Undergraduate Schedule of Events

April 13, 2023

Nebraskan Student Union Ponderosa Rooms

Thursday, April 13, 2023

7:30 - 9:00 am ..... Students set up posters, (Sessions 1&2) Ponderosa A&B

9:00 – 10:00 ..... Session 1: Natural & Physical Sciences Poster Presentation

10:00 – 11:00 ..... Session 2: Behavioral & Social Sciences Poster Presentation

11:00 -1:00 ..... Poster removal (Sessions 1&2) and set up (Sessions 3&4)

1:00 - 2:00 ..... Session 3: Prof & Applied Studies Poster Presentation

2:00 – 3:00 ..... Session 4: Fine Arts & Humanities Poster Presentation

10:00 am – 2:00 pm ..... Oral Presentations - Ponderosa C&D

1:15 PM…….Music Performance – Ponderosa C

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

Graduate Schedule of Events

April 13, 2023

Nebraskan Student Union Ponderosa Rooms

Thursday, April 13, 2023

7:30 - 9:00 am ..... Students set up posters, (Sessions 1&2) Ponderosa A&B

9:00 – 10:00 ..... Session 1: Natural & Physical Sciences Poster Presentation

10:00 – 11:00 ..... Session 2: Behavioral & Social Sciences Poster Presentation

11:00 -1:00 ..... Poster removal (Sessions 1&2) and set up (Sessions 3&4)

1:00 - 2:00 ..... Session 3: Prof & Applied Studies Poster Presentation

2:00 – 3:00 ..... Session 4: Fine Arts & Humanities Poster Presentation

1:30 – 2:00 pm ..... Oral Presentations Via Zoom

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

Undergraduate
Oral Presentation Schedule

Thursday, April 13, 2023

Session 5 (Ponderosa C)

10:00-10:15 Marissa Hoover (Chem)

10:15-10:30 Stephanie Vielmas Duarte (Bio)

10:30-10:45 Osaira Ovando (Bio)

10:45-11:00 Ella Buhlke (Bio)

Session 6 (Ponderosa D)

10:00-10:15 Cassie Kouma (English)

10:15-10:30 Storm Remmenga (English)

10:30-10:45 Sydney Weiler (History)

10:45-11:00 Miranda Niemeyer (History)

Session 7 (Ponderosa C)

11:00-11:15 Avery Mitchell (Bio)

11:15-11:30 Noah Shackelford (Bio)

11:30-11:45 Kyle Dittmer (Bio)

11:45-12:00 Trenten Theis (Bio)

Session 8 (Ponderosa D)

11:00-11:15

11:15-11:30 Trinity Angle (English)

11:30-11:45 Gracie Luebbe (English)

11:45-12:00 Kenny Mitchell (English)

Session 9 (Ponderosa C)

12:00-12:15 Earlen Gutierrez (Pol Sci)

12:15-12:30 Tell Jensen (Pol Sci)

12:30-12:45 Joseph Hiatt (Pol Sci)

12:45-1:00 Ian Johnson (Psych)

Session 10 (Ponderosa D)

12:00-12:15

12:15-12:30 Journey Noyes (Sociology)

12:30-12:45 Derek Elton (Teach Ed)

12:45-1:00 Cassidy Schelling (Teach Ed)

Session 11 (Ponderosa C)

1:15-1:30 Bailey Manhart (Music Performance)

Room: Ponderosa C

Session 5

10:00 am---**Marissa Hoover:** *Photochemical dimerization of chalcones using macrocyclic cavitands (Mentor – Mahesh Pattabiraman)*

10:15 am ---**Stephanie Vielmas Duarte:** *Metastasis of Diabetic Triple Negative Breast Cancer Cells: Role of Cytoskeletal Inhibitors (Mentor – Surabhi Chandra)*

10:30 am ---**Osaira Ovando:** *The Role of Focal Adhesion Kinase on the Transwell Migration Assay of Diabetic Triple Negative Breast Cancer Cells (Mentor - Surabhi Chandra)*

10:45 am ---**Ella Buhlke:** *Characterization of Cross-Species Transmission of Drosophila melanogaster Nora Virus (Mentor – Kim Carlson)*

Room: Ponderosa D

Session 6

10:00 am---**Cassie Kouma:** *Writing Original Poetry Inspired by Christian Martyrs (Mentor - Marguerite Tassi)*

10:15 am ---**Storm Remmenga:** *"Class Performance": Socioeconomic Intervention in Sally Rooney's Normal People (Mentor - Denys VanRenen)*

10:30 am ---**Sydney Weiler:** *Anne Campbell & Super Intendency (Mentor - Linda Van Ingen)*

10:45 am ---**Miranda Niemeyer:** *The Persistence of Resistance in HIV/AIDS Education and Awareness (Mentor - David Vail)*

Room: Ponderosa C

Session 7

11:00 am ---**Avery Mitchell:** *Diseases Ticks Carry in Western Nebraska (Mentor - Julie Shaffer)*

11:15 am ---**Noah Shackelford:** *The Prevalence of Tick-Borne Disease-Causing Pathogens in South Central Nebraska (Mentor – Julie Shaffer)*

11:30 am ---**Kyle Dittmer:** *Determining Antimicrobial Activity of Metal-N-Heterocyclic Carbene Complexes Against Staphylococcus Aureus (Mentor – Austin Nuxoll)*

11:45 am ---**Trenten Theis:** *Staphylococcus aureus Persisters are Associated with Reduced Clearance in a Catheter-Associated Biofilm Infection (Mentor – Austin Nuxoll)*

Room: Ponderosa D

Session 8

11:00 am

11:15 am ---**Trinity Angle:** *Committed to the Masculine Box (Mentor Janet Graham)*

11:30 am ---**Gracie Luebbe:** *Asian American Literature: An Examination of Narrative Techniques in the Autobiography (Mentor – Janet Graham)*

11:45 am ---**Kenny Mitchell:** *Everything Here is Reasonably Playful: A Novella (Mentor – Theodora Ziolkowski)*

Room: Ponderosa C

Session 9

12:00 pm---**Earlen Gutierrez:** *The Role of Latin American Women in the Fight Against Climate Disaster and Capitalism (Mentor - William Aviles)*

12:15 pm ---**Tell Jensen:** *The Sojourn or Journey to Renewable Energy (Mentor - Chuck Rowling)*

12:30 pm ---**Joseph Hiatt:** *Gender & Career Choice: Do Our Views Toward General Roles Influence Career Choice? (Mentor – Satoshi Machida)*

12:45 pm ---**Ian Johnson:** *Wait, which one was it? Misinformation and memory (Mentor – Katherine Moen)*

Room: Ponderosa D

Session 10

12:00 pm

12:15 pm ---**Journey Noyes:** *A Content Analysis of The Fifty Shades of Grey Series (Mentor – Sandra Loughrin)*

12:30 pm ---**Derek Elton:** *Midwestern Athletic Coaches Personal and Professional Media Usage (Mentor – Bryan Artman)*

12:30 pm ---**Cassidy Schelling:** *Teaching Students Who Have Experienced Trauma (Mentor – Dena Harshbarger)*

Room: Ponderosa C

Session 10

1:15 pm --------**Bailey Manhart** (Music Performance) *A Musical Journey with the Concerto for Eb Saxophone and Orchestra, Op. 109 (Mentor – David Nabb)*

Graduate Writing Competition Abstracts

Laura Gregory
Mentor: Marguerite Tassi
Title: *There's a Double Meaning in That: Female Kinship and the Multifaceted Nature of Heroism and Blessedness in Much Ado About Nothing*

I have chosen to include this line "There's a double meaning in that" (spoken by Benedick in Act 2 scene 3) in the title of this analysis as a way of introducing the play's two heroines: Hero and Beatrice, and my argument that these women's names at once symbolically exemplify and ironically contrast with their characters' natures. While referring to scholarship on Shakesperean names, allegory, and societal and gender roles, I will consider the meaning of these names—Hero meaning "hero" and Beatrice meaning "blessed" or "blessing"—and examine the ways that these characters define and are defined by heroism, blessing, and womanhood. Moreover, I will argue that as these characters are so closely knit and supportive of each other, they define and are defined by each other's names as well as their own. Although I will be focusing on these women, I will also refer to Benedick—whose name can also be translated as "blessed"—and his noteworthy decision to advocate for these women when they find themselves at odds with a male-led society. Ultimately, I will conclude that both Hero and Beatrice are as cursed as they are blessed, as heroic as they are victimized by circumstance, and that these loving and supportive cousins help each other to find happiness by making the most of their name-given, definitive strengths.

Scott Pate
Mentor: Douglas Biggs
Title: *Winterset's Captain: Charles Webber Aikins and a Rural Iowa Community in the Great War*

The rural Iowan community of Winterset – located southwest of Des Moines – experienced World War I through the actions of Company A, 168th Infantry, 42nd Division - predominately composed of men from the community - and Captain Charles Webber Aikins. A shoe store owner and leader of the local Iowa National Guard garrison in the community, Aikins led Winterset's young men to the battlefields of Europe, becoming one of the first Americans to win the Croix de Guerre in March

1918. However, Aikins' public service career never materialized outside the rural community following the war, with Winterset rejecting him during a mayoral election. In Over Here, David Kennedy highlights the effort to mobilize American public opinion, highlighting the role of the Committee of Public Information (CPI) in monopolizing the information published in newspapers. Meanwhile, Fredrick Johnson's Patriot Hearts demonstrates how the local experience differs from the national experience by examining the impact of the Nonpartisan League's influence on Minnesota's Goodhue County. The wartime experience of Charles Aikins and Winterset further deviates from Kennedy's work showing how one rural community organically supported the war with news of Captain Aikins and "our boys" on the front pages of their weekly newspapers, influencing the community's actions. Aikins only receives passing attention in publications on the history of the 168th Infantry, with local memory forgetting Company A's wartime impact. By examining local newspapers, officers' and soldiers' diaries, regimental histories, and government documents on the impact of chemical warfare, it becomes possible to reconstruct Aikins' story. From these sources, a local history of a forgotten town figure emerges, showing how a rural Iowa community changed due to its participation in the Great War.

Graduate Online Oral Presentation Abstracts

History

Christy Gordon Baty
Mentor: Will Stoutamire
Title: *Embroidered Book Bindings in Early Modern England*

In the late sixteenth and early seventeenth century, a small but interesting fashion for embroidered book bindings grew and declined over an approximately 70 year period. The needlework adorned devotional books like the Bible, Psalms, Book of Common Prayer, and meditations on sin and godliness. These embroidered designs and materials ranged from almost child-like simplicity to incredibly elaborate, professionally made with silk and gold metal thread. This was an odd juxtaposition between decorative embellishments on religious books and the state religion of evangelical Protestantism which, in its most extreme form, advocated for iconoclasm and getting rid of “popish” trappings. These books and their bindings represent a quickly changing culture and the contradictions that created: the expansion of the book trade and falling book prices, the growth of the gentry and middle classes and their efforts to increase their social status, the rise of Protestantism which introduced the idea of men and women engaging directly with Scripture, the rise in literacy rates and spread of education. The embroidery itself also asserts the activity of the women (and handful of men) who did this work, who spent hours in industry and piety creating these covers. Many of these books also include inscriptions of the owners, the women who handled and loved these objects and gifted them onto important people in their lives. This presentation will demonstrate that examining these extant bindings provides a compelling way to understand the lives of the women who were impacted by these social, religious, and political changes.

Kinesiology and Sports Sciences

Kobe Lo
Mentor: Elena Robinson
Title: *Management of Post-Concussion Syndrome in a High School Wrestler: A Case Study*

Background: Post-Concussive Syndrome (PCS) describes the collection of symptoms that persistent for weeks to months after a concussion. This syndrome may present with concussive symptoms, including those associated with vestibular ocular dysfunction (VOD) such as balance issues, vision impairments, poor eye coordination, and dizziness. Vestibular and oculomotor rehabilitation can improve outcomes of VOD by stressing impairments in a controlled manner.
Patient: A 14-year-old high school wrestler suffered his third concussion during a summer wrestling camp. The patient presented with various symptoms including headache, nausea, inability to sleep, and poor balance, eye coordination, and response time. The patient was prescribed rest by a physician for four weeks due to prolonged symptoms. Following rest, the patient began vestibular ocular exercises.

Intervention: The utilization of vestibular ocular motor screening (VOMS) exercises, such as smooth pursuits, saccades, convergence, Vestibular-Ocular Reflex test, Visual motion sensitivity test, were used as an active rehabilitation plan to assist in recovery. Exercises were performed daily for about one week before final physician assessment.

Outcomes: Using VOMS improved the patient's symptoms, bettering his classroom focus and rehab performance. While the patient did not return to sport that fall, VOMS reduced the time for clearance to daily physical activities such as weightlifting and running.

Conclusion: An active return to play protocol is crucial in the rehabilitation of concussions. Vestibular ocular dysfunction is common after a concussion. Thus, implementation of VOMS not only as an assessment tool for screening but as a rehabilitation tool can help recovery from a concussion.

Clinical Bottom Line: Vestibular ocular motor screening is a validated tool that can be used in the creation of an active rehabilitation plan to improve the prognosis and recovery for patients suffering from concussions.

Teacher Education

Kelsey Walker
Mentor: Phu Vu
Co-Author: Phu Vu
Title: *Structured Student Conversations and their Impact*

This action research described a teacher's first experience with teacher inquiry in a small, rural school setting in a sixth-grade Language Arts classroom. In this project, the teacher identified a question of how to help her students communicate with others more effectively and learn from classmates by using positive interactions, as she wanted to see how implementing student discussion protocols into her classes affected peer relationship skills, a necessary social-emotional learning competency. She then designed an action plan or intervention based on this question by integrating five student discussion protocols including structured controversy, pair communication, triad protocol, personal experience panel, and Socratic seminar. These interventions were embedded as part of a refugee unit, where students read a middle grade novel about a Syrian refugee and other informational texts featuring the refugee experience. By collecting data from three different sources, which included field notes, student surveys and student interviews, the teacher documented the intervention as part of the teacher inquiry. Over a period of three weeks, the data indicated a general sense of improvement of both student conversational and relationship skills when various discussion protocols were implemented and utilized in the classroom. Observations and discussions were described, and the teacher's reflections on the first venture into teacher inquiry were included.

Undergraduate Oral Presentation Abstracts

Fine Arts & Humanities

English

Trinity Angle
Mentor: Janet Graham
Title: *Committed to the Masculine Box*

Everyone is impacted by the cultural standards that are pressed upon them by society. These standards are based on any facet of an individual's identity- i.e., their gender, sexuality, physical appearance etc. People who present themselves as masculine face specific societal pressures. In this paper, I will discuss what I refer to as the Masculine Box. This Masculine Box refers to the societal standards that are placed on men. Although masculinity is not inherently bad, it is the connection to toxic ideologies and violence that brings concern to the rest of society. An analysis of the masculine characters in Viet Thanh Nguyen's novels The Sympathizer and The Committed demonstrate the negative impact of the Masculine Box on one's individuality and one's mind. These two novels follow an unnamed narrator and his experiences as a spy in America for the Communists and later in France. Both novels explore the relationship between the narrator and his blood brothers. The first as a spy in the first novel, and a drug dealer later in the second. This paper will focus on the narrator in The Committed in order to develop the ideas above. Ultimately, I will entertain the question: Is there any escape from the Masculine Box?

Cassie Kouma
Mentor: Marguerite Tassi
Title: *Writing Original Poetry Inspired by Christian Martyrs*

My research project involves writing creative narrative poems based upon the lives and deaths of Christian martyrs. My process involves learning about a martyr or recalling

the stories I have heard about one in the past. A specific detail about each death usually sticks with me and prompts me to choose that saint to write about. I then do in-depth research involving the state of the country the saint lived in and why Christian persecution was occurring at that time. I have chosen martyrs of various ages, but most of them died relatively young. The youngest include two thirteen year old children and a mother in her early twenties while the oldest was a grandfather in his mid-sixties. In addition, I have selected martyrs who were killed in a wide range of locations including Africa, China, Korea, Italy, Mexico, and more. Another aspect of this project is the poetry style, which is heavily inspired by Emily Dickinson. I use elements she utilized such as common meter for the lengths and forms of stanzas. Punctuation is another aspect inspired by Dickinson, especially with the use of the dash. In addition, the original poem that I wrote for this project began as an imitation poem mirroring Dickinson's "Because I Could Not Stop for Death" in its theme of death and meeting it as an old friend. These poems are meant to present narrative insights into the perspectives of individuals who sacrificed their lives but believed strongly that they gained something much more valuable.

Kenny Mitchell
Mentor: Theodora Ziolkowski
Title: *Everything Here is Reasonably Playful: A Novella*

Kenny Mitchell's novella entitled Everything Here is Reasonably Playful follows the development of Benjamin, a 13-year-old boy grappling with his everchanging life and holding tightly to imaginative play as a means of escapism. He creates his own world with his sister's abandoned Barbie dolls, using them to delve deeper into the parts of his identity he feels are secrets best left hidden. What Benjamin does not realize is his dolls live their own complex lives in their world separate from his, yet his actions bring unintended consequences. The dolls begin to panic when Benjamin's actions start negatively affecting their daily life—trapping them in a remote home with no escape and forcing them to come to terms with their identities amid intense, tragic loss. The book examines child development, familial relationships, and the multifaceted nature of human reactions when all the bits and pieces of life seem to be popping out of place.

Mitchell's presentation will consist of a fiction reading from his book's second draft. The reading showcases the intentional thought process behind constructing a long work of fiction, establishing complex characters and familial relationships, and the meticulous revision process involved in structuring and pacing the opening chapters of a book.

Storm Remmenga
Mentor: Denys VanRenen
Title: *"Class Performance": Socioeconomic Intervention in Sally Rooney's Normal People*

Sally Rooney's novel, Normal People, offers thoughtful, but not suffocating, commentary on how wealth can dictate a person's life more than any other aspect of their upbringing. On one hand, Rooney emphasizes how Connell and Marianne, the novel's central characters, will rekindle their torrid romance. On the other hand, Marianne's wealth, or Connell's relative poverty, seems to consistently interfere with their relationship, creating questions for readers regarding the outcome of the novel. For example, Rooney presents a scene in which Connell and Marianne win the same scholarship. For Connell, it is life-altering, but for Marianne, it merely reinforces her sense of self:. "For her the scholarship was a self-esteem boost, a happy confirmation of what she has always believed about herself anyway: that she's special." This scene exemplifies this essay's exploration of their different circumstances in life as it, and others, affect the way they see each other. Though Connell does not think less of Marianne for it, he does occasionally observe how privileged she is. Because she takes that privilege for granted, Marianne and Connell struggle to comprehend each other wholly. Normal People continuously walks on the edge of the idea that wealth determines their lives, but this essay suggests that Rooney may not fully believe that. This novel's intervention, then, asks its twenty-first century readers to think through meaningful social relationships that go beyond economic status.

Gracie Luebbe
Mentor: Janet Graham
Title: *Asian American Literature: An Examination of Narrative Techniques in the Autobiography*

Nisei Daughter by Monica Sone, *Woman Warrior* by Maxine Hong Kingston, and Fifth Chinese Daughter by Jade Snow Wong are prime examples of autobiographical Asian American literature. However, these texts should also be given the consideration of presenting canonical literary styles in tandem with their memoir-esque storytelling. My research presents an examination of the authors of these three books to show how they produce a combination of both autobiography and fiction to create a unique story. I utilize academic research essays and articles such as "Asian American Literature within and beyond the Immigrant Narrative" and "Asian American writers: a bibliographical review" to show how the written works of these Asian American women should be given merit for the thought-provoking and amusing literature they are, instead of being solely viewed through a western or eurocentric lens which portrays

them as an “immigrant narrative.” In this paper, I will have a specific focus on the narrative techniques and styles portrayed in *Woman Warrior* and *Fifth Chinese Daughter*. Comparing the variation in narrative techniques and styles in these two texts offers insight into their individual creativity and approaches to storytelling. The information gathered through my research on this topic is important because it depicts how Asian American literature is moving from a marginalized place to a much more centralized area of importance within all contemporary literature.

History

Miranda Niemeyer
Mentor: David Vail
Title: *The Persistence of Resistance in HIV/AIDS Education and Awareness*

Through historical analysis of HIV/AIDS awareness on Nebraska campuses, this project explores the continuity and discontinuity of cultural responses to this Public Health Crisis emerging throughout history. HIV is a virus that is resistant to many cures making it difficult to navigate and understand. As facts and stigmas regarding Sexual Health reveal themselves through examination of primary sources, this project displays unique interdisciplinary qualities blending STEM and Humanities together. During this process, my research bridges the gap between science and society using local stories and events to develop a greater understanding of Public Health in Nebraska. My research calls attention to the LGBTQ+ movement, and how this powerful event created discontinuity that began in the 1960’s and continues today. During such times of adjustment, the field of Public Health emerges, providing a safe place for People in Nebraska who have HIV or AIDS. Moreover, this project emphasizes the importance of community outreach, and how foundations like the Nebraska AIDS Organization positively influence the world we live in, opening opportunities and jobs for social workers, physicians, and administrators. Overall, this project reveals that as persistence of awareness continues, prevention is reinforced, ultimately creating agents of change.

Sydney Weiler
Mentor: Linda Van Ingen
Title: *Anne Campbell & Super Intendency*

While my original research was to explore women in rural education in the 1950s, my research led me to a more focused topic research that can bring more understanding to the history of women in rural education. As I was researching the Country School Legacy: Humanities on the Frontier oral history interviews, I stumbled a crossed a woman named Anne Campbell. Subsequent research on her at the State Historical Archives in Lincoln revealed that she was the first woman to hold the title of Nebraska Commissioner on Education while also impacting the foundation of Nebraska education in the mid 1970s and early 1980s. While there has been much research on women in rural areas as teachers and in education, there still has not been much research and scholarship about Nebraska women educators in higher positions and in positions of authority. Books such as “Catharine Beecher: A Study in American Domesticity by Katheryn Kish Sklar (1973), School Women of the Prairies and Plains by Glenda Riley (1994), and Call School: Rural Education in the Midwest to 1918 by Paul Theobald (1995), provided much needed understanding on the historiography of women teachers. These historians show how rural education was significant to the times while also understanding the impact of women teachers on rural America. Anne Campbell is part of this historical legacy. What I found is that even through a conservative time and strict norms about what women should do, Anne Campbell’s ambition and family life, work life, and her impact on Nebraska education should be known to history and not be left behind. Primary sources that I used while conducting my research included newspapers, oral history interviews, as well as some government documents regarding Campbell’s work. The reason this research is so important is because it sheds light on women of authority who were in education at this time. The research finally acknowledges and recognizes the women who changed and impacted education for Nebraska.

Behavioral & Social Sciences

Political Science

Earlen Gutierrez
Mentor: William Aviles
Title: *The Role of Latin American Women in the Fight Against Climate Disaster and Capitalism*

The ongoing ecological crisis has affected everyone's lives in one form or another; climate change has disrupted and uprooted families, displacing them as refugees all across the globe. Natural disasters have become more extreme—taking lives during destruction. Each year it gets drier and drier, resulting in low crop yield, a decrease in soil nutrients, and ultimately an increase in famines and predisposed health conditions. However, not everyone suffers the same, for example, Latin American women are disproportionately affected by socioeconomic, cultural, and environmental factors. The disproportionate effects that women have to endure is violent and inherent in a capitalist system.

This study will analyze the connections between social reproduction theory, capitalism, and climate change. I will begin by studying the case of a Latina-led environmental justice movement and observe the ways that capitalism has exacerbated income/wealth inequality and the effects of climate change within the country that the movement is located. Second, I will address the relationship between environmental hazards and environmental health issues, highlighting the importance of including reproductive justice in the conversation. Third, I will apply social reproductive theory in order to illustrate how capitalism is inherently violent towards women through sexist and economic exploitation.

Tell Jensen
Mentor: Chuck Rowling
Title: *The Sojourn or Journey to Renewable Energy*

For most at a young age, climate change is initially established into the horizons of a child, in degrees of us versus them. It's a sensitive and oftentimes polarized topic that pertains to those that openly accept it, and debate on best methods to work for it, and

those that stand against climate change progress, whether that be in denial, ulterior purposes, or something else entirely. In this project, I plan to look into some of the challenges facing us in dealing with climate change, where we have made progress in our fight against climate change, and how best to educate people on the matter and the process of dealing with it. Surface level, one could see the principal values it can add for students to become more informed on this topic. But I hope that on an intrinsic level, that I can also help broaden the perspectives of students to realize that despite a heavily stigmatized culture of our country, that issues have more than just two sides to them, and through compromise, understanding and listening, we can begin to have more rational discussions from both sides of the table when it comes to solving and dealing with situations that arise, and have been around for decades. A simple answer would be that the issue of facing climate change is a matter that pertains to each and every one of us as it deals with the world we live in. But personally, looking into this issue, begins to help me branch out into the world farther, reaching out more on my own to look into problems that need to be brought up and discussed. I want to partake in helping society come closer together, through learning more about matters, how we should go about addressing them, and realizing that it isn't just an us versus them format for controversies. The matter that I want to research is also important to me. I have grown up on a farm, and continue to use those roots on a daily basis. I love and cherish my base in a more rural setting, and seek to help out nature on our planet. Climate change affects all aspects of nature on this planet of ours, and I would like to see progress in this area, and hope to do my part in making that advancement needed to raise awareness to some, and deeper understanding to others. So while climate change can be said to be a global issue, as it is, I have deeper connections to this issue as I am passionate about the landscape and earth upon which I was raised, and I hope to share my findings and knowledge found in researching the issue of climate change and the challenges that we come across in facing it, and the progress we've made in the direction towards a more sustainable future.

