and improve supply chain efficiency.

Objectives

- Examine Scopus research articles to understand data-driven decision-making trends in supplier management.
- Evaluate Real-World Supplier Data
- Collect and process supplier performance data from Data.gov and Kaggle using Excel.
- Classify suppliers by product type and identify key insights.
- Apply a Balanced Scorecard
- Measure supplier performance across lead times, defect rates, costs, and inspection results.
- Rank suppliers based on overall scores.
- Visualize and Communicate Findings
- Present results in Tableau for clear, data-driven decision-making.
- Provide actionable insights to improve supply chain efficiency.

Teacher Education

Poster U147– Avery Laing
Mentor: Naheed Abulqasim Ali Akbar Abdulrahim
Title: *Culturally Relevant Education in Social Studies Classrooms: A Qualitative Research Synthesis*

The purpose of this qualitative research synthesis is to examine empirical studies conducted on the implementation of culturally relevant education (CRE) in social

studies contexts with BIPOC (Black and Indigenous People of Color) learners. Fourteen studies published studies between 2010-2024 met the criteria for inclusion in this review. Criteria included: (a) the study was published in a peer-reviewed journal, (b) the study was conducted within a PK-12 U.S public school context with practicing teachers, (c) culturally responsive teaching, culturally relevant pedagogy or culturally sustaining pedagogy were part of the study's theoretical framework or conceptual framework, and (d) information about the methods was reported. Findings revealed eight overarching themes: (a) identity, (b) instructional engagement, (c) high expectations, (d) student critical thinking, (e) critical self-reflection, (f) social justice, (g) building relationships with students and families, and (h) collaboration. Findings underscored the value of CRE in social studies contexts to key stakeholders. Specifically, CRE fosters the building of a classroom community of learners and involves the utilization of culturally relevant texts and multiple perspectives to enhance student learning. In addition, CRE cultivates teacher identities as advocates for teaching for social justice and promoting social change and instilling this orientation in students. Moreover, CRE contributes to enhancing community engagement, sociocultural awareness, and understanding of diversity and difference. Implications for researchers, policy makers, and practitioners are discussed that emphasize the need for and critical importance of CRE.

Poster U148 – Emma Kehler
Mentor: Paula Thompson
Co-Authors: Tatum Smith, Grace Ottman
Title: *Curriculum Use and Early Childhood STEM*

The purpose of my research project is to gain information around planning and curriculum use from the perspective of early childhood educators who work in family child care homes. As both owner and operator, in-home family child care providers can face many challenges in providing care and education to the young children they serve, who often span from six weeks to school-age. Some of these challenges include time and resources for planning activities, interacting with parents, and supporting young children who due to their age often lack emotional regulation and coping skills. In-home family child care providers often work long hours to support family work schedules, earn minimal pay, and lack benefits. Family child care providers are responsible for purchasing their own curriculum and supplies which is problematic because of the minimal pay that they receive. These combined factors often contribute to minimal or no curricular resources for family child care providers (Herman et al., 2021). The goal of my project is to further identify and then reduce these barriers by providing a place where providers can go for lessons and activities, specifically science, technology, engineering, and math. As part of my research, I conducted a

survey with local in-home family child care providers. The goal of the survey was to better understand what challenges in-home family child care providers face related to curriculum use, what STEM activities or curriculum they already use, how they plan for these activities, and what challenges these providers are facing. The data from this survey is still being analyzed, however, the preliminary results suggest that young children's challenging behaviors, lack of time, and lack of resources are challenges for in-home family child care providers. The next step in my study is to finish analyzing the data that I collected from the survey.

Poster U149 – Seoeun Koh
Mentor: Naheed Abulqasim Ali Akbar Abdulrahim
Title: *A Comparison of Special Education in the United States and South Korea*

This study compares inclusive education and the Individualized Education Program (IEP) process in South Korea and the United States, aiming to enhance the effectiveness of South Korea's special education system. Through a comparative analysis of the literature, this review examines legal frameworks, instructional approaches, and collaboration among teachers, parents, and specialists to identify key differences and propose improvements. In the U.S., Free Appropriate Public Education (FAPE) and Least Restrictive Environment (LRE) principles ensure that the most students with disabilities are placed in general classrooms with appropriate support. In contrast, South Korea follows a placement-based inclusion model, where many students attend special schools or self-contained classrooms despite legal mandates promoting inclusive education. The U.S. enforces IEP implementation through legal regulations, standardized procedures, and collaborative planning, ensuring active participation from teachers, parents, and specialists. This approach fosters a wellstructured system that addresses individual student needs and promotes inclusive education. In contrast, South Korea's IEP process remains teacher-centered, with minimal involvement from general education teachers and limited parental input. As a result, collaboration in the development and execution of IEPs is less comprehensive, potentially affecting the effectiveness of special education services. This study suggests enhancing teacher training, expanding co-teaching models, and increasing parental and expert participation to strengthen South Korea's special education system. By fostering a more inclusive and collaborative approach, special education can be better integrated into general education settings, ensuring that students with disabilities receive the support they need. Ultimately, this shift can lead to higher-quality education, improved learning experiences, and better long-term outcomes for students with disabilities.

Poster U150 – Tatum Smith
Mentor: Jane Strawhecker
Title: *Curriculum Use and Early STEM*

In some sectors of the early childhood education workforce, curriculum use is not a guarantee. In fact, in-home family childcare providers tend to not use curriculum (Rege et al., 2024) often due to barriers to access and funding. This, combined with the long hours that they work, contributes to minimal or no curricular resources for family childcare providers (Herman et al., 2021). Understanding the curriculum is essential in helping educators fully implement the curriculum. This need is particularly evident in science, technology, engineering, and math (STEM) where some adults may not be confident, making them less likely to plan and implement STEM (Leung, 2023). With proper training and access to resources, educators' confidence and ability to adhere to the curriculum will increase (Leung, 2023; Zucker et al., 2021; Odom et al., 2019; Kinzie et al., 2015; Woods et al., 2020; Rege, 2024). Although many curricular resources exist for early childhood education, very little research has been done on the implementation of STEM instruction in family childcare settings. Participants were recruited through a partnership with ESU 10 Early Learning Connection (ELC). Data is currently being collected via an online Qualtrics survey with a blend of questions on demographic information and resources used for STEM implementation. The information will be analyzed and shared in my poster presentation.

Fine Arts & Humanities

Art & Design

Poster U153 – Evan Hadden
Mentor: Nadine Saylor
Title*: Combination of Swedish and Venetian Glass*

This research project explores the integration of Venetian and Swedish glassblowing techniques, combining the rich decorative traditions of Murano with the refined, minimalist forms of classic Swedish vessels. While Venetian glass is known for its

vibrant color application, intricate cane work, and technical complexity, Swedish glass emphasizes clean lines, organic shapes, and restrained elegance. By merging these two aesthetics, this study aims to develop a hybrid style that retains the refined forms of Swedish glass while incorporating the elaborate patterning and color manipulation characteristic of Venetian techniques.

The research process involves a series of practical experiments focusing on the application of Venetian cane and murrine work onto traditional Swedish vessel forms. Techniques such as reticello, filigrana, and zanfirico are applied to archetypal Swedish silhouettes—such as graal and overlay-style vases—to assess how these decorative elements interact with the understated elegance of Swedish design. Challenges in compatibility, including heat management, timing, and the structural integrity of complex patterns on simple forms, are addressed through iterative testing and adaptation.

This project contributes to the field of contemporary glass by bridging historical methodologies from two of the most influential glassmaking traditions. The resulting works challenge traditional categorizations, offering a new perspective on how glass can function as both a vessel and a canvas for ornamentation. Through this fusion, the study highlights the technical versatility of glassblowing and proposes a dialogue between two historically distinct but equally sophisticated traditions. The final body of work showcases a collection of hybrid vessels that balance the dynamic visual complexity of Venetian glass with the elegant restraint of Swedish design, pushing the boundaries of what is possible within hot glass artistry.

Calvin T. Ryan Library

Poster U151 - Emma Huggins
Mentor: David Arredondo
Title*: Intertextual References in Conspiracy Theory Texts*

This project will apply network theory to the base text of Michal A. Hoffman II's Secret Societies and Psychological Warfare in order to trace marked intertextual references to books, serials, newspapers, songs, transcripts, and other published media. Using computer software to map these relationships will provide a deeper understanding of

the text when combined with traditional literary analysis methods, broadening readers' understanding of how conspiracy theorists build credibility from existing sources, present their ideas in relation to these mediums, and anchor themselves within a larger context.