Joseph Hiatt
Mentor: Satoshi Machida
Title: *Gender & Career Choice: Do Our Views Toward General Roles Influence Career Choice?*

Gender and career choice in the United States are deeply interconnected and scholars have long sought to understand how they impact one another. This project seeks to understand how gender norms and behaviors influence career choices for females in science, technology, engineering, and math fields. The role that education plays in defining and diagnosing gender norms and the influence they wield on both the academic performance and careers of women is palpable and perplexing. The stereotypes applied to females in regard to careers in math, science, and information technology fields clearly hinder women's quest for equal opportunities in the job

market. The comprehensive collected data clearly indicates that the academic performance of females is equal to or even superior to that of men, yet the opportunities open to women often do not often translate into job offers and career positions at the same reward levels at the same rate. Much of this stereotyping is the culmination of typecasting of females at early stages of their education. The survey conducted asks participants a wide variety of questions regarding their feelings and beliefs toward gender roles and behaviors, along with career choice. Recognizing the validity of the relationship between gender and career choice is crucial.

Psychology

Ian Johnson
Mentor: Katherine Moen
Co-Author: Katherine Moen
Title: *Wait, which one was it? Misinformation and Memory*

The misinformation effect is likely to occur on a regular basis for everyday events or news stories. However, research suggests that being able to detect the misinformation and recall the misinformation reduced the misinformation effect (Putnam et al., 2017). However, this resistance to misinformation may not persist if there is a longer delay between the original information and misinformation. There has been little research done on the misinformation effect with a delay manipulation. Most of the published research that has manipulated delay duration have delays that range from a couple of days to a month. The goal of the current study was to see how newly acquired misinformation impacts retrieval of previously acquired accurate information, with a short delay and a slightly longer delay. The current study used a 2(Delay: 5 min, 15 min) x 3(item type: repeated, neutral, misinformation) mixed factorial design. Participants were presented with a slideshow illustrating a story and then after a delay (short or long) read a narrative of the same story with some details repeated or changed. While participants were watching the slideshow and reading the narrative, their eye movements were tracked to measure attention and implicit memory. We hypothesized a main effect of delay, in that participants would demonstrate higher false alarms after a long delay than a short delay. We also hypothesized a main effect of item type, in that participant memory errors would be lower for repeated items than for neutral items, and lower for neutral items than for misinformation items. Lastly, we hypothesized an interaction between test item and delay, in that there would be a smaller difference in false alarms between the short delay and the long delay conditions for the repeated and neutral items, compared to the misinformation items.

Sociology

Journey Noyes
Mentor: Sandra Loughrin
Title: *A Content Analysis of The Fifty Shades of Grey Series*

When The *Fifty Shades of Grey* book trilogy was released, sexuality and kink became a big topic within the media. As sexuality within books, movies, and television shows grows more and more prevalent, the way we think, act, and speak about sex and sexuality becomes widely influenced by the media. This paper argues that new depictions of sexuality in literature and film for previously stigmatized (and pathologized) sexual identities and practices have led to a slow de-stigmatization process and normalization of variations of sex and sexuality. This was done by examining published works on sexuality and the media through the lens of Michel Foucault and Post-Modernism, Von-Krafft Ebbing's Fetishization of Love, and Gagnon & Simons Sexual Script and Sex Role Theory. The findings of this paper suggest that, overall, the increase of sexuality within literature and films has successfully changed the way we talk, act, and think about sex, the way literature and films portray kink communities has a harmful and stigmatizing effect on those apart of those communities.

Natural & Physical Sciences

Biology

Ella Buhlke
Mentor: Kim Carlson
Co-Authors: Alexis Hobbs, Sunanda Rajput, Blase Rokusek, Darby Carlson, Kim Carlson
Title: *Characterization of Cross-Species Transmission of Drosophila melanogaster Nora Virus*

Drosophila melanogaster Nora virus (DmNV) is a novel picorna-like virus first characterized in 2006. Since then, Nora virus has been detected in several non-Drosophila species, including insects in the Orders Hymenoptera, Lepidoptera, Coleoptera, and Orthoptera. The objective of this study was to determine if DmNV

could infect individuals of other species of invertebrates besides D. melanogaster. The presence of DmNV in native invertebrates and commercially available stocks was determined. Laboratory-reared D. yakuba, D. mercatorum, Gryllodes sigillatus, Tenebrio molitor, Galleria mellonella, and *Musca domestica* were intentionally infected with DmNV. In addition, native invertebrates were collected and D. melanogaster stocks were purchased and screened for DmNV presence using reverse transcription-polymerase chain reaction (RT-PCR) before being intentionally infected for study. All Drosophila species and other invertebrates, except M. domestica, that were intentionally infected with DmNV ended up scoring positive for the virus via RT-PCR. DmNV infection was also detected in three native invertebrates (Spilosoma virginica, Diplopoda, and Odontotaenius disjunctus) and all commercially available stocks tested. These findings suggest that DmNV readily infects individuals of other species of invertebrates, while also appearing to be an endemic virus in both wild and laboratory D. melanogaster populations. The detection of DmNV in commercially available stocks presents a cautionary message for scientists using these stocks in studies of virology and immunology.

Noah Shackelford
Mentor: Julie Shaffer
Title: *The Prevalence of Tick-Borne Disease-Causing Pathogens in South Central Nebraska*

Dermacentor variabilis, commonly known as the American dog tick, is the foremost native tick species in Nebraska and is a known vector of several pathogenic bacteria. This study sought to determine the pathogen prevalence of D. variabilis ticks collected during the 2022 tick season in areas of south central Nebraska both along and isolated from the Platte River. DNA was extracted from 272 male and 260 female D. variabilis ticks for endpoint PCR testing; the presumptive positives from which were further tested through amplicon testing to verify pathogen identity. Sequencing results indicated that 13% (34) of males and 17% (43) of females tested were positive for one or more pathogenic bacteria, for a combined 15% (77) of ticks infected. Statistical analysis of the rate of infections for Spotted Fever Group (SFG) rickettsias showed no significant difference in prevalence than those observed in previous studies in Nebraska. Francisella bacteria were identified in 9% (49) of D. *variabilis* ticks collected, which is worth note considering the historically poor characterization of such bacteria both in the state and across the country. Changing levels of bacterial prevalence and thus the environmental risks of exposure are likely due to changing tick distributions, including spillover from *Amblyomma americanum*, Lone star ticks. As the incidence of tick-borne disease has been increasing across the country, Nebraska is just another

example of an area that needs further tick surveillance to identify and stop this dangerous trend.

Trenten Theis
Mentor: Austin Nuxoll
Co-Authors: Trevor Daubert, Kennedy Kluthe, Kenan Brodd
Title: *Staphylococcus aureus Persisters are Associated with Reduced Clearance in a Catheter-Associated Biofilm Infection*

Staphylococcus aureus causes a wide variety of infections, many being chronic or relapsing infections mediated by biofilms in a clinical setting. Biofilms are difficult to treat partly due to their tolerance to antibiotics; however, the reasoning for this is unclear. One potential reason for this is the presence of persister cells—dormant cells that exhibit tolerance to antibiotics. Recent studies have shown a connection between a fumC (TCA cycle gene) knockout strain and increased survival to antibiotics, some aspects of innate immunity, and in a Drosophila melanogaster model. However, the survival of this high persister strain in a mouse model containing both innate and adaptive immunity remains to be tested. We looked at how fumC knockout and wild-type strains survive within mice in a nine-day catheter-associated biofilm model. Unexpectedly, mice struggled to clear both strains of bacteria in a biofilm state. In order to determine the persister cell population in biofilms, we measured the expression of a persister cell marker (cap5A) in a maturing biofilm. Using a flow cytometer to sort biofilm cultures into populations based on their levels of cap5A expression, we were able to show that the cells which had high and intermediate levels of cap5A expression survived antibiotic treatment better, with 5.9-fold and 4.5-fold higher percent survival respectively than those with low expression. To further characterize biofilms, the membrane potential was compared to planktonic cultures. Biofilm cultures showed 2.5-fold or 22.4-fold more cells with low membrane potential compared to stationary and exponential phase planktonic cultures respectively. In order to elucidate if the persister cell state was dependent on the matrix of the biofilm, biofilm matrixes were dispersed. Following dispersal, biofilm cultures showed no difference in survival to antibiotics. These results show that biofilms are largely made of persister cells, and this may be why biofilm infections are chronic and/or relapsing in a clinical setting.

Stephanie Vielmas Duarte
Mentor: Surabhi Chandra
Co-Authors: Osaira Ovando, Surabhi Chandra, Jung Yul Lim
Title: *Metastasis of Diabetic Triple Negative Breast Cancer Cells: Role of Cytoskeletal Inhibitors*

Patients who suffer from diabetes and breast cancer have increased mortality due to chemoresistance and cell metastasis. The reorganization of the cell cytoskeleton is crucial to cell migration and metastasis. Cytoskeletal regulatory proteins, such as Rho Kinase (ROCK) and Focal Adhesion Kinase (FAK), play a key role in cell mobility. It is hypothesized that cytoskeletal inhibitors prevent scratch wound healing of breast cancer cells in hyperglycemic conditions.

To test this hypothesis, scratch wound healing assays were performed with MDA-MB-231 cells (late-stage metastatic triple negative breast cancer cells). Cells were treated in normal glucose (5mM) or high glucose (25mM) conditions in the presence of ROCK (Y-27632, 10uM) or FAK (10um) inhibitors. After 24 hours, glucose treatments completely covered the scratch. Inhibiting ROCK had no protective effect against cell migration. FAK inhibition significantly slowed the migration of cells under both normal (mean area change 17.3±6.74% of 5mM glucose control at 0h) and high glucose conditions (mean area change 0.3±0.33% of 5mM glucose control at 0h) after 24 hours. The data suggested that ROCK inhibition has no significant effect on cell metastasis. However, FAK inhibition can prevent scratch wound healing of breast cancer cells in both normal and high glucose conditions. FAK inhibition has potential as a chemotherapeutic option for treatment of triple negative breast cancer.

Avery Mitchell
Mentor: Julie Shaffer
Co-Author: Darby Carlson
Title: *Diseases Ticks Carry in Western Nebraska*

American Dog Tick (Dermacentor variabillis), the predominant tick in Nebraska, is the primary vector for Rocky Mountain Spotted Fever. In western Nebraska, the Rocky Mountain Wood Tick (Dermacentor andersoni) is known to occur, which also is a carrier of R. rickettsii. The objective was to determine the prevalence of R. rickettsii in western Nebraska (Scotts Bluff County), as data are lacking from the region. American Dog Ticks were collected from Scotts Bluff County in Nebraska near the Platte River and its tributaries, which was not what we had expected to find. Through preliminary testing of the 98 ticks collected in the 2022 season, the presumptive positives are 2 contain Ehrlichia chaffeensis and 2 contain Francisella tularensis. These PCR products

will be sent to the UNMC genomics core to confirm the positive infectious agents. This information will help the general public and clinicians evaluate risk and potential infections with tick related illnesses.

Kyle Dittmer
Mentor: Austin Nuxoll
Title: *Determining Antimicrobial Activity of Metal-N-Heterocyclic Carbene Complexes Against Staphylococcus aureus*

Antibiotic resistance is becoming a major concern with an estimated 1.27 million deaths yearly and a contributing factor in nearly 5 million deaths, which is expected to rise to 10 million by 2050. However, recent research found molecules containing metal-N-heterocyclic carbene complexes (i.e. silver) inhibited biofilm formation in multiple pathogenic bacteria. The objective of this study was to screen compounds containing silver complexes for increased effectiveness against Staphylococcus aureus in hard-to-treat environments such as biofilms and persister cells. To assess antimicrobial activity of compounds against S. aureus, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined for 13 unique compounds. Time-dependent kill assays were performed over 72 hours with C1, C3, C8, C10, C11, and C12 compounds eradicating S. aureus within 24 hours. Compounds were also tested against biofilms which are notoriously difficult to eradicate. C1, C3, C8, and C10 reduced bacterial burden by 1-log while all other compounds, including vancomycin, were unable to reduce bacterial burden. Further characterization is needed to assess whether these compounds are suitable antibiotics, but preliminary results are encouraging.

Osaira Ovando
Mentor: Surabhi Chandra
Co-Authors: Stephanie Vielmas Duarte, Diganta Dutta, Jung Yul Lim, Surabhi Chandra
Title: *The Role of Focal Adhesion Kinase on The Transwell Migration Assay of Diabetic Triple Negative Breast Cancer Cells*

Patients with concomitant diabetes and breast cancer have increased mortality due to chemoresistance and metastasis. Reorganization of the cytoskeleton is crucial to cell migration and metastasis. Regulatory protein such as focal adhesion kinase (FAK) play a key role in cell mobility. Hence, it is hypothesized that FAK inhibitor prevents the transwell migration of breast cancer cells in hyperglycemic conditions. To test this hypothesis, transwell migration assay was performed with MDA-MB-231 cells (late-stage metastatic triple negative breast cancer cells). Cells were treated in normal glucose (5mM) or high glucose (25mM) conditions in the presence of FAK (10uM)

inhibitor. Cytotoxicity with FAK inhibitor was assayed using PrestoBlue fluorescent assay, and was determined to be around 50uM. Transwell migration assay showed that inhibiting FAK slowed migration of cells as there were significantly small number of cells on the bottom of Boyden chambers in both low and high glucose treatments. The current data suggests that focal adhesion kinase inhibition can be further explored as a chemotherapeutic option for resistant diabetic triple negative breast cancer.

Chemistry

Marissa Hoover
Mentor: Mahesh Pattabiraman
Co-Authors: Sharvani Regmi, Wryleigh Doyle, Mahesh Pattabiraman
Title: *Photochemical dimerization of chalcones using macrocyclic cavitands*

Title: This project focuses on the dimerization of chalcones using photochemical reactions in order to understand the supramolecular interactions between host-host, host-guest, and guest-guest that lead to product selectivities. Our group has used this approach to study aryl-alkene families such as stilbenes, cinnamic acids, and coumarins, wherein analysis of reaction outcomes have provided wealth of insight into both the excited state dynamics of the photoactive compounds as well as the ground-state supramolecular underpinnings that governs reactivity. In this line of investigation, we recently started our exploration of cavitand-mediated PCA of chalcones, which yielded unique results compared what has been observed with aforementioned family of arylalkenes. Whereas cinnamic acids, coumarins, and stilbenes yielded one predominant photodimer upon photoexcitation, chalcone-CD complexes yield three dimeric products. Analysis of product selectivity in light of NOESY experiments, computational chemistry, and spectroscopic titrations indicate supramolecular interactions between the entities and potential complex structure. This endeavor results in knowledge for controlling photodimerization reactions, which could be useful in synthesizing biologically and medicinally relevant tetrasubstituted cyclobutanes. Phytochemicals such as truxillic acids, incarvillateine, euccomicin, and moonine contain tetrasubstituted stereospecific cyclobutane pharmacoactive cores, which are known to bind to specific receptors in mammalian cells to produce biological effects such as antineoplasticity and antinociceptivity. Thus, the ability to synthesize these structures in stereo- and regioselective manner could serve as a powerful tool in drug discovery efforts.

Professional & Applied Studies

Teacher Education

Derek Elton
Mentor: Bryan Artman
Title: *Midwestern Athletic Coaches' Personal and Professional Media Usage*

Background: The world is experiencing a digital revolution, as technology advances, professions have been forced to adapt to the advent of social media (SM). SM provides coaches the ability to interact with others, fostering conditions for collegiality, reflective analysis, practice-based professional development and presumably more efficient communication pathways with athletes and parents. While SM can be beneficial, some coaches choose to limit professional usage due to inherit risks. **Purpose:** The purpose of this study was to gain insight into the role SM has in the field of coaching. **Method:** Athletic coaches from the Midwest completed an online survey distributed via email. A cross-sectional mixed methods census research design was used to examine personal and professional SM usage as well as qualitative data about individuals' feelings towards the use of SM in the respective category. Data was deemed significant at $p<0.05$. Analysis/Results: Females reported significantly higher total personal SM usage than males ($F=68.053, p=0.001$). When examining individual platform professional use, males reported using Twitter significantly more than females ($F=3.911, p=0.049$), and females showed a significantly higher usage of Facebook ($F=14.534, p=0.001$). The presentation will expand on how these differences are associated with SM use. Conclusion: SM has the potential to professionally help coaches and provide better resources to athletes. Previous studies have shown that involvement in high school athletics increases self-efficacy and has a direct impact on predicting future healthy behaviors. Applying SM in professional settings could have a similar impact as coaches provide a better experience for their athletes by understanding how other coaches utilize SM. As SM continues to grow, future studies should investigate how to maximize potential benefits and sport-specific tactics beneficial to athletes and coaches. Information from this study will provide insight into how SM can be used to enhance the coaching profession by mode of emerging SM platforms.

Cassidy Schelling
Mentor: Dena Harshbarger
Title: *Teaching Students Who Have Experienced Trauma*

This session is intended to inform educators and future educators who do not have the background, resources, and/or training to know how to help children who have experienced trauma. Trauma is not going to disappear (Lenore C. Terr, 2003), therefore, it is important for teachers to have the knowledge, tools, and support strategies to come alongside students who have experienced trauma. Students who have experienced trauma are often labeled as “bad kids”. However, as participants will learn during this session, they are not “bad kids”, but rather they have had “bad experiences” (Van der Kolk, 2007) and are coping in whatever way they know. Educators have the opportunity to make a difference by providing students with alternative coping tools and strategies that they can use throughout their life. Attendees will leave with access to a digital presentation containing information, tips, research-based practices known to positively impact the learning environment, such as teaching students’ ways to self-regulate, so they may be able to more successfully experience an inclusive setting and into the future.

Graduate Posters – Online and In Person

Fine Arts & Humanities

Communication

Poster G1 – Jamila Bajelan
Mentor: Mary Harner
Co-Author: Mary Harner
Title: Water Quality Monitoring at the Kearney Outdoor Learning Area

The Kearney Outdoor Learning Area (KOLA) is adjacent to Kearney High School along a tributary of the Platte River in south-central Nebraska. KOLA offers a space for place-based learning in a natural area near the river. We have initiated ecohydrological monitoring at KOLA to support research, education, and communication. Here we present an overview of water quality monitoring at KOLA from August 2022 to present. We use a portable instrument that measures parameters such as temperature, dissolved oxygen, conductivity, and pH. We sample three water bodies at KOLA, a drainage ditch, pond, and creek, approximately monthly and examine how parameters change across time and vary among water bodies. Descriptions of changes in water quality give insight into the health of aquatic ecosystems and their surroundings. Long-term monitoring also can offer possible explanations for patterns observed in person or with passive monitoring equipment. Furthermore, consistent data collection can lead to the creation of a long-term database of natural features of KOLA that, when combined with other monitoring from the site, can create something bigger. Water quality is one of several datasets being collected at KOLA, along with observations of sights and sounds, natural history, and ecohydrology phenomena, to help us better understand this place in the Platte River watershed. Finally, this research increases awareness of KOLA as a local site for ecological monitoring and place-based education. Students at all levels may benefit from monitoring at KOLA as they learn the methodology, practice data collection, and share findings.

Poster G2 – Gwendolynn Folk
Mentor: Mary Harner
Co-Author: Mary Harner
Title: *Perceptions of the Kearney Outdoor Learning Area*

Outdoor learning has been shown to increase test scores, as well as boost problem-solving and critical thinking skills compared to standard lectures. Kearney is fortunate to have a dedicated outdoor learning area directly next to Kearney High School. This is a great resource for the community, as the Kearney Outdoor Learning Area (KOLA) has instrumentation for long-term ecological monitoring, such as a time-lapse camera, audio recorder, groundwater observation wells, and water level gauges. As KOLA is relatively new, there is little known about how teachers and students use the area or features that could make using it more appealing. Our objective was to gauge teacher's current use of KOLA, as well as learn what may limit or deter them. We distributed surveys to teachers at Kearney High School asking about subjects they teach, how often they take classes to KOLA, what barriers they face in using KOLA, and changes or improvements they would like to see made. In this poster, we describe the survey approach and preliminary results. In addition to feedback about improvements and barriers, the survey also lets us see how teachers are using this area and how often. With this information, we can better understand the number of students being brought to KOLA per year and by which classes. By understanding how often the area is being used and for what reasons, we can take suggestions from teachers and offer recommendations to make KOLA more appealing for use. By making KOLA more relevant to classes, we hope it becomes possible for more students in the area to access benefits that outdoor learning offers.

Poster G3 – Jada Ruff
Mentor: Tiffani Luethke
Title: Let's Talk, Analysis of Communication Effectiveness in Higher Education

A communication audit is a detailed evaluation of the strengths and weaknesses of an organization's communication channels and systems. Communication within the university setting is a core component of leadership. Effective communication assists in building trust, aligning efforts to pursue future goals, and inspiring positive change. A communication audit provides an opportunity to explore an organization's information flow, feedback, and communication channels. The purpose of this research is to conduct a communication audit with academic faculty, university administration, and internal employees of one Midwest university office. The study will identify current and existing practices of communication processes, identify gaps existing within the communication channels, and provide recommendations for communication

improvement. Subjects will be recruited through an email invitation. Participants who agree to participate will complete a 15-question web-based survey including multiple choice and open-ended questions. Subjects will also be invited to participate in focus group interviews to expand on the survey topics. Data will be collected, coded, analyzed, and disseminated to all parties involved after the study's conclusion.

Natural & Physical Sciences

Biology

Poster G4 – Blase Rokusek
Mentor: Kim Carlson
Co-Authors: Sunayn Cheku
Title: *Utilizing the Drosophila Activity Monitors (DAM2) from TriKinetics to Automate Heat Tolerance Assays in* Drosophila melanogaster

A common approach to assess heat tolerance in Drosophila is to monitor the time to knockdown (TKD) after exposure to an elevated temperature. Flies are housed in individual vials and placed inside a heated water bath, and TKD is monitored manually by researchers. While very well-established, there remains an inherent amount of subjectivity to these assays. Recently, in the Journal of Insect Physiology, MacLeon et al. (2022) described a reliable automated method for assessing heat tolerance using a video-based assay. In our lab, we have developed a similar high-throughput method for automating heat tolerance assays using the Drosophila Activity Monitors (DAM2) from TriKinetics. To accompany the DAM2 system, we have written a program and created easy-use executables to automatically read the last time of movement from the activity data generated. Our data shows that this automated DAM2 method reliably differentiates heat hardened and control flies. Meanwhile, activity profiles created from the activity data themselves are of interest. These activity profiles show obvious group differences, with a notable difference being that the hardened flies show less overall activity during the heat stress event then do the control flies. Finally, we have found that we can reliably predict the TKD from activity data early in the assay, well before physiological collapse has been reached. Objective, high throughput automated alternatives to traditional observation-based heat tolerance assays could prove useful,

especially when considering the novelty of activity profiles spanning the duration of the heat stress event prior to the TKD. These types of data could allow for the investigation of previously unexplored aspects of thermal tolerance and stress-induced behavior in Drosophila, which could harbor relevant information and lead to a more complete understanding of heat tolerance in Drosophila as a process rather than an isolated moment at the time of paralysis. The project described was supported by grants from the National Institute for General Medical Science (GM103427 & 1U54GM115458).

Poster G5 – Sunanda Rajput

Mentor: Joseph Dolence

Co-Author: McKenna Vininski, Nicholas Hobbs, Joseph Dolence

Title: *AR signaling protects mice from developing allergic responses to peanut*

Despite increasing prevalence of peanut (PN) allergy, our knowledge of the immunological mechanisms involved in initial development of disease remain unclear. Specifically, how sex hormones may regulate the immune pathways that lead to the development of PN allergy remains limited. Recent data strongly suggests that PN allergy displays a sex bias, with female prevalence over male. An analysis of US adults allergic to PN showed that females were twice as likely to develop PN allergy during their childhoods. The two-fold difference favoring females with PN allergy was maintained into adulthood. This study aims to understand the role of sex hormones in mounting an allergic response to PN, specifically the role of androgen (AR) signaling. C57BL/6 WT male, female, and androgen-deficient (ARTfm) mice were sensitized in our four-week PN inhalation model. We observed ARTfm males have higher PN-specific antibody responses and worse anaphylactic responses following PN challenge than WT males. WT males also displayed less severe anaphylactic responses compared to ARTfm and female mice. This data strongly supports the role of androgens in modulating PN-specific immune responses, enabling us to further examine differences in anaphylaxis by developing a mouse model to examine how mast cells responding PN are impacted by AR signaling.