Communication

Poster U154 - Maggie Wells
Mentor: Mary Harner
Title: *Slices in Time*

Throughout the United States, hundreds of cameras capture images of water sources approximately every 15 minutes at sites monitored by the U.S. Geological Survey. These images are available online through the Hydrologic Imagery Visualization and Information System (HIVIS). Researchers at the University of Nebraska are developing a computer program called GRIME-AI that facilitates access to large image sets, such as from HIVIS, and assists in working with images for research and creative purposes. GRIME-AI allows hundreds of images to be downloaded and processed to create visualizations and analyze image data. One form of visualization is a composite slice that is created by copying the same section of images taken across time and placing those sections side by side to create a single graphic. The objective of my project was to find which images can make the most compelling composite slice graphics. My process was to select a camera site using GRIME-AI; download images from a select time interval; choose a clear, beautiful snapshot from each day with calm water; and process the images using the composite slice function in GRIME-AI. I found that images with lateral views, good lighting, nice exposure, and obvious water lines made for smooth composite slice graphics. This poster highlights some of the most compelling composites. Creating these graphics provides a unique sense of wonder about these landscapes and their unassuming beauty. Images captured in the same frame, day after day, reveal enhanced beauty whenever a unique image composite is created.

Poster U153 – Jayda Day
Mentor: Kristen Majocha
Co-Author: Kristen Majocha
Title: *Interpersonal Communication Dynamics of AI*

While research has shown AI can help relieve loneliness (Freitas et al.), limited research has explored the potential of AI companions to alleviate loneliness, and most of the existing studies are focused on natural sciences and business applications. Our interest lies in examining the interpersonal communication dynamics of AI, particularly in comparison to the core dynamics of human-to-human communication. We aim to investigate the similarities and differences between these forms of communication, acknowledging that while AI interactions may seem similar to human conversations, we expect significant gaps in their ability to facilitate healthy dialogue. As part of this research, we plan to conduct surveys to gain insights into people's perceptions and experiences regarding their relationship with AI. We will begin by conducting a comprehensive review of existing literature on both interpersonal communication and AI communication, with a particular focus on consumer companion apps like ChatGPT and Replika. Based on this review, we will develop a research question and a hypothesis. We also aim to create a questionnaire that will be approved through an Institutional Review Board (IRB) application. Our goal is to administer this survey as part of a summer research project in 2025.

English

Poster U155 – Jessica Bruha
Mentor: William Burns
Title: *Neo Aesopica*

Abstract: For hundreds of years, fables have been used to teach morals and instill good judgement. Despite the popularity and longevity of fables, however, the genre has remained stagnant for decades. This paper examines the evolution of the fable genre as well as the origins of popular character archetypes to modernize the genre. Fables are best characterized by their use of anthropomorphized plants and animals, such as the cunning fox and the kingly lion, as tools to convey the moral of the fable. Firstly, this paper asserts that many of these character archetypes were shaped by the interactions humans had with these plants and animals at the time. Furthermore, many other archetypes have their roots in folk legend and mythology, such as the owl as a symbol of wisdom. Secondly, the archetypes and morals were influenced by the

stereotypes and moral values of the time period in which they were written. The paper explores this by comparing the fables of Aesop to the fables of the Victorian era, focusing particularly on the differences between the morals and beliefs. Lastly, the paper is accompanied by a collection of fifteen original fables, which utilize the findings of the research to modernize the genre.

History

Poster U156 – Delaney Tracy
Mentor: Will Stoutamire
Title: *"The New, the Metropolitan, Order of Things": The Frank Businesses in Kearney, Nebraska*

The city of Kearney was incorporated in 1873, and over the next two decades the city experienced a boom in both population and industry. One of the key figures in Kearney's industrial development was George W. Frank, an entrepreneur originally hailing from New York who purchased the Kearney Canal and completed construction on it in 1886. With it, Frank brought hydroelectric power to Kearney that fueled other emerging industries, with which Frank himself was often involved. However, by the turn of the twentieth century, all of the Frank businesses would be sold or shut down as the family left the area. Among these relatively short-lived businesses were the Nebraska Ice Company, the Kearney Brick Company, the Kearney Electric Railway Company, and the Leavenworth Improvement Company. Little research has been conducted with respect to most of these companies even though they played a role in the early development of Kearney; furthermore, research into these businesses can now contribute to our understanding of the industrial development of the Midwest because these companies demonstrate the emulation of industrialization in the East that characterized developing towns across the region. Additionally, the Franks' administration of these companies, especially as they began to deteriorate, illustrates the effects of the Panic of 1893 on rural industry. In examining these lesser-known companies, a pattern of poor business decisions in response to financial strain emerges that, in the end, contributed to the decline of the Franks and led to their departure from Kearney. Because of this, my research provides insights not only into George Frank's businesses and the early history of Kearney but also sheds light on the impact of the industrial era and the Panic of 1893 on rural communities.