Math

Poster G6 – Tatiana Moore
Mentor: Amy Nebesniak
Co-Author: Kaitlyn Gasper
Title: *STEM in Action: A Comprehensive Look at STEM Classes Offered in a Local Summer Learning Camp*

Science, Technology, Engineering, and Mathematics (STEM) based curriculums have swiftly taken learning communities across the nation by storm. Designed to prepare students for a world of advancing technology, STEM education uses hands-on learning and real-world application experiences to assist in the development of a variety of essential skillsets. UNK's adoption of the former Personal Achievement WorkshopS (PAWS), a summer-learning camp, from Kearney Public Schools provided a plethora of opportunities for educational growth and expansion. This transition included the incorporation of three main categories of classes to be offered each year of camp. Recognizing the importance of STEM-based learning, the camp directors of the new PAWS University designated a category specifically related to STEM, in addition to Art and Humanities. The purpose of this study was to analyze PAWS courses offered to determine the correlation between the percentage of STEM-based classes and students who registered for one or more.

Professional & Applied Studies

Communications Disorders

Poster G7 – Kiley Allgood
Mentor: Ladan Ghazi Saidi
Title: *The Effects of Language Learning on Cognition in Older Adults*

As individuals age, structural and functional neurocognitive changes occur. Prevalent cognitive processes that often regress with aging include attention, memory, reasoning, auditory and visual processing, and processing speed. Impaired cognitive

processes can inhibit individuals' ability to effectively operate, which decreases their quality of life. This study aims to assess how learning a language affects cognitive ability in older adults (age: 60-80). A series of cognitive assessments as well as functional and structural MRI scans are administered to participants before, and after, the start of their language-learning program. This allows researchers to assess the neurocognitive effect of the language-learning intervention. Participants agreed to complete at least 90 minutes of a language learning curriculum each day through an online language learning program (LLP) for five days a week over the duration of four months. Participants were able to select a language of their choice, offered by the LLP, to study for the intervention. Researchers monitor the cumulative amount of time participants spent on the LLP each week, the amount of time spent on the LLP each day, the number of days participants logged in to LLP, and participants' average scores each week for completed lessons. The preliminary results show significant changes to pre/post-measures of response time for the Stroop test, which measures selective attention, for the Digit Symbol test, which measures processing speed, for semantic fluency, which measures working memory, executive function, and word retrieval, and for the Montreal Cognitive Assessment (MoCA), which measures global cognition. Evolving evidence suggests engagement in activities that activate parts of the brain involving cognition can improve or slow the regression of cognitive health with aging (Wenisch, et al., 2007; La Rue, 2010; Saragih, et al., 2022). This study's preliminary results align with our previous studies in that language learning engages parts of the brain involved with cognition (Ghazi Saidi, et al., 2013; 2017a; 2017b).

Poster G8 – Kinzey Cooper
Mentor: Jan Moore
Title: *Healthy Loss and Occupational Exposures in Female Farmers & Ranchers*

The purpose of our study is to examine the relationship between long-term noise-induced hearing loss and occupational exposures in independent female farmers and ranchers. Specifically, we examined the hearing status of female agriculture workers and their pertinent demographic data, work history, noise, and chemical exposure on the farm/ranch. The data of this study stems from the results of audiological assessments, a comprehensive background survey, a survey of communication concerns, and cognitive assessments. Currently, this study includes 20 women participants who have completed various sections of our protocol and have devoted their lives to agriculture.

Kinesiology and Sports Sciences

Poster G9 – Jena Cottam
Mentor: Erin Sweeney
Title: *Dual Undergraduate Majors of Health and Physical Education: Do They Have the Same Passion for Both Subject Areas?*

There is currently little known about the passion of health and physical education preservice teachers. Undergraduate students who are pursuing dual degrees in both health and physical education and are being certified to teach both subjects, but are they passionate about teaching both content areas? While there are studies looking into passion levels for physical education in current teachers, there is minimal regarding passion in dual endorsements for undergraduate students. Being passionate for teaching your subject area is a crucial part of quality and effective teaching. The purpose of this study was to collect and compare data on the passion of teaching physical education and health education, specifically of undergraduate dual majors. An electronic survey was given to dual majors across the United States based on the passion scale created by Sigmundson et al. (2020). Responses from participants revealed that undergraduate dual majors have a significantly higher passion for teaching physical education than health education ($Z = -4.669 - -2.706$, $p<.008$). These findings confirm that more research needs to be done in this area to eliminate this possible gap in passion, so that students graduating from a health and physical education program are effective teachers in both content areas. Universities may want to determine if their preparatory programs are curating quality, passionate educators that are suited to teach both subject areas.

Poster G10 – Clay Frels
Mentor: Quincy Johnson
Co-Authors: Dayton Sealey, Nick Lamoureux, Kate Heelan, Quincy Johnson
Title: *Analyzing Differences in Jump Characteristics Between NCAA Division II Men's and Women's Basketball Athletes*

Countermovement jumps (CMJ) are regularly used as a baseline assessment for athletic performance to aid in measuring fatigue, biomechanical asymmetries, and to quantify adaptations to training. Due to the differences in anatomical and physiological makeup between the sexes, it is important to examining unique contributors to athletic performance. PURPOSE: The purpose of this study was to identify primary contributors of CMJ performance between men's and women's NCAA Division II athletes. METHODS: 15 men (height:194.3 $\pm$ 5.6 cm., weight: 89.4$\pm$6 kg., BMI:

23.7±1.9 kg/m2) and 15 women (height: 179.1±5.33 cm., weight: 75.6±11.3 kg., BMI: 23.5±2.5 kg/m2) NCAA Division II collegiate basketball players performed 2 CMJ with an arm swing (CMJ-AS) on a portable dual-force plate system (Hawkin Dynamics, ME). Pearson's correlation analyses were utilized to identify significant jump characteristic differences between men's and women's basketball athletes. RESULTS: For women's basketball athletes, takeoff velocity, relative propulsive net impulse, peak relative propulsive power, and tendon stiffness associated most to CMJ performance ($p<0.01$; $r=1.00$-0.729). For men's basketball athletes, takeoff velocity, relative propulsive net impulse, peak propulsive power, and jump momentum associated most to a CMJ ($p>0.01$; $r=1.00$-0.786). CONCLUSION: Results suggested that takeoff velocity, relative propulsive net impulse, and peak relative propulsive power had the strongest relationship with CMJ height for both men and women basketball athletes. This demonstrates that regardless of sex, an athlete's ability to express force concentrically at the instant of takeoff directly correlates to their ability to jump, especially during the propulsive phase of the jump for the last two listed. However, unique relationships were also observed between sexes. Tendon stiffness for women, and jump momentum for men were strongly related to jumping performance. This information can be utilized by performance staff to guide general and specific training approaches for enhancing athletic performance through the development of muscular strength and power relative to an athlete's needs.

Poster G11 – Carleigh Novak
Mentor: Kate Heelan
Co-Authors: Kate Heelan, Bryce Abbey
Title: *10 Year Changes In Prevalence Of Obesity In Rural School Children*

School children who were born in the mid-2000s experienced obesity incidence at even higher rates, at younger ages, and at higher severity during the developmentally important stages of childhood (Cunningham et al., 2022). Severe obesity affects between 4 and 6 percent of US children, and the prevalence is increasing (Skelton, 2009). In addition, the prevalence of obesity among 2-19 year old's increased from 19.3% to 22.4% during the COVID-19 pandemic (Lange et al., 2021). PURPOSE: To evaluate the prevalence of moderate obesity and severe obesity over a 10-year time span, including the pandemic, among elementary and middle school children in a rural Mid-western US community. METHODS: Body mass and stature were collected from 3562-3833 elementary and middle school students in 2011, 2016, and 2021. Moderate obesity was defined as a BMI greater than the 95th percentile to 120% of the 95th, and severe obesity as a BMI greater than 120% of the 95th percentile. Prevalence was determined for moderate and severe obesity across the three-time points for age groups <10 and ≥10 years old. RESULTS: The prevalence of obesity was 15.06% (n=556), 14.19% (n=544), and 15.10% (n=538) for 2011, 2016, and 2021, respectively.

Table 1. Prevalence of Moderate Obesity (MO) and Severe Obesity (SO) Over 10 Years

	2011			2016			2021		
	all	<10 yo	≥10 yo	all	<10 yo	≥10 yo	all	<10 yo	≥10 yo
n	3692	2029	1663	3833	2015	1818	3562	1929	1633
MO(%)	10.46%	9.66%	11.43%	9.81%	8.19%	11.61%	10.08%	8.92%	11.24%
SO (%)	4.60%	3.20%	6.31%	4.38%	3.67%	5.17%	5.03%	4.51%	5.53%

CONCLUSION: Although the overall prevalence of obesity did not change over 10 years, and is lower than the national average, the prevalence of severe obesity increased 40% from 2011 to 2021 among children younger than 10 years. Obesity in childhood can be linked with short- and long-term physical and mental health effects. Chronic inflammation, high blood pressure, higher risk of type 2 diabetes, and the persistence of obesity into adulthood are some possible effects.

Poster G12 – Jacob Paczosa
Mentor: Kazuma Akehi
Title: *FIFA 11+ training program may improve functional movement screening scores*

Background. Researchers estimate there are over 80,000 ACL injuries each year in the United States. One popular ACL prevention program is the FIFA 11+. The FIFA 11+ has been reported to increase neuromuscular control, stabilization, and strength of the thigh muscles which has been shown to directly lead to fewer ACL injuries. Study Design. A factorial design. Outcome measures. Functional movement screening (FMS) scores based on the lower extremity stability, mobility, balance, and extensibility using a standardized ordinal FMS scale (i.e., zero to three). Methods. Twenty-four collegiate recreationally active individuals will be recruited. Each will experience deep squat, hurdle step, inline lunge, shoulder mobility, active straight leg raise, trunk stability push up, and rotary stability exercises to identify their FMS scores. Following the FMS, subjects will be assigned in either an 8-week of FIFA11+ training group or control group. The post-training FMS will be performed in the last session of the 8 week training session in both groups. Clinical Application. Although there are many ACL prevention programs in practical settings, one of the most popular and the lower extremity focused functionality screening is the FIFA 11+. The goal of the FIFA 11+ is improved posture, body control, and correct alignment of the body when performing athletic movements such as rapid change of direction and decorrelation. FIFA 11+ can be objectively reviewed to see whether it is preventing injuries using a functional movement screen. We hypothesized that implementing FIFA 11+ program twice a

week throughout a season may improve FMS scores resulting in less risk of ACL and lower extremity injury.

Poster G13 – Keiichiro Kawauchi
Mentor: Kazuma Akehi
Title: *Weak hamstring muscle strength may induce the stiff landing strategy and cause the patellar tendinopathy*

Context: Patellar tendinopathy (PT) is degenerative condition of the knee, and one of the most common musculoskeletal problems associated with sports that requires high volumes of jumping such as volleyball and basketball. During landing phase of jumping, quadriceps loading causes great strains on the patellar tendon. Additionally, by performing a stiff landing strategy, the patellar tendon is subjected to higher strain. Thus, decreased (less than 45 degrees) and/or too much (more than 60 degrees) peak knee flexion at landing may increase the risk of patella tendinopathy. Objective: The purpose of the study is to determine whether stressful knee flexion angle due to the weakness of hamstring muscles leads patella tendinopathy during loading and landing moment of jumping. Design: A factorial case-control study. Setting: Controlled laboratory. Patients or Other participants: Twenty-four collegiate aged recreationally active individuals who sustained the PT and did not sustain any knee injuries in the last 6-months will be recruited. Main Outcome Measures: Knee flexion, knee valgus angles, ground reaction force (GRF), net impulse, and rate of force development (RFD) at jumping and landing will be examined using the three-dimensional motion capture system. Additionally, quadriceps and hamstring muscle strength testing will be performed using the isokinetic dynamometer. Clinical application: The result of this study can provide better clinical insight of PT prevention based on a relationship between their thigh muscle strength and landing strategy.

Poster G14 – Brianna Powers
Mentor: Kazuma Akehi
Title: *Lower Extremity Joint Kinetics and Kinematics Differences Between Sexes*

Context: Men and women are anatomically and structurally created differently. It have been reported that females have more general joint laxity, greater tibiofemoral angles, shorter femurs and tibias, and more femoral antervesion at all stages of maturation, when compared to males of the same age. These differences may cause more musculoskeletal lower extremity injuries in females. **Objective:** The purpose of the current study is to examine the gender differences in lower extremity joint kinetics and kinematics during dynamic athletic motions. Study Design: A factorial study design will be used. **Participants:** Thirty subjects, male and female, ages 19 to 30, will be recruited. Each participant will be recreationally active at least 2-3 times a week.

Procedure: Subjects will visit the laboratory twice; the familiarization session and the motion capture session. Knee flexion angle, dynamic knee valgus angle, ground reaction force (GRF), and rapid force development (RFD) during jumping and landing will be measured using a three dimensional motion capture system. Each joint kinetic value will be compared by gender for further analysis. **Clinical Application:** The results of this study will examine jumping and landing strategies and provide better clinical insights into differences between genders. We hypothesized females tend to have less knee flexion angles and greater dynamic knee valgus angles, which leads to greater GRF and poorer RFD during the motion.

Poster G15 – Dayton Sealey
Mentor: Quincy Johnson
Title: *Quantification of Game and Practice Demands of NCAA Division II College Football Players Using Global Positioning Systems*

Global positioning systems (GPS) allow athletic organizations to have an in-depth view of the physical demands of sport. Understanding these demands can lead to reduced acute and chronic injuries and improved performance. PURPOSE: The purpose of this study is to quantify the physical demands among different position group classifications in college football throughout a full competitive season and the differences between the groups. METHODS: 32 male NCAA Division II football players wore 10hz GPS units throughout the 2022 fall football season. Thirteen different position groups were represented including quarterback (QB), running back (RB), slot receiver (SAM), wide receiver (WR), tight end (TE), center (C), offensive tackle (OT), safety (S), corner back (CB), outside linebacker (OLB), inside linebacker (ILB), defensive tackle (DT), and defensive end (DE). Athletes were divided into three categories: skill (QB, RB, SAM, WR, S, and CB), big skill (TE, OLB and ILB), and bigs (C, OT, DT, and DE). The season was divided into fall camp, in-season practice, and games. From the data recorded, total distance (TD), walk distance (WD, ≤2.5mph), jog distance (JD, 2.5-10.7 mph), run distance (RD, 10.7-14.1 mph), sprint distance (SD, >14.1 mph), and top speed (TS) were used for the analysis. RESULTS: The RD was significantly ($p < .001$) greater in the skill group for fall camp and in-season practice but was significantly ($p \leq 0.05$) greater in big skills during games. SD and TS were also significantly ($p < .001$) greater during fall camp and in-season practice for the skill position group, but there was no significant difference ($p > .05$) with the big skills in these metrics during games. CONCLUSION: The skill group covers greater distances at higher speeds than any other group during fall camp and in-season practice, but similar SD and TS to big skills in games, and less RD.

Poster G16 – Kirstyn Leffler
Mentor: Elena Robinson
Title: *Abdominal Strains in Collegiate Volleyball Player with Genetic Markers of Ehlers-Danlos Syndrome*

Background: Abdominal strain injuries occur when the muscles produce flexo-extension movements. Abdominal strains are seen in most flexo-extension sports; however, they are rarely seen in volleyball players with 0.0048% players a year. While this injury may be common among rotational sports a genetic factor of Ehler-Danlos Syndrome (EDS) can influence the connective tissue (CT) in the muscles. Patient: The patient was a 20-year-old colligate volleyball player diagnosed with EDS two years ago and had reoccurring abdominal strain within 10-months. The patient initially presented with a sensation of pull with the first abdominal strain. Treatment of the initial strain was laser therapy and cryotherapy with continuation of physical activity. During the second occurrence, the patient presented with pain and diminished strength which resulted in refraining from physical activity until pain subsided. Interventions: The patient underwent two weeks of complete rest with LIGHTFORCE® laser treatment and cryotherapy. Following rest, the patient progressed through strengthening exercises and a return-to-play progression after 3 weeks of rehabilitation and treatment of symptoms that contribute to EDS. Outcomes: The use of modalities subsided the symptoms of pain during the second occurrence of the strain. These modalities help in reduction of inflammation located in the abdomen and the exercises that strengthen the muscles mutated by EDS. Conclusions: Little is known about treatments for volleyball players with abdominal strains and EDS with its effects on muscles. This case study presents a potential way of rehabilitating an abdominal strain and brings awareness to clinicians about EDS. Screening or being aware of athletes with EDS can prevent injuries from occurring by creating an exercise program for patients with EDS. Clinical bottom Line: Creating an exercise program for core strength can help prevent abdominal strains. Patients with EDS can participate in a prevention program to strengthen surrounding muscles to help prevent injuries.

Poster G17 – Christina Nelson
Mentor: Elena Robinson
Co-Authors: Elena Robinson, Jordan Dille
Title: *Hip Range of Motion and its Effects on Elbow Injuries in Adolescent Baseball Players*

Context: Due to the forceful nature of throwing placed on the elbow during overhead throwing, elbow pathologies are a common issue in baseball players. There are a

variety of risk factors for elbow pain and injuries in baseball including inadequate hip range of motion (ROM). Nevertheless, research is insufficient in using hip ROM as a predictor for elbow overuse injuries, and most research is focused on baseball pitchers. The objectives of this study are to determine the relationship between pre-season hip ROM and seasonal elbow complaints using the Oslo Sports Trauma Research Centre Overuse Injury questionnaire (OSTRC-O2) and to determine if pre-season reported elbow pain will correlate to greater elbow complaints using the OSTRC-O2. Methods: This study will use a repeated-measures design to measure hip ROM and collect self-reported information on elbow overuse injuries/complaints in adolescent baseball players. Twenty high school aged, male baseball players (ages 14-19 years old) will be recruited for the study. To be eligible for the study, subjects must be a current participant on their high school's baseball team and able to fully participate in overhead throwing activities. Exclusion criteria includes history of a hip disorder that limits appropriate ROM and/or increases hip pain or currently have an injury to the hip(s). Prior to the start of the season, subjects will be recruited through word-of-mouth. If interested in participating, the subject and parent/guardian will sign an informed consent and complete a questionnaire assessing previous injury history, team position, and current elbow pain. Once the questionnaire is complete, active internal and external hip rotation measurements will be taken. Throughout the baseball season, the subjects will complete the OSTRC-O2 every two weeks to assess self-reported elbow problems or complaints. Post-season, hip rotation measurements will be taken once more and statistical analysis will be completed on gathered data.

Poster G18– Melissa Gellermann
Mentor: Kazuma Akehi
Title: *The Relationship between Scapular Dyskinesis and Glenohumeral Joint Instability in Collegiate Student Athletes*

Shoulder joint instability (SJI) is a common mechanism of musculoskeletal injury in collegiate athletes that can result in considerable amount of time away from their sports. SJI is generally classified as traumatic or atraumatic in origin as well as by direction of the instability. This can also occur from repetitive microtrauma, particularly in overhead athletes and football linemen. Some studies reported up to 80% of shoulder instability is also related to scapular dyskinesis, which is a deviation of the scapular during shoulder movement. The purpose of this study is to examine if scapular dyskinesis has a correlation in glenohumeral joint instability in competitive collegiate student athletes. Twenty collegiate student athletes who are aged between 19-25 years and participate in sport that is required to have overhead throwing motions and/or high velocity/intensity exercise on their upper extremity will be recruited. The shoulder joint range of motion (ROM) and its accessory motions will be calculated

using the three-dimensional motion capture system during their shoulder dynamic motions. Then the manual scapular testing such as scapular assistance test (SAT) and scapular retraction/reposition test (SRT) will be performed to examine their scapular motion (i.e. scapular dyskinesis). With the results of the study, it will provide clinicians the prevalence of glenohumeral joint instability along with the scapular dyskinesis in the collegiate student athletes who perform high velocity and intensity exercise on their upper extremities.

Poster G19– Kenny Ernest
Mentor: Kazuma Akehi
Title: *Effects of High Intensity Laser Therapy on Delayed Onset Muscle Soreness*

Context: High Intensity Laser Therapy (HILT) is one of the newest modalities made widely available for treating musculoskeletal injuries and pain. Photobiomodulation (PBM) has been studied previously in low level laser therapy (LLLT) applications. While previous research on low level laser applications has yielded positive outcomes, research on HILT is limited. Objective: The purpose of this study is to quantify the efficacy of HILT applications in the treatment of acute musculoskeletal pain utilizing clinically induced Delayed Onset Muscle Soreness (DOMS) as a stimulus. Pain scale data and functional movement tests will be utilized to obtain quantifiable data on effectiveness. Study Design: Factorial study design with HILT application being sole dependent variable. Participants: Twenty-four (12 male, 12 female) recreationally active individuals between the ages of 19 and 30 will be recruited as participants. Procedure: Participants will complete a personalized fatigue protocol utilizing the isokinetic dynamometer to induce DOMS. Immediately after this, pain and functional movement data will be collected. The participant will then either experience HILT treatment or a pseudo laser treatment for four consecutive days. After each treatment, participants will be asked their pain level and perform functional movement testing. Data between groups will be compared. Clinical Application: This study will provide quantifiable data regarding HILTs ability to treat musculoskeletal pain. Additionally this research may be able to provide further insight into the physiological processes by which PBM is effective.

Poster G20– Cassie McDonald
Mentor: Kazuma Akehi
Title: *Effects of a functional knee brace on the lower extremity kinetics and kinematics changes during dynamic lower extremity motions after the knee arthroscopic procedure*

Context: Functional knee bracing has a positive effect on reducing the anterior tibial shear force during anterior-posterior shear loading in the non-weight bearing and weight bearing of the knee. Functional knee bracing also limits knee joint internal rotation placing the knee in a more stable position for the heel-strike part of running. Previous studies were not conducted using patients who have experienced a post-knee arthroscopic procedure such as ACL reconstruction surgery. Purpose: The purpose of the study is to determine hip, knee, and ankle joint kinetics and kinematics changes during dynamic lower extremity motions wearing the functional knee brace in the collegiate-aged individuals who have a history of knee arthroscopic surgery. Methods: Each participant will visit the lab a total of three times (i.e. familiarization session, 1st testing, and 2nd testing sessions) separated by at least 48 hours but not exceed 72 hours. The first visit will include completing the informed consent/health history form and familiarizing the subjects with the dynamic athletic motions (e.g. body squat, single-leg squat, vertical jump, unilateral jump, drop jump, lateral jump, lateral lunge, and single-leg stand) on the 3D motion capture system platform. The second and third visits are the data collection sessions with or without wearing functional knee bracing. The PI will randomly assign participants to wear the functional knee brace in either second or third visit of testing. Clinical Application: This current research is unique and original data to report the effectiveness of functional knee brace on the individuals who have experienced the knee arthroscopic procedures. Elucidating these effects may provide important clinical information on joint kinetics and kinematics as injury prevention and return-to-play strategies in collegiate competitive athletes.

Poster G21– Kellen Reinsch
Mentor: Kazuma Akehi
Title: *Relationship Between Hamstring/Quadricep Muscle Strength Ratio and Ground Reaction Force in Vertical Takeoff and Landing*

Context: It has been reported that poor quadriceps and hamstring muscle strength ratio causes poor jumping and landing strategy, which can lead to an increased risk of musculoskeletal injuries on the lower extremity. However, it is inconclusive how much muscle strength imbalance causes poor jumping and landing strategy. Objective: The

objective of the study is to identify a relationship between quadriceps and hamstring strength (Q/H) ratio and the ground reaction force (GRF) produced in vertical jump takeoff and landing. Participants: Thirty recreationally active participants (fifteen male, fifteen female) between the ages of nineteen and thirty years will be recruited. Procedure: Subjects will report to the laboratory a total of two times. In the first visit, subjects will complete the consent form and then health history questionnaire to ensure their safety in the study. Then, subjects will experience the familiarization session on quadriceps and hamstring muscle strength testing on the Isokinetic Dynamometer and then perform vertical jump on the 3D Motion Analysis. During their second visit, subjects will be instructed to perform three maximal voluntary isometric contractions (MVIC) for quadriceps and hamstring muscles at 60° of knee flexion. After completing the MVIC session, subjects will perform two vertical jumps on the 3D Motion Analysis. Clinical Application: The results of this study can provide insight in how an improper quadricep/hamstring muscle strength ratio impacts ground reaction takeoff and landing force and how these forces can lead to better understanding in lower extremity injury susceptibility during dynamic athletic motions.

Teacher Education

Poster G22– Kelcie Burke
Mentor: Marisa Macy
Title: *Creation of Online Professional Development for Child Outcome Summary*

The objective of this research project was to prepare early intervention service providers in assessment of children using the Child Outcomes Summary (COS) evaluation tool and how to utilize it in their practices. This was done through a prerecorded online professional development webinar with time at the end for live chats with the researchers for participants to ask questions on the assessment tool. Prior to the development of the webinar a survey was sent to providers with specific questions to gain insight into thoughts and perceptions on this tool. These results were then used to guide the development of the webinar to address key concerns of the respondents. This project utilized case studies of children with varying degrees of ability with sample COS forms to show appropriate use of the tool as well as practice examples, per the results of the survey indicating the need for guided examples. Following the completion of the webinar there was a series of online modules for participants to complete to get a more in depth look at the individual parts of the COS outlined in the webinar. Within the modules will be videotaped examples of two of the project coordinators using the tool with 3 different diverse kids in the state of Florida. This project was developed with a team through the University of Central Florida in

collaboration with UNK. Funding was provided by the State of Florida Department of Health, Div. of Children's Medical Services for $500,000.00 with permission to disseminate the results.