Poster U157 – David Johnson

Mentor: Amber Alexander
Title: *Indigenous People's History in Nebraska School Curriculum*

This research project examines how Indigenous history has been historically included and implemented in the material of Nebraska public school's history curriculum. Analyzing Indigenous history in school curriculum is important to finding and identifying potentially harmful biases and views that have historically been present in the United States. Recognizing these historical biases will allow for a better understanding of harmful views currently present in society. This project examines the presentation and accuracy of Indigenous People's history in educational and fictional book materials used in public school curriculum from 1965 to 1990. The language used to refer to and group Indigenous peoples in curriculum materials was examined to identify potential biases or prejudices. The accuracy of Indigenous history was examined for potentially misleading or misinformative information that has the potential to exacerbate harmful stereotypes or historical inaccuracies. Findings around the presentation of Indigenous Peoples show much of the material used terms and identifications that could be considered improper and potentially harmful stereotyping, but the findings did not appear to promote any direct prejudice against Indigenous Peoples. The findings surrounding the accuracy of Indigenous history, however, show problematic trends, as misleading summaries and a lack of essential details create room for potentially under-informed and biased perspectives of Indigenous history. The findings of this research are helpful in identifying potentially harmful perspectives and educational trends still present within public education today.

Poster U158 – Hannah Vraspir
Mentor: Nathan Tye
Title: *The Afterlife of White Buffalo Girl*

For my URF Project, I focused on understanding and learning a little bit more about the grave of White Buffalo Girl, she was a little 18-month-old Ponca child buried in Neligh, Nebraska. She died when the Ponca nation was forcibly to move to Indian Territory (now Oklahoma). This Became known as the Ponca Trail of Tears due to the loss of people and their sacred homeland. The Ponca passed through Neligh and asked the people of Neligh to bury White Buffalo Girl and tend and respect her gave like they would one of their own. My project explores of legacy of this action. I ask why the Ponca bury her there and who paid for her headstone. I also explored the continued relationship between Neligh and the Ponca through this burial. Based on archival research in the Antelope County Historical Society the secondary scholarship on the

Ponca, I explore this important story, for both Neligh community and the Ponca tribe as well. I hope to shed a little bit of light and more of an understanding of influence both communities have had on each other and continue to share her legacy that was left behind and carried on by a community.

Poster U159 – 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.

Poster U160 – Grace Schaefer
Mentor: Will Stoutamire
Title: *Camp Atlanta Research and Digitization*

In 1942, at the request of the British, the US government agreed to take 175,000 Axis POWs. To do this, they needed land that met a specific set of requirements. POW 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 Mexican 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 main camps had branch camps that stemmed across Nebraska and into 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 on transcribing twenty-four digitized oral histories from former POWs, guards, and local residents involved with the camp. These oral histories were originally conducted in the 1990s as part of a POW camp reunion, and were only recently digitized by the museum. Once the transcriptions are complete, I will be creating an Omeka website that hosts both the digitized oral histories and transcripts, along with digitized letters, photos, and other records from the camp. This will allow me to build a virtual exhibit on Camp Atlanta that interprets the history of the camp through the voices and experiences of those who were there. Once completed, this project will bring a forgotten part of Nebraska history to the public.

Modern Languages

Poster U161 – Mariana Mosqueda
Mentor: Janet Eckerson
Title*: Job Satisfaction of First Year Teachers: A Comparative Case Study*

Teacher workforce shortage is a national issue exacerbated by the COVID-19 pandemic. Many schools struggle with retaining teachers, especially underserved areas like rural and urban communities. Many educators leave the field in the first to five years making retention of early career teachers critically important. One in ten teachers do not return to the classroom after their first year (Gray & Taie, 2015). This study examines key factors that influence job satisfaction and teacher retention during the first year of teaching through qualitative interviews with two first-year teachers from different school settings and experiences. Two cases were chosen from a group of interviews of first year teachers who were participating in an early career educator cohort of professional development. Using a phenomenological theoretic framework the study examines the two cases which represent two very different job satisfaction conditions at the end of their first year of teaching. Carlos, one of the participants, reported feeling so dissatisfied with his experience he ended up leaving to a different school district for the following year. In comparison, the second participant, Emma, who also faced difficult challenges during her first year reported a high level of job

satisfaction at the end of the year. The analysis examined internal factors like self-efficacy and resilience and external factors like administrative support that contributed to their very different outcomes. Analyzing two different qualitative interviews illustrates how different environments, community engagement, administrative support, and dispositional factors all play a role in teacher satisfaction and retention in first-year teachers. Implications of the findings can inform the design of new teacher induction programs.