Poster G23– Erin Johnson
Mentor: Tammi Ohmstede-Schmoker
Co-Author: Nicole Wiemers
Title: *Continuing Professional Development: Start Early and Get Connected*

Continuing professional development is an expectation and requirement once a person becomes a Nationally Certified School Psychologist (NCSP), so why not start early? The need to prepare students for the future as well as enhance content of required courses in the program led faculty to add a CPD requirement to the school psychology program. Students admitted into the program are expected to obtain a minimum of 300 CPD hours throughout their time in the program. There is flexibility in the ways in which this requirement is met to allow diversity in content, mode of instruction/participation, time, and resources required. Students have reported this requirement as being extremely beneficial to their training and professional networking.

Poster G24– Amelia Meyer
Mentor: Tammi Ohmstede-Schmoker
Co-Author: Dylan Moore
Title: *Peer Mentoring: Assessment Labs for Clinical Skills*

The Peer Mentoring Assessment Lab has been in place for approximately six years. The assessment lab is staffed by the second-year practicum students within the program on a bi-weekly basis. The assessment lab is offered to first-year students as a way to enhance their standardized administration, scoring and interpretation skills for the multiple tests they learn within the respective classes. Students may attend the assessment lab to view demonstrations and/or receive corrective feedback on administration, scoring procedures and interpretation for specific testing instruments. The practicum students are able to refine their assessment skills while also gaining experience with consultation through the assistance and feedback they provide to the first-year students. Quantitative and anecdotal data collected from students and faculty involved in the assessment lab indicated enhanced clinical skills of both first-, and second-year students within the school psychology program.

Poster G25 - Sierra Wilson
Mentor: Em Meyer
Co-Author: Sydney Slie
Title: *Remote Class Attendance Considerations for School Psychology Programs*

As many classes return to in-person format, students ask to attend class remotely when they are ill or out of town. While this appears to be a simple accommodation that suits the needs of instructors and students alike, it should be evaluated carefully before being applied across the whole school psychology program of study. This poster will include a list of the courses that allow remote attendance without compromising student learning in and outside of the classroom. There will also be student and faculty input about their views on why remote attendance should and should not be maintained when COVID-19 is less of a concern keeping everyone attending from home.

Poster G26–Dylan Moore
Mentor: Em Meyer
Co-Author: Megan Johnson
Title: *Review of School Crisis Plans in Central Plains*

Crisis preparation plans were solicited from 3 school districts from central plains and then compared with the PREPaRE model checklist. The PREPaRE Safety Plan Checklist is vital so districts are prepared to respond appropriately and effectively to crises. The present study focused on evaluating the strengths and weaknesses of three school districts' crisis plans. There were some consistent areas that were lacking and could be opportunity of growth for these districts. The current study summarizes previous research, outlines the PREPaRE model checklist, and compares/contrasts District A, B, and C to the checklist.

Poster G27– Katherine Kovanda
Mentor: Phu Vu
Title: *Effects of Fluency Intervention in Fourth Grade*

This project detailed the effects of fluency intervention in one fourth grade classroom in the Fall semester of 2022. The school in this intervention is a Title I school in a high-poverty area in Lincoln, Nebraska. 23 fourth graders participated in this intervention. There were five parts to this fluency intervention. First, a“fluency flash” in which partners of similar ability read aloud to each other. Next, students practiced Fry’s instant phrases, the most commonly used phrases in the English language. Another

piece was giving students more opportunities to read out loud such as choral reading and reader's theater. The fourth intervention was a daily teacher read aloud so that fluency could be modeled to students by the teacher. The final component was listening to individual students read a grade level passage for the first time (cold read) for one minute to determine words correct per minute (rate). The quantitative data measured were rate and accuracy. The fluency goal was 87 words correct per minute. The starting rate of proficiency for this class was 68%. After the intervention, 91% of students were reading with fluency. The average rate of improvement was +14.6 words correct per minute. This five part fluency intervention was successful.

Poster G28 (and Online)– Breana Dobesh
Mentor: Phu Vu
Co-author: Phu Vu
Title: *Detecting a Possible Correlation Between Hands-On Experimentation and Scientific Data Analysis I 8th Grade Students*

It has been made evident among the scientific education community that K-12 students are struggling to determine meaning and significance when presented with sets of scientific data. However, our society continues placing great importance on students' ability to perform at a high level on the ACT which contains a section in which students are asked to analyze and interpret scientific data. Additionally, science educators are commonly pushed to develop and implement lessons in which students complete hands-on experimentation with the goal of inspiring inquiry and critical thinking. This action research examined the impact of integrating hands-on experimentation on eighth- grade students' skills of scientific data analysis and interpretation in a science class. The intervention given to the treatment group was tasking students with completing scientific experiments during their daily lessons, along with collecting and analyzing data from those experiments. Collected data through both control and treatment groups indicated that there was no significant difference in mean test scores between the two groups. Discussions and suggestions for future studies were included.

Undergraduate Posters

Behavioral & Social Sciences

Geography

Poster U1 – Justin Vrooman
Co-Mentors: Paul Burger and Angela Hollman
Title: *Mobile Health and Chronic Care: Using GIScience to Assess Health Care Accessibility Among Broadband Subscribers in Nebraskas Micropolitan and Rural Areas*

Individuals with chronic health conditions such as heart disease, cancer, and diabetes, have a persistent need for health care. Those suffering from these conditions have a more difficult time accessing the care they need, and a lower quality of life compared to those with similar conditions in urban areas (Bartee et al. 2019; DeGuzman et al. 2020.) Mobile health (mHealth) has emerged as an alternative method for receiving health care for those who lack access to a hospital or health care facility due primarily to living in a rural or micropolitan area with greater geographic distances to hospitals (Burger et al. 2022). The increased reliance on the internet for mHealth and other daily activities has heightened efforts to quantify the differences in internet speeds, particularly among rural broadband customers (Hollman et al. 2021). A closest facility analysis is employed in GIScience to compare network travel times to hospitals and broadband customer locations in Nebraska's micropolitan and rural areas. Comparing network travel times to hospitals with recorded internet speeds of residential customers demonstrates the extent to which differences exist between those customers in micropolitan and rural areas who do and do not use broadband for mHealth.

Poster U2 – Kyosuke Hara
Mentor: Vijendra Boken
Title: *Studying the Impact of Armed Conflicts on Global Food Availability*

The ongoing war between Russia and Ukraine has created an agricultural crisis. Ukraine's wheat production and exports, which account for 28% of its food products, have significantly decreased since the war began in February 2022. Based on the data collected from various sources, this study examined the trends in agricultural production and exports from Ukraine and the energy costs. The findings reveal that the impact of the war is significant and warrants urgent attention.

Compared to 2021, the amount of wheat production declined by 30%, and exports declined by 48%. This study specifically focused on some of Ukraine's main agricultural products, such as corn, wheat, and sunflowers, and found significant changes in production and exports from the previous years. The study reveals how much these changes have occurred due to the ongoing war.

Moreover, the impact of the war extends beyond agriculture, leading to price rises for energy and food products, causing significant inflation, negatively impacting the world's economy. While the focus of the study was on Ukraine's agricultural crisis, it also sheds light on the broader implications of the war.

To conclude, the Russia-Ukrainian war has caused a severe agricultural crisis that has impacted the world economy. This study highlights the extent of the crisis by examining the trends in production and exports of some of Ukraine's main agricultural products. The findings reveal that the impact of the war is significant and warrants urgent attention.

Poster U3– Narindra Ranaivo
Mentor: Vijendra Boken
Title: *Impacts of Droughts in Madagascar*

I chose to research about an issue Madagascar is currently confronting as I am Malagasy. I was born and raised in Madagascar, so this topic carries a lot of meaning for me. This research’s purpose is to show the impacts of the multiple droughts Madagascar faced over the past recent years. The research analyzes the rainfall pattern over the past years. Using graphs, I’ll show the rainfall pattern history, and when and for how long there was a decline of rainfall in Madagascar. Because the Southern regions of Madagascar rely heavily on precipitation, this research focuses more on these regions as they were the most impacted by the droughts. This research looks at how much of an impact the droughts had on the population in these regions,

how much of an impact it had on vegetation health, and how it impacted the water supply and quality. Some of the impacts this research will talk about include agricultural production decline which lead to food insecurity and malnutrition. It includes the gradual decline in groundwater level in some Southern regions in Madagascar. This research will also touch on the drought's impact on the livestock as cattle were often thinner and in poor condition due to the dry land.

Poster U4– Oliver Combs
Mentor: Jason Combs
Title: *Louis Everts and The Official Atlas of Nebraska*

Throughout the atlas hysteria of the late 1800s and early 1900s was one constant . . . Louis Everts. Louis Everts was born in Cattaraugus County, New York in 1836 and later moved in 1851 with his family to Geneva Township, Kane County, Illinois. Everts relocated from Kane County to St. Charles, Illinois and later to Chicago before returning to Kane County to join the 52nd Illinois Infantry during the Civil War. Everts served as an assistant adjutant general with the Fourth Division, Fifteenth Army Corps and eventually achieved the rank of major. Following the Civil War many who had served in the conflict, including Everts along with later well-known mapmakers Alfred T. Andreas and Thomas Thompson, recognized the need for and value of quality maps and soon entered what would become a lucrative atlas and map production industry. Louis Everts was an early leader in this field and in the years following the Civil War played a primary role over the next 50+ years publishing both atlases and plat books along with a variety of other works. A List of Geographical Atlases in the Library of Congress published in 1909 includes several of Everts' works including county atlases from Massachusetts, Michigan, New Jersey, Ohio, Pennsylvania, Rhode Island, and Wisconsin, in addition to The Official Atlas of Kansas, and, of course, The Official Atlas of Nebraska. This project uses The Official Atlas of Nebraska (1885) to examine migration and ownership patterns along with early settlement trends in the state. The publication date of 1885 was not random chance, boosters and promoters were enjoying Nebraska's success in the early 1880s and supporters used the atlas to attract additional investors and settlers. The atlas also demonstrates that at various scales, both clustering and hybridization appear with Nebraska's early population. Desire coupled with an opportunity brought pioneers not only from surrounding states but from around the world to Nebraska.

Political Science

Poster U5 – Norah Renner
Mentor: Peter Longo
Title: *The Impact of Genomic Embryonic Medicine on Rural Communities*

Diversity is a quality that is upheld and celebrated in western culture such as the United States. Diversity is what makes every human unique, allows others to gain insight into experiences they have not personally endured, and assists a better understanding of different cultures, religions, perspectives, and nationalities. Yet, diversity acceptance and recognition, in its most simple form, is challenged with advancements in genomic embryonic medicine. Indeed, the programs offered to those with disabilities could be severely reduced. The impact on rural people will be problematic. This paper will explore the social and political impacts of genomic embryonic medicine; evaluate the impact on the rural sector; and offer solutions to encourage and support diversity.

Poster U6 – Kimberly Gomez
Mentor: Diane Duffin
Title: *Eroding Democracy: the use of social media by Right-Wing Populists*

New forms of technology have changed the way information is disseminated to the public daily. It's important to recognize that new waves of technology have created threats to democracy, and this cycle is likely to continue. This new wave formed of social media and algorithms facilitate strong ties to political identity and fuels polarization to extremes. Those who look to consolidate power are able to do this with how easily information is spread in this era. The way to do this, is to have a constant stream of information from the informer to the audience. Use disinformation to create shock and breaking down democracy becomes easier. The insurrection of January 6, 2021 illustrates the severity of this problem. To gain an understanding on how harmful disinformation can be, I have read literature to explain how populist authoritarian figures use these new forms of media to harm existing democratic systems and norms. Also, how they identify what populations are more susceptible to populist appeals. Specifically, class and race. This project lays foundation to my intention to research how right-wing populist leaders use social media specifically to target populations who are susceptible to their appeal.

Poster U7– Austin Dubas
Mentor: Satoshi Machida
Title: *Opinion of US Foreign Policy*

My research project focuses on how US Foreign Policy is affected by anticipated personal gains of the US citizenry. The research is focused on how American citizens gain the will for interventionism in foreign policy that may result from their view of anticipated personal gain. The intent is for the research community to gain insight into people's views on foreign policy. Recently, the United States public has been mixed on their views of global interventionism, which I believe can be linked to more personal reasons. Internationally and domestically, the people's views of foreign policy in international confrontations may affect the entirety of the United States' ability for any global intervention. In this paper, it is discussed that I am actively conducting a survey on U.S. citizens who are of 19 years of age or older. My survey asks 11 questions and takes about 5 minutes. Also, I am researching other scholarly works that have conducted similar surveys to draw a possible link to my anticipated research topic.

Poster U8 – Macy Bryant
Mentor: Chuck Rowling
Title: *Human Trafficking*

Human trafficking is a global issue that infiltrates all areas of the world. Further, it affects people from all different demographics and places. With that being said, this project's intention is to research various aspects of global and local human trafficking including public awareness, location, types, and risk factors. Also, the research will focus on the different organizations such as the International Labour Organization, to discover how their policy, structure, and missions combat this. Eventually, the research will evolve into studying the severity and prevalence of trafficking, in context with popular highways and interstates.

Poster U9 – Alexis Chavez Monasterio
Mentor: William Aviles
Co-Author: William Aviles
Title: *The Immigrant Industrial Complex: Continuity in the Biden Administration*

Many expected that with the transition from the xenophobic and anti-immigrant Trump administration to the ostensibly "pro-immigrant" and "humane" Biden administration that substantial changes would be forthcoming in the existing "immigrant industrial complex". The degree that the immigrant industrial complex was linked to the emergence of "21st-century fascism" or the need to eliminate Latino immigrants from

society reinforced this idea given the importance of these views in the rhetoric and politics of the Trump administration. In addition, the increasing demand for labor within the U.S. economy during the Biden administration suggested that the structural needs of global and national capital would facilitate less restrictive policies. Yet, two years into the Biden administration substantive changes to this complex have not been forthcoming and the strength/role of this complex has remained significant. While there has been an increase in the flow of migrants into the United States, this increase has much to do with the decline of immigration due to various COVID controls and not to a radical shift in U.S. immigration policies. The immigrant industrial complex has remained significant despite the changes in presidential administrations. Through a comparative analysis of immigration policy in the Trump and Biden administrations, we find that the continued strength of this complex reflects the institutionalization of this industry that continues to serve the long-term interests of capital and the continuing power/influence of neo-fascist forces within U.S. civil society. These forces within civil society have been effective at undermining/frustrating efforts to weaken, let alone dismantle, the immigrant industrial complex. Our paper speaks to the importance of civil society and capital's more complex needs in understanding policy continuity.

Poster U10– Braden Peterworth
Mentor: Chuck Rowling
Co-Author: Caleb Hendrickson
Title: *The Battle for the Soul of America: How Joe Biden expanded American Exceptionalism*

This study discusses how Joe Biden expanded American exceptionalism and the modern jeremiad during the 2020 presidential election by utilizing a new theme in his speeches, seeing the election as a ‘battle for the soul’ of the nation. We argue that Biden utilized this new theme, following his return to the modern jeremiad, at an unprecedent rate compared to his predecessors. Our findings show that Biden: (1) utilized American exceptionalism and the modern jeremiad during his presidential campaign in 2020, which was a return to normal following the Trump presidency; (2) introduced a new concept into those two theories, ‘the battle for the soul’. We discuss how this new language utilized by Biden helped return attention to American exceptionalism and helped gardener support for his campaign against Donald Trump in 2020. This study can be applied to future presidential elections, especially if this theme is utilized by future candidates with the same level of success.

Poster U11– Peyton Luedders
Mentor: Peter Longo
Title: *Determining the Patentability of Biotechnology: The Line Between a Patentable Invention and a "Product of Nature"*

Patent law is an area of critical importance as discoveries are rapidly being applied to modern industries. The laws of patentability are defined in Title 35 of the United States Code. However, these laws are not able to fully explain what is allowed to be defined as patentable subject matter. Precedent from the courts is then required to determine patentability. In the field of patenting biotechnology, there is a separate issue to deal with. Title 35 states that “products of nature” are not patentable subject matter. When these types of patent claims are made, the court must determine whether the subject matter is an actual new creation or simply a “product of nature”. This article examines multiple biotechnology patent court cases in order to determine where this line can be drawn. These cases determine that claiming patents on DNA segments and determining drug dosages based on patient metabolite concentration are simply known laws of nature and are unable to be patented. However, human made organisms and the creation of methods to create and preserve different biochemical compounds are seen as inventive and meet the standards of patentability. Many other patent claims lie in the middle of these as well. In examining these court cases and the text of Title 35, a better understanding of patentable subject matter in the field of biotechnology will be developed.

Poster U12– Shelby Haney
Mentor: Chuck Rowling
Title: *Russia's Invasion of Ukraine: What does this mean for the Future of the World Order?*

On February 24th, 2022, Russia launched a military attack on Ukraine. The current Russian President Vladimir Putin had labeled it as a “special military operation.” As Russia continued to invade Ukraine in the days following, western allies began to announce new sanctions against Russia. Russian citizens have been affected by online propaganda in regard to Ukraine, as well as statements from Putin to the population, putting the blame on the United States and NATO. These actions pose a risk to the international community for a number of different reasons. Throughout this research project, I will look at a number of different questions which include: (1) In the event of the Russian invasion of Ukraine, what explains the international response? (2) What are the broader consequences of this conflict moving forward? (3) What does this mean for the Liberal International Order? Mainly I will be focusing on the variable of the Liberal International Order. I will also look at the humanitarian efforts that have

been made, for example, the actions of the UNHCR. While analyzing the Russian invasion, one could determine the fact that this event can fundamentally shift the world order. The purpose of this study is to examine the effects, the international response, and the consequences of this war. After investigating this situation and gaining knowledge on multiple aspects of the war, this study can help promote education on the international community, clarify our understanding of this situation, and aid in solutions to fix the at-risk current world order.

Poster U13– Melisa Becerra Gonzalez
Mentor: William Aviles
Co-Author: William Aviles
Title: *Feminicides and the Global: The Cases of Colombia and Peru*

Latin America is a referential point when it comes to the expansion of gender-based violence and its final stage: feminicide. Colombia and Peru have both dealt with this issue but have represented starkly different levels of femicidal violence. From 2017 to 2021, according to the Colombian Observatory of Femicides, an estimate of 2,766 cases were registered. In contrast, the Peruvian Ministry of Women and Vulnerable Populations reported only 712 feminicides occurred during this same period. These two share several factors that have been viewed as central to feminicides, including patriarchal systems of inequality and social exclusion, a history of intensive political violence, weak judicial institutions, and high levels of impunity. In addition, they each have been governed by various neoliberal coalitions who have sought to integrate their respective economies into global capitalism. Theories around the violence against women have long stressed an “ecological”/domestic framework that stresses factors such as levels of economic/social marginalization, the existence of pervasive violence, gender equity within the nation, social norms, and levels of development. We find that, while these factors are important to the causes of feminicides in these two cases, a complete understanding of the differences between Colombia and Peru necessitates the integration of their global contact including their level of integration into the global economy, the power/influence of the global trade and the extent of the systematic and different types of manifestations of feminicide. Our findings reinforce the arguments put forward by feminicide scholars that urge us to incorporate the global in their respective analyses of this area.

Poster U14 – Tanner Butler
Mentor: Satoshi Machida
Title: *Juror's as Veto Players: How the Jury's Power to Nullify Defines the Social Contract*

The jury plays an important role in the American criminal justice system, they can act as the sole arbiters of guilt or innocence. In doing this they have a hallow duty to apply the facts of the case to the law. Giving them some interpretative powers over criminal law at one of the most important stages, when determining guilt. This interpretive power gives an important power to the people over the ultimate fate of criminal law to the people. In this the jury is able to act as a veto player. They are the classic example of what a veto play is. This paper looks to look into how the construction of a jury as a subset of society acts in the how we construct the jury as veto player. Use of special analysis will demonstrate the role that individual jurors play both a possibly being veto players in their own right and to the overall construction of a jury as a veto player. Finally the paper will discuss the how this view of the jury interacts with the reasons that the jury was originally established, and more modern ideas and critiques of the role of the jury in society.

Poster U15 – Alyssa King
Mentor: Satoshi Machida
Title: *Citizen's Opinion of Current Issues*

Human behavior is a field studied often. In human behavior, scientists frequently research how one's perception of a given topic can influence the way they behave. The aim of this research is to examine the relationship between United States citizens and their willingness to express political opinion and thought. In this study, we consider political issues, such as the January 6th insurrection, and how they are discussed by United States citizens on both an online platform and offline. In order to examine citizens' perceptions of current issues, this study conducts an online survey. The findings from such an analysis is especially useful in interpreting how citizens view current political issues.

Poster U16 – James Kriz
Mentor: William Aviles
Title: *Military Environmental Policy and Congress*

This research has focused on the difficulties associated with passing environmental regulations on military emissions standards. Throughout the process of reviewing the

current literature regarding the congressional policy-making process alongside DOD spending and policy, I have identified three major variables accounting for the success of military environmental policymaking. First is the nature of bill lifespan in Congress, as bills take time to get deliberated despite an active lifespan of 2 years. Thus, such bills relating to military emissions may simply fail due to excess deliberation needed on them. The second variable is the introductory intent of bills relations. There is some literature supporting that legislatures propose certain bills with a knowing lack of support, for a couple of possible identifiable reasons. Whether that be gaining public attention for an issue, or simply bringing attention to it in Congress itself. In either scenario the bill is not proposed to be passed, rather it is proposed for the sake of being proposed. The third variable would be the effects of committees and the nature of committee politics. Committees give large amounts of directional power to the committee chairs, allowing them the ability to steer towards policy actions they prefer. This particular variable is supported fairly extensively throughout the research. Thus, it can be understood that committee politics is the major player in congressional action toward military environmental policy. This research is significant in its findings as it helps to gain a better understanding of why a known major pollutant, the US Military, is not being held to certain emissions and environmental standards. In an era where climate change is becoming an increasingly pertinent issue, it is important to understand how these policies are being applied to various areas.

Poster U17– Kennia Garcia-Retana
Mentor: Diane Duffin
Title: *Political Knowledge and Generation Z*

Participating in elections is one of the key freedoms America has to offer its citizens. Accompanying such a right follows the individual responsibility to obtain proper information. The development of political engagement and political awareness for each individual generation has had its contributing social, economic, and environmental factors play a role. Whilst it is not a newly studied topic in trying to understand what Americans know about politics and why it matters, this project seeks to understand specifically Generation Z's (consisting of those born between 1997-2012) political knowledge and awareness compared to previous generations, and further understand where the knowledge derives from.

This study has already taken steps in attempting to pinpoint what the initial instigators for political interests are, as well as the sources that may be the root of where Generation Z may be acquiring political knowledge; Ranging sources include the now available alternate forms of media, exposure to 'new norms,' family and friends, and education. Moving forward I will evaluate how well preexisting patterns of political

knowledge apply to Generation Z and why such erudition in this case is equivalent to determining power.

Poster U18– Temo Molina
Mentor: Satoshi Machida
Title: *A Veneer of Legitimacy: Nationalist Narratives in Social Media*

Like several forms of media, online social media features heavy amounts of political narratives. Internet platforms present an abundance of political news stories and rhetoric, and that content comes in a variety of ideological persuasions. The proposed research, however, focuses on the promotion of American nationalist ideologies, specifically through social media. This project is broken into three parts. The first part investigates a rhetorical tool several political messages use to garner support: credibility. Elements such as expertise or reputation can make ideas more appealing to audiences. Put another way, a perception of legitimacy can make messages more persuasive. Nationalist political interests, then, may seek to enhance the legitimacy of their ideas by incorporating some type of appeal to credibility. The second part of this project examines how political groups promote nationalist themes on social media with an appearance of legitimacy, with particular emphasis on an appeal to the authority of education. Specifically, the project points to several instances of online nationalist rhetoric presenting itself in an educational light. The third part will test the educational framing of nationalist messages by conducting an online survey and analyzing its results. When reviewed in the context of the existing literature, the research may contribute to a better understanding of the strategies and effectiveness of nationalist narratives on social media.

Poster U19 – Maddie Getz
Mentor: Peter Longo
Title: *The Intersection of the Healthcare and Insurance Industries*

Health care is one of the most critical foundations of community life. Assurance of good health for all members of society is far from guaranteed, despite the central role it plays. Throughout history, society has grappled with the complexities of health care delivery. Many segments of the community suffer undue burdens with inadequate care from health care providers and governmental programs. The search to mitigate health care deficiencies ought to consider multiple factors. The uniquely American health care system, with its notoriously private structure, rapidly rising cost of care, and large uninsured and underinsured population, is a wide-reaching institution with complex and significant effects on all citizens. This project will provide an analysis of the foundations of the American health care system and study the significant impact of unsettled health

policy upon the American public. In order to grasp just how intricate and divisive the health policy environment is, this paper will provide a broad overview of the political and historical background, along with recent developments, of health policy in the 20th and 21st centuries. The study and application of relevant case law, with special attention to the Affordable Care Act of 2008 and its attempt to redesign the healthcare system, will provide the foundations for legal analysis.

Poster U20– Samuel Schroeder
Mentor: Peter Longo
Title: *The Supreme Court and the Evolution of Church and State Jurisprudence*

This research project aims to track the projection of how the United States Supreme Court has ruled on cases concerning problems relating to the separation of church and state outlined in the establishment clause of the first amendment. This was accomplished by analyzing and applying different political concepts such as “judicial regimes” and “jurisprudential regimes” to the understanding of how the Court has historically ruled on church and state cases. Furthermore, the use of material from scholarly books and articles regarding the jurisprudential regimes and the trends of past courts can give insight into the reasoning behind church and state cases. Additionally, reviewing the different methods that Supreme Court justices have used to formulate opinions, such as the controversial “ Lemon Test” as well as other tests created from landmark cases can reflect the jurisprudence of the current court, as well as how it is received by other justices. This project also examines the church and state jurisprudence of the Roberts Court, the current Supreme Court, to illustrate the influences of prior courts and how society is currently affected by the Court’s rulings. Through this research, we can better understand how the Supreme Court has been shaped, how the Court shaped secularism in the United States, and what the future of secularism may look like.

Poster U21 – Tyler Kearn
Mentor: Peter Longo
Title: *American Citizens Thought on Another Civil War*

This study examines American citizens’ beliefs about the civil war to come. Prior research has very few explanations for this issue. Some believe it still to be a rather unsettling matter. Previous research has focused on the idea of states leaving the union rather than the idea of a civil war. While many news sources have begged the question of the possibilities. This research will explore the political rhetoric and constitutional rhetoric of this assumption. The idea of social issues in America being a factor of an up-and-coming civil war. As seen in the United States, there is a massive division between political parties (Republican and Democrats). Exploring political love,

anger, and violence contributes to the frightful idea of another civil war in America. Through past endeavors seen throughout the 1861-1865 U.S. Civil War, the “South” wanted to part from the “North.” Even today, there is still this thought of dissolving from the union. In conclusion, the research will be about the belief and possibility of such an outcome, how these factors contribute to the thought, and how it could be prevented.

Poster U22– Ashley Roemmich
Mentor: Peter Longo
Title: *Red Alert: A Case Study of Redlining Policies in Omaha, Nebraska and Their Impact on the Climate Crisis*

Racial discrimination is embedded in American history. The New Deal program created many opportunities, but it also led to racial discrimination in housing. This racial segregation is not limited to any region, paving way for a dissimilarity index of 61.3% — with 0% being total integration and 100% being total segregation — in Omaha, Nebraska today. This paper begins with a critical examination of redlining and housing discrimination, tying the issue to Omaha. It then connects the subsequent housing discrimination policies to the current climate crisis, examining the effects of heat islands, as well as the benefits of urban forests. It ends with an analysis of Nebraska Natural Resource District’s tree program and its distribution efforts, observing whether or not the program is equitable while also showing that redlining and subsequent housing discrimination policy is an environmental policy issue.

Poster U23 – Jade Vak
Mentor: Peter Longo
Title: *Enjoyment of Liberal Arts Classes and Empathy in Future Health Care Workers*

The main goal of the proposed research is to examine the relationship between liberal arts classes and empathy. More specifically, this study examines how the enjoyment of taking a liberal arts class relates to empathy in future health care workers. The proposed research can contribute to the education of future health care leaders (Mogro-Wilson & Tredinnick, 2020; Scott, 2011; Suksatan et al., 2020). I will examine the hypothesis suggested above by conducting an online survey targeting UNK students who are currently enrolled in the health care curriculum.

Poster U24– Caleb Hendrickson
Mentor: Chuck Rowling
Co-Author: Braden Peterworth
Title: *Making American Exceptionalism Great Again: How Joe Biden Sought to Restore the Idea of American Exceptionalism during the 2020 Presidential Election*

This study is an expansion upon Joe Biden's embrace of the modern jeremiad in his 2020 campaign, and how he sought to restore the concept of American Exceptionalism in his discourse. The study relies on a quantitative analysis of each speech for Biden during the course of his campaign which was compared with previous oppositional candidates during their respective campaigns (e.g. Kerry in 2004, Obama in 2008, Romney in 2012, and Trump in 2016). The content analysis sought to explore the manner and extent that Biden invoked American exceptionalism. These findings alone were significant, showing that Biden contrasted sharply with Trump who offered a vision of restoring American exceptionalism that was focused primarily on "self-exceptionalism" (often using the famous phrase, "I alone can fix it") in his treatment of American exceptionalism. Rather, Biden was very similar to his other predecessors (Kerry, Obama and Romney) in his vocal embrace of American Exceptionalism. This study builds on these findings by looking at two emerging themes of the jeremiad that Biden alone has incorporated; "The Battle for the Soul" and "Lived Up to Our Ideals" signify two new codes of American Exceptionalism. We discuss how these findings contribute to our broader understanding of the modern jeremiad and American exceptionalism within the modern presidency.

Poster U25– Lucia Castro Jacobo
Mentor: William Aviles
Title: *From Workers to Community Members: A case study of Lexington and Crete Nebraska*

From Workers to Community members is an extension of a previous project. The past project focused on the literature regarding immigrant integration in Lexington and Crete Nebraska. The central question is to see if both towns are both successful in the integration and what factors are in place to facilitate or ease these groups into a new community. I was able to see that the majority of the growth was attributed to the meatpacking plants recruiting individuals from Mexico and Central America to meet the demands. The difference in this piece is that the conclusion will be drawn from the one on one interviews from leaders of each community. Not only will I be compiling my own questions on the subject, but hopefully revitalize the research on these communities as there has not been new relevant information or works on the immigrant community in

Nebraska. This is important work as a bulk of the research on these communities were done from 1990s to 2010. I hope to see if the factors that are brought up such as education, income, language, religion, and social division are brought up in by the interviewees to see what still needs to be done in these communities or what can others implement to make sure their immigrant communities flourish.

Poster U26 – Carson Kreager
Mentor: Peter Longo
Title: *Aristotle's Perfect Citizen*

In today's modern society there are many people who do not partake in their civic duty of voting, do not interact with their community, and may not even be considered a good citizen. Aristotle's view of what it means to be a “good citizen” can be applied to modern citizens to show what needs to be done to be considered a true citizen. Previous research has used Aristotle's Politics Book III, in which Aristotle outlines what he believes is a good citizen. Many of them have used these readings to try and change how our democracy functions. I seek to change how the citizens within our democracy function. The main focus comes from the readings of Aristoles and how others have analyzed it. Using Aristotle's definition we can see how a citizen needs to act in order to be considered “good”. If we take the information that a good citizen takes part in government, we can draw two conclusions. Either someone that joins the government and takes part in it, or someone that votes and pays attention to politics can be considered a good citizen. If these findings hold to be true, then in association with being involved in government, paying attention to it, and voting, it can be inferred that this person must also be a good member of the community. Being a good neighbor can mean a number of things: helping others, being kind to one another, and actively interacting amongst neighbors. If these are all brought together, not only do you have a good citizen, or a good neighbor, you have a good friend. I will examine the works of Aristotle to determine the features of a good citizen; apply Aristotle’s features to modern society; and offer suggestions as Aristotle could be applied to current political life.

Psychology

Poster U27– Ibinye Green
Mentor: Megan Strain
Title: *Not Recognized or Not Important? Perceiving Racism in the Healthcare Setting*

Racism is an overlooked and profoundly underestimated problem in healthcare. It has been linked to worse quality of care and lower trust in doctors (Findling et al., 2022), which reduces treatment seeking in patients of color. Racism may manifest as implicit bias, expressed subtly (Rhee et al., 2018). While these cues may be apparent to some, that isn't the case for all. While firsthand experience with racism may prompt Black doctors to combat its emergence in interactions with their patients, their success in doing so may be undermined by systemic racism (Harvard Health, 2017). Doctors of color may unintentionally engage in racism-perpetuating behavior, which may be less likely to be recognized. Thus, doctors' race may be another factor influencing individuals' likelihood of noticing racism. It is the goal of the current study to examine whether these factors may impact individuals' likelihood of recognizing and reporting incidents of racism in a healthcare setting. We measured individuals' recognition of and likelihood of reporting racism in one of four vignettes describing a doctor-patient interaction in a 2 (race of doctor) x 2 (racism severity) between-groups design. We received IRB approval, and the research was conducted as part of our university's Undergraduate Research Fellowship program. We hypothesized a main effect of doctor race: individuals exposed to scenarios with Black doctors will be less likely to recognize and report the incident than individuals exposed to scenarios with White doctors. We also hypothesized a main effect of racism severity: individuals exposed to the subtle conditions will be less likely to recognize the incident as racist and less likely to report it. Finally, we expected a significant interaction in which participants who are exposed to a Black doctor showing subtle racism will be the least likely across conditions to recognize and report the behavior.

Poster U28– Peyton Neff
Mentor: Megan Strain
Title: *The Role of Gender in Humor Enjoyment*

The stereotype that women aren't funny has been a common perception that has had lasting effects on perceptions of gender dynamics in humor. Research that has evaluated this stereotype has suggested that most people find men to be funnier than women (e.g., Hooper et al., 2016). In addition, complex gender norms may be in place when it comes to the group being targeted (Strain et al., 2015), and whether the joke

subverts or reinforces stereotypes (e.g., Strain et al., 2016). The goal of the current study is to examine the interaction among joke-teller gender, joke target, and participants' gender on their perception of jokes as enjoyable.

College students were instructed to watch videos across four conditions which vary by comedian gender (man or woman) and the target of the jokes (men or women). Participants rated their enjoyment of the jokes (presented in a randomized, counterbalanced order). We are analyzing our data using a 2 (comedian gender) x 2 (joke target) x 2 (participants gender) mixed factorial ANOVA, with comedian gender and joke target as within-subjects variables, and participant gender as a between-subjects variable. Consistent with past work, we hypothesize a main effect in which male comedians will be rated more positively than female comedians. We also hypothesize a main effect of joke target, such that jokes making fun of women will be perceived as funnier than those making fun of men. However, we hypothesize that these effects will be qualified by a significant interaction showing that participant gender moderates the degree to which participants enjoy the different combinations of comedian gender and joke targets.

Examining these relationships allows us to further study current stereotypes about women and humor specifically, and also provides an opportunity to examine how humor targeting groups in different ways may impact its perception.

Poster U29 – Brooke Thoendel
Mentor: Peter Longo
Title: *Immigration, a Pathway to Mitigate the Rural Labor Shortage*

Lawmakers, impacted workers, and the business sector have persistently explored Immigration pathways to mitigate the rural labor shortage. There is abundant research that documents the current labor shortage, the immigrant working population, as well as efforts to mitigate labor shortages. The shortage of laborers (documented or not) remains a challenge for the business sector. This paper will: 1) analyze the policies aimed to address the rural labor shortage; 2) evaluate immigration policies that impact the labor force; 3) consider legislation and court cases that mitigate immigration and labor shortages; 4) propose a solution based on laws and sound business practices that will allow for immigration policies that are helpful to the immigrant as well as the business sector.

Poster U30 – Johanna McClure
Mentor: Katherine Moen
Title: *Searching for Strange: Detecting Abnormalities in Radiographic Images*

Visual Search is a basic cognitive psychology task that involves looking for a target among other irrelevant information. Though it is mostly used for studying visual attention, it is also used in everyday life, such as looking for your keys in the morning. Doctors use visual search to look at radiographic images for potential diagnoses for a patient. Because their line of work is extremely important, it is important they know how to search effectively and accurately. Accurate visual search is essential to reduce false diagnoses and improve patient outcomes. We may be able to accelerate doctors' training by understanding the different visual search patterns between experts (doctors) and novices (undergraduate students). Games like "I-spy" or "Where's Waldo?" use similar cognitive processes that a doctor would use when searching in radiographic images. In both types, someone must search through irrelevant tasks to find something specific, whether it be "Waldo" or a lung lesion. The purpose of the current study was to look at search patterns, across a variety of different stimuli and measure participants accuracy in finding anomalies as well as their eye-movements while they searched. Twenty undergraduate participants and seven medical experts searched for abnormalities in natural forest scenes and radiographic images (chest x-rays). Participants were instructed to look for abnormalities and click on the first one they saw. Participants searched through 40 forest scenes (half target present, half target absent) followed by 40 radiographs (half target present, half target absent). Eye-movements were tracked throughout the experiments. Overall, experts were more accurate than undergraduates in radiographic images, participants were 68% accurate whereas the experts were 82% accurate. We also found that experts take longer to complete the trials, but they use the same strategies for both stimulus types. Undergraduates also take longer for x-rays, but they use different strategies than what they used while looking at forest scenes.

Poster U31– Kelsi Woodard
Mentor: Katherine Moen
Co-Author: Katherine Moen
Title: *Is seeing believing? The role of background speech and visualization on eye-witness memory*

Throughout a normal day, an individual is exposed to many different types of sensory information that they may or may not want to experience. Unlike with the other senses, one cannot simply turn off their processing of auditory inputs, and even if an individual attempts to ignore them, these inputs are still subconsciously processed. An individuals' memory performance may also be impacted by their visual imagery ability. Very minimal research has been done regarding the impact of an individual's visualization ability on eyewitness memory. The goal of the current study was to see how extraneous background speech, whether it be consistent or inconsistent with the visual stimuli, and individual visualization abilities influenced eyewitness memory. The current study employed a 2 (background speech type: congruent vs. incongruent) x 2 (delay task: visualization task vs. distractor task) between factors design. At the beginning of the study, participants watched a short point-of-view video of someone going through their day. The video was overlayed with either congruent or incongruent audio descriptions. After the video, participants were either instructed to imagine the content of the video or complete a distractor task. After the delay, participants completed a memory test about items seen during the video. As a result of this study, we hypothesized a main effect of background speech type, such that memory accuracy would be higher for the congruent condition than the incongruent condition. We also hypothesized a main effect of visualization, such that accuracy would be lower when participants are given time to visualize the video's content, compared to the distractor condition. Lastly, we hypothesized an interaction between speech type and visualization condition, such that participants provided with incongruent background speech would recall more incorrect information when given time to visualize it.

Poster U32 – Baden Copsey
Mentor: Chris Waples
Title: *Factors Influencing Quiet Quitting in the Workplace*

In the wake of COVID-19 there has been a notable shift in workplace dynamics, specifically one being "quiet quitting." Quiet quitting is characterized by employees performing only the minimum requirements of their job responsibilities. Research suggests that although the COVID-19 pandemic may have played a role in the rise of quiet quitting behaviors, poor management may be a more significant contributor to employees feeling undervalued and unappreciated, which in turn has led to an increase in quiet quitting behaviors (Zenger & Folkman, 2022). It is essential to understand the underlying factors that contribute to these feelings of undervaluation

and the subsequent decision to perform discretionary behaviors. By examining such factors, we hope to gain a deeper understanding of how organizations can support employee engagement and reduce the likelihood of quiet quitting. Previous empirical studies have shown that employee development (e.g., skills training, leadership training, mentorship/coaching, etc.) plays a crucial role in promoting job satisfaction and feelings of value within an organization (Jehanzeb & Mohanty, 2018). Additionally, research has demonstrated a positive association between work-life balance and employees going above and beyond their job requirements (Chandni & Manjunath, 2020). Low wages have also been linked to a decline in employee satisfaction (Petrescu et al., 2022). Our study seeks to further explore these findings by examining the influence of work-life balance, employee development, and compensation on quiet quitting behaviors. Through this study, we aim to explore the impact of employee engagement factors such as work-life balance, employee development, and compensation on quiet quitting behaviors. Results, implications, and future research directions will be discussed.

Poster U33 – Tiffany Chase
Mentor: Julie Lanz
Title: *Food insecurity and academic performance*

The purpose of this study was to explore whether a relationship exists between food insecurity and academic performance in first-year undergraduate students. When students lack access to enough food to live a healthy and active lifestyle, they report lower grade point averages (GPA) and are less likely to stay enrolled in school (van Worden et al., 2018). Since the pandemic, food insecurity has risen excessively on college campuses, and across the Midwest, where up to 63.3% of students are food insecure (Cuy Castellanos & Holcomb, 2018). In the present study, we conducted a prospective panel design across two time points at a Midwestern university. After IRB approval, data on demographics and food insecurity were collected during the Fall 2022 semester, and data on academic performance were collected from the Registrar's Office after the semester ended. There were 19 participants over the age of 18, and the majority were first-generation students. The average age was 19.4 (SD = 1.5). Most participants were women (n = 11, 57.9%), and 42.1% were men (n = 8). Most participants were White (n = 14), making up 73.7% of the study. The remaining participants were Hispanic or Latino (n = 4, 21.1%), Asian (n = 1, 5.3%), and Black or African American (n = 1, 5.3%). No participants were food secure, 36.8% of participants reported low food security (n = 7) and 63.2% of participants reported very low food security (n = 12). This is consistent with previous literature that suggests that first-generation students are disproportionately affected by food insecurity, which has negative implications for GPA and college retention rates.

Natural & Physical Sciences

Biology

Poster U34 – Nicole Messbarger
Mentor: Julie Shaffer
Co-Authors: Darby Carlson and Julie Shaffer
Title: *DNA Analysis for Determining Disease Prevalence of Ticks in Central Nebraska*

The major native tick species in Nebraska is Dermacentor variabilis, the American Dog tick. This tick is a vector for Spotted Fever Group Rickettsioses, as well as Francisella tularensis, two life threatening bacterial infections. Although this tick does not carry a wide range of diseases, it is a public safety concern for Nebraska citizens due to the high risk of exposure to D. variabilis ticks in the state. The objective of this study was to collect D. variabilis ticks from central Nebraska, along the Long Pine Creek and the Wood River. Three hundred eighty-five adult ticks were collected, and of those 174 were males and 210 were females. The total DNA of adult ticks was then extracted. Currently, multiplex and single plex PCR is being performed on the DNA samples to determine the presence of infectious bacteria in the ticks. This information will help us to better understand the rates of disease prevalence within the population as compared to the ticks along the Platte River.

Poster U35 – Sadie Cooley
Mentor: Nicholas Hobbs
Title: *Effect of androgen receptor on over-mark preference in male mice*

Many terrestrial mammals, including mice, use scent marking to communicate with same- and opposite-sex conspecifics. A specialized form of scent-marking, called over-marking, occurs when one animal places its scent mark over that of a conspecific. This behavior may be used to indicate interest in potential mates or as a form of competition. Upon exposure to an over-mark made from the scent marks of two conspecifics of similar condition, rodents exhibit a preference for the top-scent donor over the bottom-scent donor. Many factors influence this preference for the top-scent donor of an over-mark, including the subject's diet and hormonal status. However, it is unclear what role androgen receptor (AR) plays in organizing and/or activating this behavior. Male mice lacking AR (testicular feminization mice (tfm)) Therefore, the

current study tested the hypothesis that top-scent preference of male mice is affected by AR. Adult wild-type (wt) male and tfm male mice were isolated a week prior to behavioral testing to minimize social influences on their behavior. Subjects were then exposed to a simulated over-mark made from the urine of two wt female mice. Behavioral testing consisted of two separate phases: a 5-min. exposure phase and a 3-min. preference phase. The amount of time subjects investigated each scent mark during the preference phase was recorded to compute a preference score. The results of the current study may provide evidence to the role of AR in how mice respond to over-marks. Over-marks serve as a biologically relevant model of spatial memory.

Poster U36 – Payton Sindelar
Mentor: Surabhi Chandra
Title: *Effect of High Glucose on Spermine Oxidase and Rho Kinase in Triple Negative Breast Cancer Cells*

Chronic diabetes exacerbates several health conditions including cancer. Concomitant diabetes and breast cancer has been associated with high mortality. Our lab has previously shown that polyamine pathway is involved with the proliferation of breast cancer cells, however specific enzymes involved in this pathway have not been fully investigated. Moreover, phytochemicals such as black seed oil (BSO) has been shown to have cytotoxic potential in certain cancers but its role in diabetic breast cancer is not yet explored. The hypothesis of this study was that polyamine pathway enzyme, spermine oxidase and a cytoskeletal enzyme, Rho kinase are downregulated in high glucose conditions in breast cancer cells, and this effect can be prevented using black seed oil. Triple negative breast cancer cells, MDA-MB-231, were used for the study and treated with varying concentrations of glucose. Western blot technique was performed for protein analysis. It was observed that the protein levels of spermine oxidase (SMOX) and rho kinase (ROCK1 and ROCK2) were significantly decreased with high glucose treatments. Since these enzymes are involved with cell structure and function, it is likely that they can affect cell proliferation as well. Experiments in combination with BSO are still ongoing to study its protective role on the expression of these enzymes.

Poster U37 – Alethia Henderson
Mentor: Joseph Dolence
Co-Authors: Sunanda Rajput
Title: *Response of type 2 innate lymphoid cells to peanut is sensitive to sex-specific differences*

An understanding of the mechanism in which peanut (PN) initiates immune responses to generate PN allergy remains limited. Specifically, how sex differences impact the development of PN-specific immune responses is unknown. This study compared male, female, and androgen receptor-deficient Tfm mice exposed to PN, via inhalation, in a 3-day mouse model to investigate how sex differences impacted the response of lung type 2 innate lymphoid cells (ILC2s). After 3-day exposure, lungs were collected and processed with a lung dissociation kit to obtain immune cells from the lungs to further analyze. Cells were stained with antibodies to identify ILC2s by flow cytometry. We found ILC2s were sensitive to sex differences with ILC2s in female PN-exposed lungs having a more abundant response than ILC2s in male PN-exposed lungs. Tfm mice displayed a greater ILC2 response to PN compared to both male and female

wild type mice. We have shown that IL-1α is released by lung epithelial cells following inhalation of PN. Therefore, we wanted to examine whether ILC2s expressed IL-1R1, the receptor for IL-1α, and if these cells were sensitive to hormonal regulation. We discovered that ILC2s, especially KLRG1+ ILC2s, express IL-1R1 in response to PN, indicating ILC2s directly respond to IL-1α released by lung epithelial cells after PN inhalation. Furthermore, Tfm mice showed more severe ILC2 responses. Taken together, this data suggests that sex hormonal differences between males and females influence the initial immune responses to peanut following inhalation of the allergen. The response we observed in the Tfm mice reveals that androgen sex hormones are important in regulating ILC2 responses to PN. Future studies will further elucidate the ILC2 populations to better understand how they are activated against PN with a particular focus for how sex differences impact these responses.

Poster U38 – Wangeci Kariuki
Mentor: Yipeng Sui
Title: *Pregnane X Receptor Links a Plasticizer AlkylsulphonicPhenyl Ester to Dyslipidemia*

Cardiovascular disease (CVD) is still the leading cause of mortality and morbidity worldwide. Recent human studies have implicated a novel link between exposure to endocrine disrupting chemicals (EDCs) and CVD. Pregnane X receptor (PXR), a nuclear receptor that is activated by a variety of dietary steroids and environmental

chemicals, is identified as a xenobiotic sensor that is associated with lipid-dependent metabolism. Our preliminary data in human hepatic HepG2 cells suggested that Alkylsulphonic Phenyl Ester (ASE), a non-phthalate universal plasticizer, could increase the activity of human PXR. ASE has been found in dust particles and soil, and has effects on lipid production, the lipolytic reaction, and fatty acid uptake. It is still unclear how ASE alters the lipid metabolism. In this study we first use cell-based transfection essay to investigate the underlying mechanism how ASE binds and activates PXR in both human hepatic and intestinal cells. We also test how ASE regulates the cholesterol uptake in human LS180 intestinal cells. The quantitative PCR analysis is performed to examine the mRNA expression level of the genes associated with lipid metabolism. Our study could provide a novel insight understanding how exposure to certain EDCs increases CVD risk in humans and elucidate the role of PXR as a mediator of EDC-elicited dyslipidemia for future environmental chemical risk assessment.

Poster U39 – Hannah Moravec
Mentor: Yipeng Sui
Title: *An Organochlorine Pesticide Lindane Activates Atherogenic Pregnane X Receptor*

Endocrine disrupting chemicals, or EDCs, are a group of chemicals commonly found in the environment that can lead to numerous diseases due to their effect on the endocrine system. EDCs are pollutants that can be found in substances such as air particles, water, household products, medications, and plastics. Recent studies have shown EDCs to be associated with cardiovascular disease and its risk factors. The mechanisms as to how these EDCs influence the development of cardiovascular disease are still unknown. Numerous EDCs have been shown to activate a nuclear receptor Pregnane X Receptor (PXR) which regulates the xenobiotic metabolism and is involved in the development of atherosclerosis. Lindane (Gama-Hexachlorocyclohexane) is an organochlorine pesticide (OCP) commonly found in shampoos and topical lotions for the treatment of lice and scabies. Our preliminary data suggests Lindane as a potent PXR agonist. While PXR activation in response to Lindane exposure is observed in both human intestinal and hepatic cells, PXR activation is more potent in intestinal cells than hepatic cells. The cholesterol uptake assay and the mRNA expression of the genes involved in the lipid metabolism are analyzed in human intestinal LS180 cells. This study will provide further insight into the mechanism of Lindane mediated PXR activation and the impact it has on lipid homeostasis.