Poster U162 – Jose Montanez
Mentor: Janet Eckerson
Title*: Measuring linguistic insecurity in U.S. Heritage Spanish Speakers and its effect on enrollment in undergraduate language courses.*

Heritage speakers of Spanish in the United States are characterized as individuals who grow up in homes where Spanish is spoken and are to some degree bilingual in Spanish and English (Valdes, 2001). Heritage speakers of Spanish in the U.S. navigate complex linguistic and cultural environments influenced by widespread ideologies and attitudes towards their language practices. Language practices of bilinguals such as code-switching, loan-words, and the use of Spanglish are often deemed substandard or not even considered part of the Spanish language by dominant language ideologies. These attitudes are often disseminated at home and in educational and social contexts and may have adverse effects on the development of social and linguistic identities of heritage speakers of Spanish in the U.S. The degree to which heritage speakers engage in language practices may be correlated with a decreased confidence in their linguistic capabilities. (Driver, 2023), and lead to their decision to enroll (or not) in secondary or post-secondary language courses. This study will examine the relationship between the use of language practices, the self-perceived feelings of linguistic insecurity of heritage Spanish speakers in the U.S., and the extent to which those sentiments encourage or deter undergraduates from pursuing language education. In this study, a novel system that collectivizes three separate measures of insecurity will be used to assess the self-reported perceptions of the participants. Firstly, the Bilingual Language Profile (BLP) (Birdsong, Gertken, & Amengual, 2012), this scale assesses participants' self-reported language dominance based on factors such as language use, proficiency, and exposure. The Bilingual Code-Switching Profile (BCSP) (Olson, 2024) will also be used, this instrument quantifies participants' self-reported frequency, contexts, and attitudes toward codeswitching. Finally, the Diverse Learner Linguistic Insecurity Scale (DLLIS) (Driver, 2023), this scale assesses linguistic insecurity among diverse bilingual speakers in academic and social contexts.

Music, Theatre, & Dance

Poster U163 – Mary Osterman
Mentor: Ting-Lan Chen
Title*: The Application of the Suzuki Method in Public Schools' Music Education*

The goal of this research project is to outline the philosophies and pedagogical approaches of the Suzuki Method that can be applied to public schools' music teaching, particularly secondary education, to create an optimal learning environment. The typical music education at public schools centers on heterogenous group classes, whereas the Suzuki Method, established by Dr. Shinichi Suzuki, focuses on one-on-one instruction and homogenous group lessons, along with its emphasis on parental involvement and "nurture over talent". Primary sources, including online articles and books written by Dr. Suzuki, certified Suzuki music teachers, and Suzuki Method practitioners were studied and analyzed to draw conclusions and help generate the pedagogical plans that adapt the Suzuki Method to public school music education. These adaptation plans include: 1) On top of ensemble classes, one-on-one teaching is added while allowing a class period of practice time for students' personal growth; 2) Instead of strictly following the principle of "parental involvement" in students' practice, the creation of a mentoring system is encouraged through having upper classmen or advanced students provide volunteered mentorship and support to younger students; 3) Parental involvement is fostered through online weekly reports and event engagements, including fundraisers; and 4) Applying the Suzuki Method's "Every Child Can" by providing learning opportunities to not only schools that can afford instrumental programs but also socioeconomically underprivileged school districts through financial strategies such as the "Robin Hood" method for school instruments' rental prices.

Poster U164 – Victoria Nimneh
Mentor: Anne Foradori
Title*: Considering Black Trauma as a Component of Authentic Storytelling in Contemporary Opera*

Identifying authentic storytelling can be complicated, even if it remains fluid in its process and definition. It is a means of sharing an experience that is honest, genuine, and respectful. It is truthful and transparent and creates a sense of intimacy. Authentic storytelling can express vulnerability in depicting characters. The narrator engages with their audience, fostering discussion, interaction, and understanding. The basis of my research project was to examine and evaluate the authenticity of storytelling in contemporary Black opera using several criteria I devised, including the presence of Black trauma. For this presentation, I have chosen three contemporary operas to examine: The Central Park Five (2019) by Anthony Davis, Fire Shut Up in My Bones (2019) by Terence Blanchard, and American Apollo (2024) by Damien Geter. My familiarity with the Bechdel-Wallace Test (1985) and the DuVernay Test (2016) guided me in developing criteria for my study.