Poster U40 – Megan TenBensel
Mentor: Bryan Drew
Title: *Effects of Fire in Grazed Grasslands*

In late April of 2022 the Road 702 Wildfire, a stand-replacing event, ravaged an estimated 41,155 acres in Furnas County, Nebraska. The most recent fire of this magnitude occurred an estimated 136 years ago. The intention of this study is to discover how plant species diversity varies among pastures that have historically been grazed to different extents. Specifically, this study compares three different pastures: One pasture has been impacted by both the fire and overgrazing due to cattle, the second was impacted by the fire but was not grazed, and the third pasture, a control, consists of a piece of land that was not impacted by the fire, and has not been grazed for two decades. The variety of sites used in this study allows for a wide diversity of plant species. Using a random sampling collection quadrat method to measure density and diversity within the different pastures, we took a base sample of plant species during the late fall of 2022. Monitoring precipitation levels throughout the summer of 2023, and monitoring plant population fluctuations in these grasslands plots are essential for the practicality of this study. This study will continue for a minimum of four years in order to collect the data necessary to assemble conclusive results regarding the effects of native and invasive plant species in grazed settings that result after a prescribed burn or wildfire. This study will help inform fire prescription management techniques by elucidating plant diversity patterns under the influence of fire and grazing.

Poster U41 – Hilary Vaughn
Mentor: Surabhi Chandra
Title: *Phytochemical Compounds, Gymnemic Acid and Black Seed Oil, as Chemotherapeutics in Triple Negative Breast Cancer*

The biologically active compounds gymnemic acid and thymoquinone have been shown to have various anticancer effects. Gymnemic acid is naturally sourced from the leaves of Gymnema sylvestre. The anticancer properties of gymnemic acid may be due to its influence on carbohydrate binding in cells. Black Seed Oil, the oil extract from the Nigella Sativa plant, is known to contain high levels of thymoquinone, which is a known cytotoxic compound. However, the potential cytotoxicity these compounds have on triple-negative breast cancer cells has yet to be explored. Our hypothesis was that natural compounds such as gymnemic acid and black seed oil show potent toxicity in triple negative breast cancer cells. Cell culture assays were performed to determine cytotoxicity in triple-negative breast cancer cells (MB-231) using PrestoBlue dye.

Varying concentrations of gymnemic acid were tested and no significant cytotoxicity was found. We are currently looking into the cytotoxicity of Black Seed Oil. The long-term goal is to use such natural phytochemical compounds as supplements to treatment of aggressive cancers.

Poster U42 – Cali Gunderson
Mentor: Bryan Drew
Title: *Effect of pollinators and visitors of the mint Blue Sage (Salvia azurea) in Nebraska*

The Blue Sage (Salvia azurea), a central Great Plains native mint species (Family Lamiaceae), plays an important role in Nebraska's ecosystem through its value for native pollinators. Native bees commonly are attracted to the nectar of the abundant flowers of this species. We hypothesized that Salvia azurea is primarily pollinated by bumblebees and simply visited by other pollinators. We documented the pollination patterns of Salvia in Cottonmill Park, Buffalo County, Nebraska. In total, we observed 45 pollinators. From the 45 specimens collected, we documented that 58% of the pollinators were bumblebees, 31% were other bees, and 11% were butterflies. From identified bumblebees, we observed that 64% were American bumblebees (Bombus pensylvanicus) and 36% were common eastern bumblebees (Bombus impatiens deayi). Given that S. azurea is primarily pollinated by native bumblebees, planting and conserving this species across the Great Plains can lead to an increase in bumblebee diversity.

Poster U43 – McKenna Cruikshank
Mentor: Austin Nuxoll
Title: *The Role of slsA in Staphylococcus lugdunensis Biofilm Formation*

S. aureus has been the primary focus of the medical community, regarding staphylococcal related infections. However, there have been new concerns that a related bacterium, S. lugdunensis, is responsible for biofilm-induced infections, similar to those caused by S. aureus and S. epidermidis. Contributing to the pathogenic nature of this organism is its ability to form a biofilm, the culprit behind cases of endocarditis and severe prosthetic joint infections. To identify important factors involved in biofilm formation, S. lugdunensis was treated with ethyl methanesulfonate (EMS) and individual mutagenized cells were isolated through cell sorting. Cells exhibiting both decreased and increased biofilm formation were sequenced and a mutation in the gene coding for a surface protein, slsA was identified in a low biofilm former. A knockout of the slsA gene is currently being conducted to confirm these screening results. Additionally, to confirm that S. lugdunensis forms a protein-mediated biofilm, it was treated with proteinase K. Proteinase K treatment resulted in dispersal, further

suggesting S. lugdunensis forms protein-mediated biofilms and that the slsA gene likely plays a major role in this process. This study helps us to understand the factors involved in biofilm formation in S. lugdunensis.

Poster U44 – Sam Lueders
Mentor: Surabhi Chandra
Title: *Techniques in Molecular Biology Lab for Studying Signaling Pathways in Diabetic Breast Cancer*

For this research experience, laboratory techniques important for future research were learned and practiced. A specific study was not done because of time constraints with first semester URF. The techniques practiced were cell culture, treatment and western blot. Cell culture using established cell lines provides a model to understand human physiology and pathology at molecular level. Triple negative breast cancer cells, MDA-MB-231, were cultured and maintained in this lab. Maintaining the cell line included splitting the cells and changing the media weekly. Treatment of cells with different concentrations of glucose was also learned, which mimics the environment of a breast cancer cell in a diabetic state. Western blot is a technique used to separate proteins by their weight and further identify them using specific primary and secondary antibodies. Protein was extracted from cells after treatment, and equal amounts loaded on electrophoresis gel after protein estimation. Currently, spermine oxidase and Rho kinase are being studied with glucose treatments. These metabolic proteins are of interest because they affect numerous cellular processes. In the future these techniques will be used to perform signaling experiments on diabetic human breast cancer cells.

Poster U45 – Dawson Kosmicki
Mentor: Letty Reichart
Title: *A New Age: Developing a Separate Development Classification*

Plumage characteristics are widely used in the field to identify bird species, and in some cases, a bird's gender and age. While not all bird species' plumage differs between the sexes or over time, some can have dramatic differences. An example of this is the orchard oriole (Icterus spurius), which not only features distinction in plumage between male and female, but also varies in coloration as it ages. This is especially prevalent in males as they mature, and while it is not difficult to distinguish first and second-year males, there is no set of criteria to discern third-year males. Our goal is to develop a set of criteria that would allow us to create an age classification of third-year male orchard orioles for use in field studies. Thus far, we have compiled data

in the form of images taken from previous oriole trapping sessions and intend to analyze these photographs to determine patterns in known third-year males. Once patterns have been identified and more samples are collected, we will be able to provide a new classification method to accurately identify third-year males.

Poster U46 – Naara Ramirez
Mentor: Letty Reichart
Title: *Molecular Sex Determination of Confusing Baltimore Orioles*

Before scientific advancements a few decades ago, only karyotyping and phenotypic traits were used to determine the sex of birds. However, these traits are not reliable or efficient for all bird species of different age classes. Some bird species exhibit sexual dimorphism, where males and females have different phenotypic traits, like plumage patterns. Adult Baltimore Orioles, three years of age or older, typically show distinguishable plumage differences. However, Baltimore Orioles as young males (2-year-olds) are nearly indistinguishable from older females (>3-year-olds) in terms of plumage color and patterns. To determine the sex of these physically confusing birds, we use molecular techniques to amplify regions of the sex determination gene (CHD gene). We collected blood samples from Baltimore Orioles trapped May-June, between 2016-2019. We extract DNA and use PCR to amplify the CHD gene, that determines sex in birds. Gel electrophoresis is then used to visualize the results. This molecular method will allow us to identify the genetic sex of physically confusing birds. Once we determine molecular sex for these individuals, we will conduct photographic analysis of the physically confusing birds. Photographic analysis will allow us to identify new distinguishing plumage traits to accurately determine sex of birds without having to use molecular techniques.

Poster U47 – Logan Grose
Mentor: Keith Geluso
Co-Authors: Keith Geluso, Carter Kruse
Title: *Sex Ratio Patterns in Maternity Colonies of Brazilian Free-Tailed Bats (TADARIDA BRASILIENSIS) in the Southern United States*

Brazilian Free-tailed Bats (Tadarida brasiliensis) roost in large maternity colonies across the southern United States. Some “maternity colonies” contain a significant number of adult males. Herein, we examined patterns of adult sex ratios across the United States via a literature review and examined demographics at the northernmost maternity colony in the Great Plains. Our literature review showed significantly greater percentages of females in maternity colonies in caves of the Great Plains, whereas arid regions of the Southwest tended to have more males in colonies. Non-migratory

populations in California and southeastern United States had smaller colonies in buildings and bridges, generally segregated by sex but less so than in the Great Plains. In Merrihew Cave of north-central Oklahoma, the cavernous colony consisted of about 90% adult females and 10% adult males in June and August 2022. Of adult females in June, 98% were reproductively active. In August, 32% of individuals were flying young which their exodus peaked during the middle of the outflight. Large percentages of adult females in migratory populations of the Great Plains likely reflect greater available food resources for high energetic demands of reproduction and warmer cave temperatures that allow young to develop quickly. Males from migratory populations likely occur in greater frequencies in the Southwest due to lower energetic requirements and to escape intraspecific competition with females. For non-migratory populations in California and the southeastern United States, warmer, wetter climates combined with greater available food resources might reduce the need for large, highly segregated maternity colonies. Establishing baselines of colony demographics across the distribution will aid in prioritizing conservation sites if T. *brasiliensis* becomes a species of concern because bats continue to face threats in the United States.

Poster U48 – Ran Hirosawa
Mentor: Letty Reichart
Title: *Non-breeding behavior of Western Meadowlarks in a Nebraska Grassland*

Grassland bird species have experienced significant population declines in North America and these declines are likely due to multiple extrinsic and intrinsic interacting factors. A common grassland bird species in south-central Nebraska is the Western Meadowlark. This species is a common breeding species within Nebraska grasslands and often spends the winter in Nebraska. Although the breeding behavior in Western Meadowlarks is well-known, little is known about their behavior during the non-breeding season. My research will observe and document behaviors of non-breeding Western Meadowlarks within Nebraska grasslands. My first field season will begin in Fall 2023. We expect Western Meadowlarks to be common within our study sites and we expect to observe a variety of behaviors for birds, which may include mixed species assemblages.

Poster U49 – Zane Carlson
Mentor: Joseph Dolence
Title: *Development of vaping peanut allergy mouse models*

Vaping has become very popular in recent years. However, the health effects of vaping remain unclear, especially how it impacts the immune responses that originate in the lung. Our lab has shown that peanut (PN) allergy can be induced via inhalation in mice

and recent data suggests this likely happens in humans as well. In this study, we develop in vivo model systems to ask whether vaping can influence the ability of the immune system to mount allergic immune responses against PN following allergen inhalation. First, we show that mice exposed to PN sensitization solution containing 0 mg/mL nicotine showed mild decreases in PN-specific IgE, while if the PN solution contained 3 mg/mL nicotine severe decreases in PN-specific IgE were observed. This data suggests that either the vape juice or the nicotine (or both) negatively impacts the ability of the immune system to respond to mount allergic reactions. To further examine, we developed an electronic conditioned media (ECM) approach to expose mice. This approach, first developed to test the impact of vaping using lung cell lines, allowed us to bubble vapor into the media we use to resuspend PN to expose the mice and ask whether the vapor itself alters immune response to PN. Preliminary data suggested mice exposed to 3 mg/mL nicotine ECM displayed lower PN-specific IgE. Future studies will sensitize mice to PN in the presence of higher levels of nicotine ECM (e.g., 12 mg/mL) to examine whether this drives greater suppression of IgE. Furthermore, we are planning to examine whether exposure to vape juice influences the cellular allergic immune response to PN. Taken together, this data suggests that exposure to either vape juice, ECM, or the nicotine found within each during sensitization to PN might decrease the severity of the PN-IgE reaction and the allergic response to PN.

Poster U50 – Kenan Brodd

Mentor: Austin Nuxoll

Title: *Staphylococcus aureus Persister Cells Exhibit Higher Tolerance to Innate Immune Components*

Staphylococcus aureus is a pathogenic bacterium capable of causing serious infection in humans, like skin lesions, endocarditis, and sepsis. Difficulty treating infections may be due to the presence of persister cells. Persister cells are defined by surviving antibiotic treatment, however, it is unclear whether they have a fitness advantage to other stressors. Specifically, survival to innate immunity remains largely unexplored. Previous experiments show that a fumC (fumarase C, a tricarboxylic acid cycle gene) knockout exhibits increased survival to antimicrobial peptides. These experiments prompted further investigation of persister survival to other components of innate immunity such as reactive oxygen (ROS) and nitrogen (RNS) species. S. aureus strains of wild type HG003 and fumC::N∑ were grown to mid-exponential phase, challenged with paraquat (induces ROS) and NaNO2 (induces RNS), and survival was measured over 72 hours. Based on the finding that the fumC::N∑ strain had increased survival in the presence of ROS and RNS, survival within a macrophage was examined. RAW264.7 macrophages were infected with HG003 and fumC::N∑ (multiplicity of infection of 10) and bacterial survival was measured over 48 hours. The

fumC::N∑ strain exhibited increased survival suggesting persisters may provide a survival advantage to components of innate immunity in addition to antibiotics.

Poster U51 – Sunayn Cheku
Mentor: Kim Carlson
Title: *Investigating the Role for Diacylglycerol in Heat Tolerance in Drosophila melanogaster*

Evidence from previous research suggests that heat tolerance and exposure to heat stress is associated with increases in diacylglycerol (DAG). This project explored the relationship between DAG and heat tolerance, in an attempt to determine if a causative role for DAG in heat tolerance exists. Flies receive either a DAG/PEG solid dispersion suspension or a PEG control dispersion mixed with instant media. At varying time points after exposure, flies were assessed for increased thermotolerance at varying temperatures between 39°C and 40.5°C. Time to knockdown (TKD) was scored for individual flies, and post-heat stress survival analyzed. TKD was hypothesized to significantly differ between flies treated with DAG and controls receiving no treatment, with DAG treated flies taking longer to be knocked by the heat stressor. Treated flies were also hypothesized to have significantly better odds for survival following heat shock. Current results indicate no consistent significant trends. However, DAG does appear to be involved in some capacity. Twenty-four hours after exposure to DAG, male treatment flies show significantly higher heat tolerance in some trails, but this result is inconsistent. Six hours after exposure to DAG, female treatment flies had significantly lower heat tolerance than female controls in terms of time to paralysis at 40.5°C. Due to the inconsistent results, at this time it is not conclusive whether DAG has an effect or not on heat tolerance. Nevertheless, the investigation of DAG in heat tolerance is one of significant interest considering previous lipidomic studies within the context of thermal regulation. Thermal tolerance in Drosophila and other ectotherms has become increasingly relevant given the expected increase in global temperatures in the near future as a result of climate change. The project described was supported by grants from the National Institute for General Medical Science (GM103427 & 1U54GM115458).

Poster U52– Jonathan Schardt
Mentor: Dawn Simon
Title: *Diversity of Veillonella Bacteria in Oral Microbiome*

Within the human oral microbiome, the bacteria Veillonella has been found to be associated with poor oral health in children, therefore leading to questions about whether Veillonella is detrimental to oral health in young adults. This study is part of a

larger one examining this question. There are six species of Veillonella commonly found in the oral microbiome, but we believe there may be more. In work being done concurrently we have discovered there are bacteria that grow on Veillonella-specific media, but based on PCR do not appear to be one of the six known species. This project is using a general 16S primer set in PCR to identify these unknown bacterial colonies.

Poster U53 – Mackenzie Smith
Mentor: Letty Reichart
Title: *Species Richness and Species Abundance of cavity Nesting Species in an Agricultural Landscape*

Agricultural practices have shifted from small-cultivated fields to expansive monocultures that eliminate hedgerows, windbreaks, and grassy borders. Such areas serve as habitat for nesting birds. Dryland and irrigated row-crop production is common in central Nebraska, where woodland exists within habitat fragments on agricultural landscapes. Woodland cover significantly determines bird species richness at both farm and landscape levels. Some species also are more likely associated with human structures commonly present on agricultural landscapes. In this study we will estimate species richness and abundance for cavity nesting birds in small habitat fragments of agricultural land in south-central Nebraska. We will use species point-count plots to detect cavity nesting species within the avian community. To date, we observed the following cavity nesting species: Downy Woodpecker, European Starling, Hairy Woodpecker, Northern Flicker, Red-bellied Woodpecker, House Sparrow, and White-breasted Nuthatch. Additionally, we predict to observe Eastern Screech Owls, Eastern Bluebirds, Tree Swallows, Red-headed Woodpeckers, and House Wrens with additional surveys. We hypothesize that House Sparrows and European Starlings will be the most abundant cavity nesting species within this agricultural landscape, as these species are most abundant in areas where human structures are present. Following identification of cavity nesting species in this area, we will conduct future studies on reproduction and behavior of common cavity nesting species. Conservation implications for this study include the decline of historically present cavity nesting species, and the increase of invasive species, possibly due to habitat fragmentation.

Poster U54 – Mariam Garcia Escobar
Mentor: Austin Nuxoll
Title: *Characterizing High Persister Phenotypes in Staphylococcus epidermidis Clinical Isolates*

Staphylococcus epidermidis is an opportunistic pathogen that typically resides within our normal skin flora. *S. epidermidis* causes disease in immunocompromised individuals, often mediated through indwelling medical devices. Antibiotic treatment of these infections is often unsuccessful, leading to chronic, relapsing infections with poor patient prognosis. A possible explanation for these observations is the presence of persister cells (a subpopulation of dormant cells). High persister isolates have been observed in other microbial pathogens such as *Pseudomonas aeruginosa* and *Candida albicans.* Recent work in the related pathogen, S. aureus, demonstrates persister formation is dependent on energy depletion through the tricarboxylic acid (TCA) cycle. Therefore, we hypothesized high persister isolates occur in S. epidermidis clinical isolates through an energy-dependent mechanism. To observe the possibility of a correlation between high persister formation and a dysfunctional TCA cycle, extracellular acetate was measured in high and low persister clinical isolates. Acetate concentrations are linked to a functional TCA cycle, as disruption or lower activity leads to an accumulation of acetate in the medium. Preliminary data collected has demonstrated the seemingly correlational relationship between a dysfunctional TCA cycle and increased persister formation. A total of 17 isolates have been screened to identify high and low persister forming strains. Of the 17 isolates screened, seven correlated with high extracellular acetate concentrations and exhibited high antibiotic tolerance, and four of them exhibited low antibiotic tolerance.

Poster U55 – Carlos Hernandez
Mentor: Alexis Hobbs
Co-Authors: Alexis Hobbs, Joseph Dolence, Addie Buhlke, Kim Carlson
Title: *Development of a Model for Peanut Allergy in Drosophila melanogaster*

The use of Drosophila melanogaster for the study of peanut allergies is not common, although it is effective, and budget friendly. D. melanogaster has been shown useful for human studies due to their similar genome. The objective of this study was to determine if the immune regulated genes within the D. melanogaster genome were affected by the exposure of 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, water being the control. Every 72 hours the dead flies were collected, and food was replaced. qRT-PCR was performed on 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

the Toll pathway is potentially involved in allergic reaction, as well as the Immune Deficient pathway. This means that D. melanogaster provokes an immune response to peanut and can potentially be used as a model for peanut allergy in the future. The project described was supported by grants from the National Institute for General Medical Science (GM103427 & 1U54GM115458).

Poster U56 – Madison Cervera
Mentor: Janet Steele
Title*: Stress response caused by playing competitive video games via salivary cortisol levels*

Cortisol is a steroid hormone secreted by the adrenal cortex, the outer part of endocrine glands above each kidney. Cortisol, the "stress hormone," has several physiological functions, with the largest role to maintain homeostasis. A measure of cortisol represents the physiological stress a person is experiencing physically, allowing salivary cortisol levels a sufficient model when investigating relationships between an acute stress response and external variables. We hypothesized that playing a competitive video game will act as an acute stressor, causing a significant rise in salivary cortisol. To test this hypothesis, we recruited 18 adult subjects to play Mario Kart on the Nintendo gaming system and obtained a saliva sample before and after play. We predicted the average post-play cortisol levels would be greater than the pre-play cortisol levels. The post-play average was higher, but the difference was not significant (0.279 + 0.015 mg/dl pre-play versus 0.306 + 0.030 mg/dl post-play). This study aimed to address the impact of ordinary activities on the stress response. IRB #091322.

Poster U57 – Austie Kreikemeier
Mentor: Gregory Pec
Title: *Corn productivity does not decline in soils invaded by redroot pigweed*

As global population growth is projected to reach nine billion within the next fifty years, an increased demand on agricultural yield will be required, though this will come with extensive environmental pressures. Current agricultural practices that are represented by monocultures and excessive chemical input into soils are leading to increased land degradation, disease outbreaks and invasive species outbreaks on the landscape. Of these, the latter poses substantial problems for sustainable agriculture. In particular, redroot pigweed (Amaranthus retroflexus), a native invader in North America, is among the most aggressive species that competes with agricultural crops, such as corn (Zea mays). Redroot pigweed is known for its prolific seed production, herbicide resistance, allelopathic effects, and ability to harbor a distinct and diverse soil microbiota, including soil-borne pathogens and saprotrophs. Thus, changes in the soil microbiota induced by

different plant species, such as redroot pigweed, may influence the performance of heterospecific plants such as corn in a negative manner, thereby generating plant-soil feedback (PSF). In agroecosystems, a negative PSF due to an accumulation of soil-borne pathogens may often result in yield decline in continuous monocrop systems. Here, we used field soils as inoculum, from a continuous (>50 yrs) corn monoculture that has recently been invaded by redroot pigweed, in a growth chamber study to systematically investigate PSF by linking the soil microbiome with crop performance. Overall, corn grew similar in soils conditioned by redroot pigweed and in its native field soils. However, there was a trend toward a higher root-to-shoot ratio when grown in soils conditioned by redroot pigweed, potentially indicating a weak beneficial invasion legacy effect on corn rooting systems. Our results demonstrate a non-mediated soil microbiome effect on PSF in corn productivity.

Poster U58– Conner Brown
Mentor: Yipeng Sui
Co-Authors: Jason Walton, Yipeng Sui
Title: *The Effects of Cannabidiol on Dyslipidemia Mediated by Pregnane X Receptor*

Cannabidiol (CBD) is a chemical commonly used in treating pain, anxiety, inflammation, and insomnia. While it is implied that CBD is associated with cholesterol homeostasis, it remains unclear how chronic exposure to CBD influences human lipid metabolism. Our preliminary data suggest that CBD is an agonist for human Pregnane X Receptor (PXR), a xenobiotic nuclear receptor, which is established to play a role in atherosclerosis and hyperlipidemia. In this study, we use both human hepatic and intestinal cells to investigate the mechanisms by which CBD activates PXR via cell-based transfection assays. The human intestinal LS180 cells are utilized to study whether CBD alters cholesterol uptake mediated by PXR. The mRNA expression of the genes involved in cholesterol metabolism is analyzed by real-time quantitative PCR. 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 U59 – Joe Paysen
Mentor: Keith Geluso
Co-Authors: Keith Geluso, Carter Kruse
Title: *Foraging behaviors and observations of watersnakes (Nerodia) and gartersnakes (Thamnophis) at a drying pond in southern Kansas*

Watersnakes (Nerodia) fill many aquatic niches across most of the eastern United States and use various feeding methods. Three of the most common methods include active pursuit, tail anchoring, and encirclement. At night, some of these behaviors include tactile, open-mouth feeding to substitute for visual cues. Herein we describe

two new feeding behaviors of the Plain-bellied Watersnake (Nerodia erythrogaster). We also describe other observations of snakes feeding at a drying pond in Kansas. On 12 August 2022, N. erythrogaster was observed feeding on the surface of the water with mouth open at night, whereas previously multiple species of watersnakes foraged open-mouthed only underwater. On 24 September 2022, N. erythrogaster foraged with a new technique by forming a half-circle loop behind the head while actively swimming underwater. Previously, watersnakes have been noted to completely encircle prey underwater. These behaviors and the switch in behaviors may be explained by an increase in fish density as the overall pond volume decreased from August to September. We also documented three species of snakes N. erythrogaster, N. rhombifera (Diamond-backed Watersnake), and Thamnophis proximus (Western Ribbonsnake) eating the Gambusia affinis (Western Mosquitofish) at this pond. These are the first records of these snakes eating mosquitofish in Kansas. These data increase our understanding of foraging behavior of snakes in the Great Plains.

Poster U60 – Dana Dubas
Mentor: Joseph Dolence
Title: *Examining sex-specific differences in the ability of neutrophils and dendritic cells to mount responses following inhalation of peanut*

Knowledge of how innate immune cells respond to peanut (PN) to elicit PN allergy remains unclear. Even more uncertain is how sex differences impact the ability of these cells to respond to PN. This study compared male and female mice exposed to PN via inhalation in 3-day mouse models to elucidate how sex differences impacted the response of neutrophils and dendritic cells (DCs) to PN. We found that DCs, but not neutrophils, responded to PN. We further studied DCs by examining different CD11c+ subsets, specifically focused on CD103+ CD11b- (cDC1s) and CD11b+ CD103- (cDC2s). These two DCs have been shown to capture PN following inhalation in mice. cDC1s, and to a lesser extent cDC2s, were reduced in the PN-exposed male mice in comparison to female counterparts. These results strongly suggest that while neutrophils do not respond to PN following inhalation, cDC1s and cDC2s react following exposure to PN. We have shown that IL-1α is released by lung epithelial cells following inhalation of PN. Therefore, we wanted to elucidate whether cDCs expressed IL-1R1, the receptor for IL-1α. We found that both cDC populations express IL-1R1 in response to PN, suggesting cDCs directly respond to IL-1α released by lung epithelial cells after PN inhalation. Of note, IL-1R1+ cDC2s appear to be more abundant in female verses male mice. Collectively, the data suggests DCs play an important role in response to PN, likely activated by IL-1α. Additionally, male sex hormones, namely testosterone, regulates PN-specific immune responses by inhibiting the ability of DCs to mount initial response to PN. Future studies will further examine the DC populations to better understand how they are activated against PN with a particular focus for how sex differences impact these responses.

Poster U61 – Michaela Bartels
Mentor: Nicholas Hobbs
Co-Authors: Marissa Baker, Nicholas Hobbs
Title: *Effects of Anxiety-like Behavior Associated with Food Availability on c-fos Expression in Brains of Mice*

Food insecurity is prevalent throughout the world, including the United States. Individuals experiencing food insecurity often have increased anxiety rates compared to those with available food sources. Anxiety is the most common type of mental disorder across the world, with many negative effects. Diagnosis of anxiety varies with sex and age, suggesting that gonadal hormones play a role in anxiety development. This topic was investigated with juvenile and adult wildtype (wt) female, wt male, and male mice lacking a functional androgen receptor (i.e., testicular feminization mutant (tfm)). Mice were provided continuous access to food or were food deprived for 24 hours prior to behavioral analysis using an elevated plus maze. One hour later, brain tissue was collected and later sectioned for analysis. Immunohistochemistry techniques were used to label c-fos, allowing visualization of neuronal activation in response to anxiety-like behavior. We expect to see increased c-fos expression in brain regions associated with anxiety-like behaviors, such as the amygdala and hypothalamus. C-fos positive cells will be counted and analyzed to see whether a significant difference exists in expression within anxiety-related brain regions between treatments. Results may provide evidence for determining specific brain regions involved in anxiety associated with food availability. Such findings could lead to more effective treatment options for anxiety and stress.

Poster U62 - Paiton Hancock
Mentor: Dawn Simon
Title: *Correlation of Veillonella Bacteria with Oral Health*

Veillonella is a common bacteria found within the oral microbiome, particularly in association with dental caries in children. Thus, the presence of Veillonella may be indicative of an individuals' overall oral health. In this study, we aim to understand the prevalence of *Veillonella* in healthy college-aged individuals and determine if there is a correlation between prevalence and self-reported oral health. Previous studies have been conducted in a different demographic, primarily younger children in other countries. We are using one-step PCR to identify species of *Veillonella* within the oral microbiome from tongue biofilm samples. Thus far we have examined 15 participants. Preliminary results suggest the presence of multiple Veillonella species. Based on previously published results, we hypothesize that there will be an increased likelihood of V. *parvula, V.denticariosi, and V.tobetsuensis* bacteria in individuals with lower oral

health compared to those with good oral health. If a correlation does exist, it may suggest a biological indicator of oral health. The oral microbiome composition, including Veillonella can change in the presence of other diseases, such as GERD. Thus, better understanding *Veillonella's* prevalence in the oral microbiome may have consequences beyond oral health.

Poster U63 – Marissa Baker
Mentor: Nicholas Hobbs
Title: *Effect of Food Availability on Anxiety-like Behavior in Mice*

Anxiety disorders are the largest group of mental disorders in the United States, estimated to affect 40 million adults. Women are more than twice as likely than men to develop anxiety disorders. This discrepancy between men and women suggests androgens, such as testosterone, play a role in stress response and modulating anxiety. Hormone levels may fluctuate due to numerous factors, such as diet quantity and quality, extreme stress, thyroid disorders, or natural cycles. Out of these, diet is the easiest to alter. Our study looked to determine the effect of food availability on anxiety-like behavior in mice. Adult wild type (wt) male mice, wt female mice, and testicular feminization mutant (tfm) mice, which possess a dysfunctional androgen receptor (AR), were either fed ad libitum (AL) or food-deprived for 24 hours (24FD) prior to being tested for anxiety-like behavior using an elevated plus maze (EPM). Wt females deprived of food for 24-hours exhibited higher levels of anxiety-like behavior relative to their fed ad libitum cohorts, and tfm mice demonstrated high levels of anxiety-like behavior consistently across both treatments. Wt males demonstrated the greatest variation in their response to food availability, with a trend of generally lower levels of anxiety-like behavior than other genotypes. Our findings suggest androgens play a role in decreasing anxiety-like behaviors in mice associated with food availability.

Poster U64 – Travis Woodcock
Mentor: Gregory Pec
Co-Author: Marjorie Garcia-Kerboul
Title: *Urbanization Pressures Alter Soil Microbiomes*

Urban ecosystems are expanding globally and assessing the ecological consequences of urbanization is critical to understanding changes related to land use. In urban ecosystems, the use of fertilizers, supplemental irrigation, and mowing can alter many aspects of the soil environment, including changes in the composition and diversity of soil fungi. Fungi play vital roles as nutrient recyclers, decomposers and plant symbionts. More recently, fungi have also been increasingly recognized as important in the context of public health, having a direct effect on human health as pathogenic

microorganisms. Common soil fungi, such as Alternaria, Bipolaris, and Cryptococcus, are human allergens and can elicit immune responses, impacting asthma, diabetes and other chronic diseases. Current knowledge of urban ecosystem ecology and feedbacks between urbanization and other components of global change lags behind our understanding of naturally managed and agricultural ecosystems. Toward this goal, we investigated how urban lawns influence soil fungal composition and diversity. Importantly, we compared changes in soil fungal communities in urban lawns to that of never-plowed remnant wet prairies as well as current agricultural areas in continuous corn-soybean rotation. We assessed fungal diversity and community composition by sequencing the ITS region of rDNA using long-read high-throughput nanopore sequencing technology. Three main findings emerged: (1) there were composition shifts in soil fungal communities across the different landscapes; (2) shifts in fungal richness and guild relative abundance were associated with increased urbanization; and (3) there were increases in known human allergens Alternaria and Bipolaris within urban lawns compared to agricultural and remnant wet prairie soils. Taken together, our results are consistent with other studies suggesting that shifts in the relative abundance of fungal symbionts, saprotrophs, and pathogens are related to land-use changes.

Poster U65 – Macy Hill
Mentor: Paul Twigg
Title: *Microbiome effects in a Zea mays-Panicum virgatum L. rotation with differing nitrogen fertilization*

Plots of Panicum virgatum L. for bioenergy production have been cultivated at the Eastern Nebraska Research and Extension Center (ENREC) since 1998. Some plots have been rotated with Zea mays and have varying nitrogen application regimes. Our project characterized and compared the soil microbiome of these plots through soil core samples (0-10 cm, 10-30 cm, and 30-60 cm). Microbial DNA was isolated from each sample and Illumina 16S sequencing was completed at the University of Minnesota Genomics Center. Results showed qualitative differences in bacterial family populations between rotated and non-rotated plots and in lysis methods for DNA extraction. Nitrogen fertilization impacts crop yield, which is a small puzzle piece of a much larger agricultural question.

Chemistry

Poster U66 – Trevor Dvorak
Mentor: Haishi Cao
Title: *Synthesis Fluorescence Sensor for the Detection of Hydrogen Sulfide*

Hydrogen Sulfide (H2S) is a colorless gas molecule that contains an overpowering, rotten-egg odor (National Center for Biotechnology Information, 2021). H2S in the human body is a gasotransmitter that is responsible for protecting neurons in the Central Nervous System from oxidative stress (Panthi, 2016). It will slow the uptake of oxygen and reduce the oxidative effects that neurons typically endure. There are several neurodegenerative diseases in that H2S could be a viable therapeutic agent; one, in specific, is Parkinson's disease. With the introduction of H2S, it is theorized that H2S would reduce much of the oxidative stress and neuron damage (Rumbeiha et al., 2016). This research group is working towards making a hydrogen sulfide donating molecule through a multi-step organic synthesis. The research group will exchange substituent groups on the hydrogen sulfide donating molecule and observe any fluorescent changes and properties that may be altered. Fluorescent changes will correlate to the release of Hydrogen Sulfide when exposed to a specific wavelength. This molecule will then undergo testing to find the fluorescent properties it contains to track the reaction as it releases Hydrogen Sulfide. Another aspect of our research is to look at the interaction of our molecule with other cellular molecules and see if there is any change that occurs via fluorescence tracking.

Poster U67– Ashley Maharjan
Mentor: Mahesh Pattabiraman
Co-Author: Poonam Puntambekar, Mahesh Pattabiraman
Title: *Supramolecular influence of Reactivity of ozone with Cinnamic Acids*

Cinnamic acids are derivatives of 3-phenyl acrylic acids, which are often encountered in many natural compounds. We initiated a project to study the effect of ozone on chemical stability of cinnamic acids and intend to further study the influence of macrocyclic hosts such as cyclodextrin and cucurbituril on the reaction characteristics. It has been reported that cinnamic acids are oxidized by ozone to yield an aromatic aldehyde and ethanoic acid byproduct. However, knowledge of ozone's reactivity towards electronically diverse substitution on the aromatic ring has not been explored thus far, and the influence of supramolecular interactions from host molecules have not been explored as well. In our project we designed an experimental approach that utilizes a commercially available ozone generator to produce ozone in reaction medium to oxidize a series of dissolved cinnamic acids and monitor their relative reaction rates using GC-MS and NMR spectroscopy. At concentrations near 10 mM, a saturated solution of ozone quantitatively reacts with cinnamic acids in less than 60 mins. We are

currently evaluating the presence of any trends in electronic activity of substituents in the aromatic ring and its effect on reactivity with ozone.

Poster U68 – Charlie Polen
Mentor: Kristy Kounovsky-Shafer
Co-Author: Thi Huynh
Title: *Developing an Insert to Protect Large DNA Molecules During Cell Lysis*

To study and analyze genomic variations, large DNA molecules are necessary to be able to span the variations to make assembly easier. One issue that arises is the instability of large DNA molecules and the likelihood of breakage, especially during cell lysis. To combat this, an inverted agarose insert was created using 3D printed devices. A normal insert has the cells mixed with agarose, then the cells are lysed with DNA embedded in the agarose matrix. The inverted agarose insert has the cell solution in the middle of the insert and the agarose on the outside. Multiple concentrations of low melting point agarose were tested to determine the best percentage of agarose to create the inverted insert. The agarose needs to be concentrated enough to allow for easy handling. The center part of the inverted insert was used to hold the cell solution, while the agarose walls surrounding the middle were used to protect and aid in the long-term storage of the solution. The cells were lysed, and the solution inside the inverted insert was tested to determine the amount of remaining DNA and its integrity.

Poster U69 – Nolan Gleason
Mentor: Haishi Cao
Title: *Synthesis of Fluorescent Hydrogen Sulfide Donating Molecule*

To address our long-term goal of understanding the antioxidant role of H2S and it possible therapeutic efficacy in treating neurodegenerative disease. We propose to synthesize a family of cell-permeable fluorescence sensors that will permit the sensitive measurement of intracellular [H2S]. Using these reagents, we propose to unravel the mechanism of action by directly measuring how [H2S] affects central regulators of cellular redox status, such as the abundance of reduced (GSH) and oxidized (GSSG) in PC12 cells, which are commonly used to investigate neuronal functions. Proposed fluorescence sensors will be prepared through a multi-step organic synthesis using dyes with near-IR emission signals that will facilitate the detection of H2S in living PC12 cells. Three specific aims are proposed, which involve i) the synthesis of cell-permeable sensors selective for H2S, ii) direct measurements of permeability coefficients and pharmacokinetics for [H2S] in living cells, and iii) the possible influence of cellular H2S levels on cellular redox (i.e., [GSH]/[GSSH]. For the sensor design, we propose to use a novel H2S-triggered nitro-amino reduction reaction that will be built around a cyanine 7 (Cy7) dye scaffold, which is proposed to provide a

“Off-ON” fluorescence signal in near-IR region in response to H2S binding. The in vivo sensing ability of sensors will be examined through both changes in fluorescence intensities using both PC12 rat neuronal cells and U937 monocytic cells. Finally, the relationship between H2S and cellular redox levels (i.e., [GSH]/[GSSG]) will be investigated by combining fluorescence imaging of H2S sensors with standard molecular biology measurements of the concentration of reduced (GSH) and oxidized (GSSG) glutathione, activity changes of GSSG reductase, and □-GCS mRNA levels; the latter measurements will be made using commercially available assay kits and real-time PCR). The accomplishment of the proposed project will provide a mechanistic understanding of anti-oxidation effects exerted by H2S in neuronal-like cells and the therapeutic value of H2S as a treatment for neurodegenerative disease.

- What knowledge/skills do you hope to gain from this experience?

  Lab safety, synthetic skills, research presentation skills.

- What is the importance of this project to the student?

In this project, we are focusing on synthesizing a light triggered H2S releasing agent that is cell permeable and will raise the overall intracellular concentration of H2S. Patients with neurodegenerative diseases such as Parkinson disease, Alzheimer disease and Down’s syndrome have shown to have lower levels of intracellular H2S which result in neuronal damage cause by stress from cellular oxidation to proteins. With this information we hypothesize a H2S releasing agent, that keeps the levels of H2S at 30 mM -100 mM to stay below a toxic level, can have a therapeutic effect. H2S works as a reducing reagent by exerting an anti-oxidation function inside the cell which could combat neurodegenerative diseases listed above. We expect that the proposed H2S releasing agent will provide a new approach to treat disease related to neuron damage.

Poster U70 – Madeline Riesberg
Mentor: Haishi Cao
Title: *Synthesis of Fluorescent Hydrogen Sulfide Donating Molecule*

Hydrogen sulfide, a cytotoxic gas, could potentially act as a cellular redox modulator. In small amounts, it has the ability to control oxidative effects of cells. There is a correlation between hydrogen sulfide and certain neurodegenerative diseases, such as Alzheimer’s disease. Hydrogen sulfide acts as a modulator that can balance the oxidation that is happening to neuron cells in individuals with neurodegenerative diseases. On the opposite side of the spectrum, in large amounts, hydrogen sulfide is capable of killing cells, such as cancer cells. The purpose of our project is to use a multi-step reaction to synthesize an organic compound that will release hydrogen sulfide when exposed to a specific wavelength of light. Because of the fluorescent

properties of the molecule, we will be able to not only release hydrogen sulfide, but also detect the amount that is being released. This will give us the ability to control the effects of the molecule more specifically by controlling exactly how much hydrogen sulfide is being released. Last semester, we were focused on the reaction itself and ensuring that our molecule was correctly synthesized. Using tools such as NMR spectroscopy, we made sure the structure was correct. This semester, now that we know we have the correct molecule, we are working more on testing the properties of the molecule to make sure that it will do what we intend it to do. The main ways we are testing the properties of the molecule are using spectroscopy and fluorimeter.

Poster U71 – Zach Pettit
Mentor: Hector Palencia
Co-Author: Tobias Kraft
Title: *Silver Based Antimicrobial Compounds*

The use of silver compounds as antibiotics has been gaining attention as an alternative to traditional antibiotics due to increasing antibiotic resistance. Silver compounds can effectively inhibit the growth of a broad range of microorganisms, including bacteria, fungi, and viruses.

Silver-based antibiotics have been used in a variety of applications, including wound dressings, medical implants, and water purification systems. They have also been effective in treating infections caused by multidrug-resistant bacteria, such as methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococcus (VRE).

Silver can be used in various forms such as nanoparticles and organometallic complexes. Silver nanoparticles have gained significant interest because they can penetrate the bacterial cell wall, disrupt cellular processes, and induce oxidative stress, leading to bacterial death.

Additionally, silver compounds can also inhibit biofilm formation, which is a significant factor in the persistence of bacterial infections. Silver's mechanism of action is different from traditional antibiotics, making it an attractive option for combating multidrug-resistant bacteria.

In conclusion, silver compounds show promising potential as an alternative to traditional antibiotics, particularly in the face of increasing antibiotic resistance. However, further research is needed to fully understand their mechanism of action and potential toxicity, and to optimize their use as antimicrobial agents.

Poster U72 – Thi Huynh
Mentor: Kristy Kounovsky-Shafer
Title: *Concentration of lambda concatemers using a 3D printed device*

Identifying significant variations in genomes can be cumbersome, as the variations span a multitude of base pairs and can make genome assembly difficult. However, large DNA molecules that span the variation aid in assembly. Due to the DNA molecule's large size, routine molecular biology techniques can break DNA. Therefore, a method is required to concentrate large DNA. A bis-acrylamide roadblock was cured in a proof-of-principle 3D printed device to concentrate DNA at the interface between the roadblock and solution. Lambda concatemer DNA was stained with YOYO-1 and loaded into the 3D printed device. A dynamic range of voltages and acrylamide concentrations were tested to determine how much DNA was concentrated and recovered. The fluorescence of the original solution and the concentrated solution was measured, the recovery was 37% of the original sample, and the volume decreased by a factor of 3 of the original volume.

Poster U73 – Breyer Menke
Mentor: Kristy Kounovsky-Shafer
Title: *Measuring how temperature and YOYO-1 dye concentration affects DNA mobility*

DNA stained with fluorescent dyes is utilized in different applications such as measuring the mobility of DNA, monitoring how DNA concentrates in a device, or studying the dynamics of DNA in different conditions. Previous experiments have shown that YOYO-1-stained DNA that has been incubated at higher temperatures had different mobility in agarose gels compared to DNA incubated with YOYO-1 at room temperature. YOYO-1 belongs to a family of dyes that bind to DNA through bis-intercalation and at higher concentrations on the outside of DNA. YOYO-1, BOBO-1, and TOTO-1 stained DNA, and a dynamic range of temperatures (20 - 60oC) were tested. The fluorescence was measured for the stained DNA for each dye. For each dye, two-time points were measured, either incubating the samples at a given temperature for 30 min or 24 hours. The fluorescence was measured on a DS-11 FX+ and the different dyes were compared to see if the same change in fluorescence for YOYO-1 happened with BOBO-1 and TOTO-1.

Poster U74 – Kalynn Doehling
Mentor: Frank Kovacs
Co-Author: Mahesh Pattabiraman
Title: *Measurements of Binding Constants for Human Epidermal Fatty Acid Binding Protein (FABP5) and Various Hydrophobic Ligands*

Fatty acid binding proteins are a family of small structurally conserved proteins that bind reversibly to hydrophobic ligands inside of cells and chaperone them to various locations including the nucleus and mitochondria. FABP5, also known as epidermal FABP because it was first identified in the skin, plays an important role in lipid metabolism and serves as a drug target for prostate cancer. This study presents our initial results for the expression, purification and characterization of human FABP5's binding to hydrophobic ligands using a fluorescence displacement assay and isothermal titration calorimetry.

Poster U75 – Bhava Sharma
Mentor: Mahesh Pattabiraman
Title: *Using Python to Analyze Chemical Compounds*

This project aims to use the Machine Learning approach to deduce possible correlations between the refractive index and any of its other physical properties. This research project explores the use of Python programming language and machine learning algorithms in the analysis of chemical compounds. Specifically, the project focuses on developing Python scripts that can efficiently and accurately analyze large sets of chemical data to extract important information such as molecular structures, properties, and behaviors. The project includes the use of various Python libraries and modules for data visualization, statistical analysis, and machine learning algorithms, such as clustering and classification. The research findings demonstrate the effectiveness of Python and machine learning in analyzing chemical compounds, providing insights into the potential applications of this technology in the field of chemistry.

Poster U76 – Poonam Puntambekar
Mentor: Mahesh Pattabiraman
Title: *Study of ozone binding characteristics to macromolecular hosts*

Ozone is an allotrope of molecular oxygen, which finds many uses in day-to-day applications such as disinfectant, water and air purifier, food-processing, and many other industrial and medical applications. Despite significant advances in chemistry, ozone is still used in its molecular gaseous form, which limits its application potential. In our lab, we are trying to trap ozone within molecular hosts such as cyclodextrins

(CBs) and cucurbiturils (CDs) so as to modify its apparent-physical and chemical characteristics, which could expand its application. The inclusion of ozone within the hosts (CBs and CDs) was achieved by purging aqueous solutions of the hosts with ozone released from a commercial ozone generator. The binding host-guest dynamics was monitored using UV-Vis and NMR spectroscopy, which confirmed inclusion of the gas molecules within the macrocyclic hosts. We are currently exploring the stoichiometric relationship between ozone and cyclodextrins though currently our UV-Vis-based experiments alpha- and beta-CD forms a 1:1 complex while gamma-CD forms higher order complex. Efforts are underway to determine complex stoichiometries for CB inclusion complexes as well. Future efforts will focus on obtaining ozone inclusion complexes in the solid state, and using them to chemically disintegrate undesirable chemicals such as pollutants, odorants, and allergens.

Poster U77 – Tobias Kraft
Mentor: Hector Palencia
Title: *Silver Compounds with Anti-biotic Properties Against Multi-drug Resistant Bacteria*

The use of silver compounds as antibiotics has been gaining attention as an alternative to traditional antibiotics due to increasing antibiotic resistance. Silver compounds can effectively inhibit the growth of a broad range of microorganisms, including bacteria, fungi, and viruses.

Silver-based antibiotics have been used in a variety of applications, including wound dressings, medical implants, and water purification systems. They have also been effective in treating infections caused by multidrug-resistant bacteria, such as methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococcus (VRE).

Silver can be used in various forms such as nanoparticles and organometallic complexes. Silver nanoparticles have gained significant interest because they can penetrate the bacterial cell wall, disrupt cellular processes, and induce oxidative stress, leading to bacterial death.

Additionally, silver compounds can also inhibit biofilm formation, which is a significant factor in the persistence of bacterial infections. Silver's mechanism of action is different from traditional antibiotics, making it an attractive option for combating multidrug-resistant bacteria.

In conclusion, silver compounds show promising potential as an alternative to traditional antibiotics, particularly in the face of increasing antibiotic resistance.

However, further research is needed to fully understand their mechanism of action and potential toxicity, and to optimize their use as antimicrobial agents.

Poster U78 – Wryleigh Doyle
Mentor: Mahesh Pattabiraman
Title: *Study of Photochemical Characteristics of Chalcones Reactivity*

Chalcones alpha-beta unsaturated aromatic ketones that exhibit an interesting excited state chemistry. The photochemistry of chalcones has attracted considerable interest since the early 1970s because 2′hydroxychalcones are the key intermediates of flavonoid biosynthesis in nature. Our group specializes in controlling reactivity of excited molecules through supramolecular chemistry. In this regard, the past year we have studied the innate reactivity of chalcones, and the same under influence of supramolecular control exercised through macrocyclic cavitands such as cyclodextrin and cucurbiturils. We have studied the effect of sensitizers, medium polarity and wavelength of excitation on the unimolecular and cavitand-mediated bimolecular reactivity of chalcones. This poster will present our findings based on the reaction mixture analysis performed through NMR and GC-MS spectroscopy.

Poster U79 – Jake Gutschenritter
Mentor: Hector Palencia
Title: *Antibacterial Properties of N-heterocyclic Carbene-silver Complexes*

Bacterial diseases are a significant concern due to bacterial resistance. Few antibiotics currently are not shown bacterial resistance. However, in a pandemic, the cost of human life and the economy would complicate it, as we saw in the case of Covid-19.

N-heterocyclic carbenes-silver (NHC-Ag) complexes possess antibacterial, anti-fungal, and anticancer properties. They have attracted attention because of their low toxicity, easy synthesis, and stability. NHCs, when acting as antibacterial, operate by a different mechanism, and disrupting the cell wall is one of them. We have synthesized and evaluated the antibacterial properties of six other NHC-Ag complexes, and the synthesis and biological activity will be presented and discussed.

Cyber Systems

Poster U80 – Noah Meyer
Mentor: Sherri Harms
Title: *Lloyd the Monkey 3: Judgement Day*

The evolution and maturity of a creator's work is fascinating follow, as one can see the gestation of ideas and themes of interest and watch as they blossom into bigger and better works. Previously, the creation of independent video games, most relevantly the Lloyd the Monkey series, were disseminated. In the wake of those games comes the creation of Lloyd the Monkey 3, which seeks to be the ultimate evolution of its predecessors. This installment continues from the prior games in terms of narrative, design philosophy and techniques while also incorporating new elements and technical materials. As such, this research on the creation of Lloyd the Monkey 3 will denote how the series has evolved and changed from parts 2 and 3. New and old techniques, of both artistic and technical natures, will be explored, as will the inspirations and themes of the relevant material.