Poster U165 – Sayo Kajiyama
Mentor: Anne Foradori
Title*: Strategies for Cultivating Italian Lyric Diction Skills for Native Japanese Speakers*

This research paper is intended to be used in teaching Italian pronunciation to Japanese students studying vocal music in universities located outside of Japan. This paper uses Japanese pronunciation symbols to represent Italian pronunciation instead of IPA, which is unfamiliar in Japan and can be a hurdle for Japanese students to use. By representing the IPA in Japanese language, students will be able to pronounce Italian more smoothly, pronounce it more accurately, and better convey the meaning to the audience when singing.

I conducted a literature review of articles and books by Japanese music educators and voice teachers who addressed topics as varied as developing a choral sound and general approaches to diction. I found that very little was written on this topic, so I developed my own methodology and system to see whether my experiment would work.

I did this in three steps: 1. Clarify the fundamental differences in pronunciation between Italian and Japanese sounds; 2. Develop a table of sounds to represent Italian syllables with Japanese diacritics; and 3. Use a well-known aria, “Vedrai Carino” from Don Giovanni by Mozart as an actual example of an entire piece of music transcribed in Italian pronunciation with both Japanese diacritics and IPA.

The result of this study was that for transcribing Italian sounds using Japanese diacritics proved to be a helpful tool for native Japanese speakers. There is not an

equivalent Japanese sound for every sound in Italian, and in the Western tradition of teaching lyric diction, IPA is most frequently used. However, this method of using Japanese diacritics was a bridge between an Eastern and Western language which have more in common in pronunciation than first suspected.

Poster U166 – Madison Miller
Mentor: Anne Foradori
Title*: Utilizing the International Phonetic Alphabet (IPA) in Choral Instruction: Enhancing Vocal Precision, Linguistic Clarity, and Artistic Expression*

The International Phonetic Alphabet (IPA) is a pivotal tool in choral instruction, enhancing vocal precision, linguistic clarity, and artistic expression. This paper examines the multifaceted applications of IPA in choral music education, emphasizing its role in improving vocal production, facilitating linguistic accuracy, reducing rehearsal time, and fostering cultural sensitivity. In particular, IPA serves as a bridge for singers to master difficult or unfamiliar languages, ensuring correct pronunciation and articulation while maintaining the stylistic integrity of each piece. Furthermore, the paper explores how IPA contributes to artistic interpretation, allowing choirs to explore diverse vocal techniques and emotional depth across various genres. It also addresses IPA's significance in the professional development of choral directors, enhancing their ability to communicate nuanced vocal instructions and interpret scores more effectively. The impact of IPA on audience engagement is also discussed, as clear and expressive diction significantly enhances the overall listener experience. By synthesizing current research, case studies, and real-world applications, this work illustrates how IPA empowers choirs to excel in diverse linguistic, cultural, and musical contexts, while providing solutions to common implementation challenges, such as regional dialect variations and accessibility for non-linguists. Ultimately, this paper advocates for the expanded use of IPA in choral education, demonstrating its potential to elevate both the technical and artistic achievements of choirs worldwide.

Poster U167 – Kylie Mendiola-Ozuna
Mentor: Beth Mattingly
Title*: Comparing Mexican and American Music Pedagogy*

While music is universal, the methods used to teach it vary across borders. This project will focus on comparing the music education methods commonly used in Mexico and the United States, with the goal of developing a more diverse and inclusive approach to teaching music. In comparing and studying the educational techniques of both countries, I hope to identify unique elements that can be combined to diversify the way music education is viewed. This paper aims to expand the horizons of American music educators by encouraging the incorporation of different methods and approaches that can provide a quality musical education to a diverse group of learners. In combining methods from both Mexican and American music pedagogy, I hope to develop strategies that support Spanish-speaking students and make music education more accessible in areas with a high percentage of Hispanic and Latino students. Given the percentage of Spanish speaking students in the United States, combining American approaches with Hispanic ideas is a worthwhile venture for a more inclusive classroom culture. Hopefully, this paper can begin discussions about world music education. There is much to learn in the music pedagogy of other countries.

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