Poster U81 – Carissa Kelley
Mentor: Sherri Harms
Title: *TikTok as an Emotional Outlet for ICU Nurses*

The purpose of this research is to, by way of analyzing scraped data and using sentiment analysis tools, understand the use of TikTok within the ICU nurse demographic as an emotional outlet. The stressors that were magnified in the wake of COVID-19 have prompted many nurses to seek communities of support. During the height of this infamous pandemic, when the world went online, TikTok fulfilled the demand as a host for these communities of support in a digital space.

This research created a programming script to scrape TikTok data based on the hashtags that indicate videos as relating to ICU, critical care, and nursing. This script utilizes an API to gather the raw data of video captions from the videos validated to be relevant based on the hashtags they use. Using hashtags provided by researchers in critical care, a set of videos with captions related to ICU nurses was gathered. The volume of interaction within this nursing community indicates the scope of TikTok as a tool for processing the shift in ICU nurse life within an online community. Natural language processing and sentiment analysis tools were applied to those captions to determine the sentiment of each. Sentiment was then aggregated by hashtag. Further sentiment analysis conducted on the video captions has provided an environment for thematic analysis of critical care nurse practices and personal experiences. The research shows the highest levels of positive sentiment in communities under

supportive, resource-sharing hashtags such as “#nursetipsandtricks”, “#nursehelp”, and “#nurseadvice”. Other hashtags, while having overall positive sentiment scores, came in at lower sentiment. These hashtags include “#intensivecareunit” and “#criticalcarenurse” likely reflect the difficult experiences nurses face daily. Future work includes qualitative analysis extended to understand evidence-based practice (EBP) policy implementation as evidenced in the TikTok data.

Poster U82 – Noah Mosel
Mentor: Ahna Packard
Title: *Fabrication Lab Portal*

The current world is focused on technology to keep track of many files and streamline processes. We must ensure that we create applications focused on what we need. Any program fails to be useful if it fails any requirement of its customers. Customers need fast, intuitive, and secure. If it does not provide a quick response or is unreliable than the developers fail. If users must be trained to use a program, then it fails in any aspect of being intuitive. We must also focus on security in the status of the internet. There is both moral and legal ramifications for failure to ensure customer data is stored and taken care of properly. It is no longer acceptable to create something that fails even the most basic of security tests. Taking all of this into account, we can create a system that could be utilized by a fabrication lab. Challenges that arise for this customer come from storage of data. We need to determine what is available for machines, materials, etc. We may even need to track who has access to the lab, or even has training on more technical tools. One must also think about the methods that are utilized for such training. There are many things that need to be looked at when creating any sort of system for this. This takes time alongside customer approval, which may cause many redesigns. The goal is to create something for a customer to streamline and improve the workflow for them.

Physics

Poster U83 – Mohmmed Nour
Mentor: Brandon Marshal
Co-Author: Brandon Marshall
Title: *Investigating Bubbles in Interstellar Space*

The Galactic Legacy Infrared Mid-Plane Survey Extraordinaire (GLIMPSE) was a survey that used the Spitzer Space Telescope to map the galactic plane in infrared light. The survey detected many ring-like structures, which were later referred to as infrared bubbles. When a star is formed, the pressure from its radiation starts to blow surrounding material outward. Theoretically, this is what the bubbles are indicative of: young and hot stars blowing material out and forming a bubble surrounding it. Using the GLIMPSE survey, our project centered on investigating these bubbles and determining whether any of the stars within the bubble show evidence of discs of material facilitating high-mass star formation. We found a suitable bubble, named [cpa2006]S44, that was large and relatively isolated to further investigate. Using a spectral energy distribution (SED) fitter and multiple infrared telescope databases, we found objects that appeared to be stars within the bubble. Running the SED software against those stars, we determined the most likely candidate to be a high-mass star powering the bubble S44. A star towards the edge of the bubble, arbitrarily named 2M-333, was determined to be the most likely candidate. We used the bubble's size to estimate its age, and thus compare that to how long the star's disc should theoretically last before disappearing. With a radius of 3.2 pc, we found an approximate age of 2.3 million years. Our fitting techniques of 2M-333 suggest it to be an O8.5V star, which has a disc destruction timescale longer than the 2.3-million-year bubble formation timescale, indicating that 2M-333 likely still has its circumstellar disc as well as powering S44 (or at least, is a very strong contributor), and thus, making S44 a desired target for future observations.

Poster U84 – Dylan Johnson
Mentor: Jeremy Armstrong
Co-Author: Neelam Shukia
Title: *Study of Electron-Impact Scattering of Tungsten Ions*

The study of electron-ion collisions is always a prime area of research as it provides the fundamental understanding of the dynamical behavior of different atomic processes in the high temperature plasma. During the collisions, the electrons can be recombined with ions through different reactions such as electron-impact excitation (EIE), dielectronic recombination (DR) and many more. In EIE process, the ions get excited

through the collisions with highly energetic electrons followed by the radiative decay. This radiation loss affects the plasma ignition process and stability. Conversely, the DR usually occurs at lower electron energy compared to EIE and changes the charge state of the ions. Thus, it affects both the radiative energy losses and ionization balance in the plasma. Accurate information of these atomic processes thus plays a significant role in the diagnostics of the plasma. The present work entails the calculation of EIE and DR cross-sections for Tungsten ions (W27+ to W29+) as they are being evaluated as prospective plasma-facing materials in magnetic confinement devices like the ITER tokamak. These ions are selected from the recent experiment performed at NIFS Japan. The calculations are performed using the relativistic method, and the required wave functions are calculated using Multi-configuration Dirac-Fock method through GRASP2k, and Flexible atomic code. The accuracy of these wave functions is ascertained by comparing the transition energies and oscillator strengths with the previously reported measurements.

Poster U85 – Kim Larbey
Mentor: Joel Berrier
Title: *Investigation of the Evolution of Galaxy Properties*

The properties of galaxies evolve in shape, color, and other properties over the history of the Universe. The evolution of galaxies is dependent on galaxy-galaxy interactions, as well as a galaxy's own internal properties. Through data collected by the Hubble Space Telescope (HST) and James Webb Space Telescopes (JWST), we have been able to view these interactions and produce images across the electromagnetic spectrum in order to learn more about these processes. I have examined publicly available galaxy imaging from the HST and JWST in order make comparisons between galaxies in the early universe and those produced in large scale cosmological simulations. I have taken raw imaging data from JWST to form RGB color composite images by connecting the imaging filter used to the corresponding color. From this data we are able to look into early galaxy formation and ascertain properties of those galaxies by looking at their luminosity, color, and morphology. My next step is to make comparisons of simulated galaxy features from the Illustris simulation to those observed in the early universe to compare the accuracy of the simulations model to those observed in recent JWST data, to characterize the current disparity between observations and existing cosmological models.

Professional & Applied Studies

Communication Disorders

Poster U86– Marlee Nebesniak
Mentor: Jane Roitsch
Title: *Treatment for Pediatric Patients with Dysphagia: A Survey of Speech-Language Pathology Practice Patterns*

For this study, I have designed and implemented a Qualtrics survey, received IRB approval, and currently have received 48 responses from speech-language pathologists (SLPs) through the American Speech-Language-Hearing Association's dysphagia special interest group 13 – Swallowing and Swallowing Disorders of which Dr. Roitsch, my faculty advisor, is a member and has access. I am asking speech-language pathologists this question, "What swallowing evaluations and treatments are most commonly used by SLPs to manage pediatric patients with swallowing disorders?" A secondary outcome of this data will be in the identification of practice patterns based on practice site, clinical experience, and type of dysphagia being managed (Brackett et al., 2006). This study's importance is rooted in the information it will provide. Many assessment tools and treatment approaches have been described and researched to address the needs of pediatric patients with swallowing problems, or dysphagia. Whether these approaches have made their way into professional practice is a question we would like to understand. Further, how treatments vary by clinical setting is also an important question. The results of this survey will guide us in streamlining student clinical training opportunities, development of continuing education events, and preparation of professional practice resources.

Poster U87 – Dawson Helmer
Mentor: Ladan Ghazi Saidi
Title: *Effects of Stretching and Toning on Cognitive Health in the aging population*

As the average life expectancy among humans is increasing, successful aging is becoming a critical area of study in the public health field. It is estimated that 35.6 million people lived with dementia worldwide in 2010, and the number will double every 20 years (Lan, 2015). While the odds of overcoming cognitive and physical decline in old age seem insurmountable, new research shows non-pharmaceutical intervention can improve cognitive health. The literature on cognitive health at aging is rich. One promising intervention approach is physical activity (exercise). Evidence suggests that physical activity and exercise can lower the risk of adverse outcomes associated with

advancing age (Bherer, 2013). However, we need more research to determine if exercise can minimize or prevent cognitive decline in the older adult population. Exercise falls into two categories, anaerobic, and aerobic. Aerobic exercises include exercises such as swimming, cycling, and walking, while anaerobic exercises include stretching, toning, yoga, and weightlifting. Studies have reported that both aerobic-resistance training and stretching-toning exercises improve functional mobility in adults (Desjardins-Crépeau, et. al., 2016). In addition, there is evidence that in older adults aged 64-78 years old, nonaerobic exercises (stretching and toning) have a positive impact on cognition and can slow cognitive decline (Jonasson, et al., 2017). The literature on the effect of exercise on cognitive health at aging is richer for aerobic training than anaerobic training. My study focuses on the less researched, anaerobic, branch of exercise. Older adults may not be physically able to participate in aerobic exercises due to physical decline that comes with advanced age. My goal is to find out if stretching/toning is a viable alternative to improve cognitive health in older adults. This study is a pre/post intervention. Participants include adults aged 60-80, with no neurological disorders who have access to internet. We collect a thorough case history, and assess their cognitive health using the NIH Cognition toolbox, and additional neuropsychological tests to measure executive functions prior to starting the intervention program. As of right now, I am tracking the progress of one participant. Out of 100%, the participant scored a 69% on the Stroop test, 78% on the Simon test, and 98% on the Symbol test. The participant had scores of 21 and 16 on Phonemic and Semantic fluency respectively. Participants will receive intervention on Stretching and Toning five days a week, for 30 minutes a day for six months using exercise videos that are professionally made for older adults. This is an ongoing project, and we are actively searching for more participants.

Poster U88– Jarod Owen
Mentor: Ladan Ghazi Saidi
Title: *A Unique Pattern of Stuttering in a Bilingual Adult: A Case Study*

This is a retrospective study of a participant who stutters in her mother tongue (L1) but not in her second language (L2). Stuttering is a speech fluency disorder characterized by involuntary blocks, repetitions, or prolongations of sounds, words, or phrases (Maguire et al., 2012). Stuttering is more likely to occur in bilingual individuals than in monolinguals (Usler, 2022). It has been reported that the less proficient language (typically L2) is more likely to show signs of stuttering (Maruthy et al., 2015). Further, balanced bilinguals seem to stutter equally in both languages (Lim et al., 2008), which is unlike the participant in the present study. Evidence suggests that bilinguals use cognitive control to manage the components of multiple languages by suppressing the

irrelevant language and elevating the target language in a given situation (van den Noort et al., 2019). Language proficiency, exposure, and use are factors that influence cognitive control in L1 and L2 (Unsworth et al., 2018).
In this qualitative study, we interviewed a sequential bilingual Bulgarian (L1)- English (L2) adult with high proficiency in both languages who stutters in L1, but not in L2. The participant never received services to address her stutter. She reported that she is much more focused in L2 which suggests a higher amount of cognitive control, despite her extensive daily exposure to English in all four modalities. We interpret her stuttering pattern in the context of the literature on monolingual vs bilingual neurocognitive features and neural pathways related to stuttering in childhood versus adulthood. We examine the impact of language exposure, use, and proficiency on stuttering, and we also look at the role that effortful control plays on stuttering. The literature is also examined based on the effect of the speaker's environment, and the cognitive load required in unique environments.

Poster U89 – Nayeli Cruz
Mentor: Phillip Lai
Title: *What is the Effectiveness of Gestures in Children with Autism Spectrum Disorder?*

One of the first signs of atypical development noted by parents of children with Autism Spectrum Disorders (ASD) is delayed communication. Gesturing is a type of communication used by children who have not had verbal speech. It is important because if they are nonverbal, gesturing is a way for children to communicate. Many children with ASD who are verbal also have language delays. Therefore, gesturing is a form of communication used by many individuals with ASD. In this study, ten pairs of mother-child social interactions will be coded to see the effectiveness of gestures during a 15-minutes play session. Each mother-child pair has four data-points, when the child was at 2.5, 3.5, 4.5, and 5.5 years of age. The mothers were instructed to "play with your child as you normally would at home" using a standard set of toys which were provided by the experimenters. Coding was completed in Eudico Linguistic Annotator (ELAN), a software program that helped isolate gestures in the video stream. For each gesture from the mother, a description was made to assess how effective the gesture was on the child. Preliminary results are pointing to more responses to mother's gesture as the child develops. Taken together, gestures can be an effective communication tool, especially for children who are minimally verbal.

Poster U90 – Carime Perez-Diaz
Mentor: Jan Moore
Title: *Bilingual Language Acquisition in Child with Severe-Profound Hearing Loss and a Cochlear Implant*

Historically, language acquisition in children with hearing loss is severely impacted and has consequences for their communication, social-emotional development, literacy, and vocational choice. Early cochlear implantation for children has resulted in a more typical language developmental process. In the United States, it has been highly unusual for children with hearing loss to become bilingual. In this study, we examined the vocabulary development of a child who is obtaining both Spanish and English following cochlear implantation. They received their cochlear implantation at 20 months of age. The child was exposed to Spanish exclusively up to the chronological age of 3 years. At that point in time, they entered a preschool program for children with hearing loss in English. Their Spanish vocabulary development was documented monthly by their parent using the McArthur-Bates Communicative Development Inventory (CDI). At 27 months post-implant, their language skills in English were documented by their early intervention provider. The McArthur-Bates CDI taps into different word classes and vocabulary such as phrases, animal sounds, nouns, and verbs. Typically, simultaneous bilinguals have very little overlap in their early vocabulary. Overlap does not usually exceed 25 percent. We examined our participants' word classes in both Spanish and English at the 100-word milestone of their development. At 27 months post-implant, our participant had 190 words in English. At 29 months post-implant, the participant was at 80 words in Spanish. In the category of common phrases, the participant had 13 total phrases in English and 20 phrases in Spanish. Out of those totals, the participant had eight total phrases in overlap (24%). One example of these phrases learned in both languages include "Do you want more?" and "Quieres mas?" Our poster will examine additional word class acquisition and discuss the patterns of development.

Poster U91– Paige Moore
Mentor: Ladan Ghazi Saidi
Title: *Effects of Stretching and Toning Exercises on Cognition in Older Adults*

Chronological aging, or senescence, is associated with an increased risk of chronic conditions and diseases such as cognitive impairment, cardiovascular disease, and metabolic syndrome (Bherer et al., 2013). Studies have reported that physical exercise can improve cognitive function (Falck et al., 2019; Audiffren, & André, 2019; Chen et al., 2020). Low-intensity strengthening exercise may offer a practical alternative, but

the neuropsychological benefits and potential neurophysiological mechanisms are less well understood (Yerokhin et al., 2012).

This current study focuses on the effects of stretching and toning exercise on cognition in older adults (age: 60-80). Stretching and toning exercises are low-intensity exercises with little to no equipment required. In fact, participants are allowed to perform the exercises from the comfort of their own home. The Montreal Cognitive Assessment (MoCA; online version) and a cognitive assessment battery through Gorilla (online platform) are given to each participant. The pre assessment also includes an inclusion/exclusion screening ensuring the participant is applicable for the study and a case history to collect demographic and lifestyle information.

In this study, participants enroll via email and are granted access to an online platform called Microsoft OneDrive. Each participant receives their own folder with access to each video and a Microsoft Excel sheet to monitor progress. Participants are required to watch and participate in various stretching and toning exercises for five days throughout the week for 24 weeks in total. Each participant is closely monitored and contacted weekly to ensure tasks are being completed. I will present the data of one of the participants who is enrolled in this study. The comparison of pre and post assessment will show us if physical exercise improves cognition.

Poster U92 – Michaela Jones
Mentor: Philip Lai
Title: *Gender Differences in Language Use for Children with Autism Spectrum Disorder*

There is a large discrepancy in the diagnosis of individuals with autism where males are typically diagnosed by age 3 at a much higher rate than females, who often don't get diagnosed with Autism until later into young adulthood. In this study, the focus will be on the similarities and differences between gender in the speech and language use of 12 children ages 8-11 with autism spectrum disorders. This study examines gender differences in language based on areas of (1) number of words used by the child, (2) topics discussed by the child, and (3) whether language and IQ correlate in relation to gender. Every child was given this prompt: "Hi, my name is [researcher's name] and I'll be spending some time with you today. Before we get started with our games, I'd like to get to know you better. I'm going to ask you some questions about yourself and things you like to do, okay?" Preliminary results are pointing to large variability within the dataset regarding number of words spoken (range 234 words to 1,649 words). Topics discussed includes everyday personal experiences and interests. Taken

together, a potential relationship may be observed, where the production of language and IQ are positively correlated in our sample.

Industrial Technology

Poster U93 – Keenan Torres
Mentor: Jared Burgoon
Title: *Perceptions and Expectations in the College of Business and Technology Majors*

The purpose of this study to gain a better understanding of the University of Nebraska at Kearney's College of Business and Technology internship programs across various majors through analyzing the perceptions and expectations of the students, faculty, and staff that are involved in the internship programs. The goal of this research is to utilize our findings to bridge the gap between the theoretical knowledge taught at university and the practical applications of an internship by gaining insights into the expectations of those involved. The application of the educational foundation that students build while in university becomes pivotal in their capability to be an effective part of any workplace. Internships allow for the knowledge gained to be molded into valuable and applicable skills in their potential career fields. A literature review was conducted and showed that the connection between internships experience and university programs was a valuable resource and learning experience for students. The instrument that will be utilized for the research will have three sections that will aim to understand the perceptions and expectations of students, faculty, and staff. The first section will be based off of Dr. Metzger's public instrument, originally devised by Dr. Kane. Followed by questions personally devised that will be aimed at College of Business and Technology Majors offered at the university. The last section will be concluded with a demographics section to collect applicable data on those surveyed. As this survey has yet to be administered, there are no findings to report.

Poster U94 – Allison Arens
Mentor: Dana Vaux
Title: *Historical Perspectives: Comparisons of Interior Design Styles During the NeoClassical Era*

This study on historical architectural styles and aesthetics that debuted in the early 1800s explores the Federal style of the United States, the Regency style of England, the French Empire style in France, and the German Biedermeier style, all of which were concurrent in their popularity. Informal knowledge of the rich history of France,

England, Germany, and America at the time of their respective design revolutions, which also paralleled political revolutions, is necessary to grasp design influences. Corresponding to each of these styles is the impact of political and socioeconomic aspects of historical influence. The purpose of this research project is to compare the specific design styles prevalent in these four countries during the early eighteenth century, each unique in geography and history, but alike in their impact and individuality. To achieve this, I searched databases, read scholarly literature, and reviewed historical images of each respective style allowing me to draw several connections. First, each historical style drew inspiration from common sources: Ancient Rome, Greece, and Egypt for similar reasons. Following, the Regency, Empire, Federalist, and Biedermeier styles have discernable differences that express cultural individuality. Curiously enough, however, some of the styles, particularly the Regency and the Empire, influenced each other in their design nuances, techniques in craftsmanship, and overall mood. Another factor contributing to the unique expression of each style is the separate political and social contexts of the countries. Lastly, each of these designs, in harmony with their own creation, has had an influence on design and styles in the present day. Regardless of time period, understanding the history of architecture is key in discerning why design works the way it does today.

Poster U95 – Stephanie Ajtum
Mentor: Jared Burgoon
Title: *Sense of Belonging in Construction Management Education*

Humans are known to find comfort in situations they are familiar with, and it is in their nature to gravitate towards comfort. Comfort is “a state of physical ease and freedom from pain or constraint”, and anyone experiencing this would feel a sense of belonging because nothing exists to oppose their presence. That sense of belonging can help a person excel in straining or difficult situations because mentally, that underlying support is integral. Statically, construction programs are predominantly white male. With every other demographic group underrepresented in construction education programs, something must exist either within or attract those underrepresented individuals to immerse themselves in a situation, in this case, a bachelor’s in construction education to where they might not fully feel that sense of belonging. Maybe certain factors outweigh that need, or the need to belong doesn’t exist within them. Understanding the students who physically, mentally, and emotionally endure these situations is crucial to move forward beneficially for all students, and statistics can only display what occurs in these programs to an extent. Using an explanatory sequential method to observe both quantitative and qualitative data will develop an understanding that is unmistakably intelligible from any viewpoint. To start the process,

a survey tool will be distributed to students to collect quantitative data that will give a very general idea of the present sense of belonging among current construction management majors. Observing that quantitative data will create a suggestion of the quantitative data that will be most meaningful to this research project. Everything collected and observed will aid the task of providing all students a construction management education experience of the upmost quality.

Kinesiology and Sports Sciences

Poster U96– Hunter Hiatt
Mentor: Shannon Mulhearn
Title: *Dual Roles of Coaches*

Introduction: Previous research about dual roles of coaches has focused on coaches within K-12 settings as opposed to coaches in recreational settings. The purpose of this study was to examine occupational choices of coaches in Nebraska working at recreational facilities to learn about their perceptions of coaching as a job and what additional jobs are preferable to coaches. Methods: A link to the electronic questionnaire was sent to sports directors at recreational clubs across Nebraska in the Fall of 2022. Results: The questionnaire was completed by 12 participants (83% currently coaching) with ages ranging from 25-61 (M=42). Half were coaching less than 5 years, 10% (5-10 years), 30% (10-20 years), and 10% (>20 years). Settings included public schools (20%), private schools (10%) and recreational clubs (70%). Even though 30% considered coaching as their primary job, all indicated having additional jobs, most often suggesting pay and health insurance as reasons. Coaches' other jobs included a variety from CEO, CFO, sales and management, occupational therapy, physician, and athletic training. Open-ended responses showed participants commonly talked about money and flexibility as main reasons for having second jobs. Next Steps: We are using these preliminary results to consider ways university programs might better connect with coaches at recreational facilities. Additionally, we are creating a list of sports directors at recreational facilities across the nation and will also utilize social media for the purpose of targeting a larger population of participants this Spring.

Poster U97 – Reid Beilby
Mentor: Bryce Abbey
Title: *Validity of the InBody 570 Bioelectrical Impedance Analysis Machine vs. Prodigy Advanced + Dual XRay Absorptiometry Among College-Aged Students*

Background: For many body composition studies, Dual X-Ray Absorptiometry (DXA) has been the gold standard. However, with DXA not always being a viable option due to price, timing, and higher risk than other body composition devices it can be complicated to get access to or purchase a DXA. Can the InBody 570 Bioelectrical Impedance Analysis scale (BIA Scale) be used as an accurate measure of body composition in place of the more expensive DXA machine? Between the DXA and the BIA, the DXA has a higher risk due to the small amount of radiation used in the DXA analysis, compared to the BIA which has a very minor risk to people with implantable cardiac devices. Also, BIA Scales are cheaper, faster, and more cost effective for general use in fitness and nutrition facilities compared to the more expensive DXA. The InBody 570 is a muti-frequency Bioelectrical impedance analysis (BIA) device, body composition from BIA is obtained from the measures of resistance and reactance when an electrical current travels throughout the body" (Miller). The DXA is a Dual-Energy X-Ray Absorptiometry device that uses very minor radiation to produce a picture of the body including muscle mass, fat mass, and bone mineral density. The proposed research will compare the results from an InBody 570 BIA scale and Prodigy Advanced + DXA and evaluate the differences between the two machines for the measurement of body composition.

Purpose: The purpose of this project is to collect and analyze the data gathered to compare the validity of the results of the InBody 570 BIA Scale to the Prodigy Advanced + DXA.

Methods: This project will include gathering subject results from both the InBody 570 BIA Scale and the Prodigy Advanced + DXA and making comparisons between the two's results. As well as analyzing and comparing the results to similar studies done in the past using archival data collected in a University Research Methods course.

Results: Pending IRB approval. Participants will be recruited and data will be analyzed.

Poster U98– Tristan Larson
Mentor: Kazuma Akehi
Title: *Comparison of shoulder joint complex and trunk dynamic motion deficits in collegiate softball athletes who have history of musculoskeletal issues*

Softball players run a higher risk of shoulder injury due to high velocity overhead throwing with a bigger and heavier ball compared to a baseball as well as unique windmill style pitching for the pitchers. Throughout the season, overuse of their throwing arm accelerates a cumulation of mechanical stresses that may make them more prone to throwing related shoulder injuries. The purpose of this research is to examine the shoulder joint complex and trunk kinetics differences in collegiate softball athletes who have reported musculoskeletal issues. Twenty collegiate softball players will be recruited in the current study. Then, shoulder joint range of motion (ROM), transverse or frontal accessory shoulder motions, thoracic and lumber ROM, and pelvic and hip ROM will be examined using a three-dimensional motion analysis during each exercise, which includes shoulder abduction, horizontal abduction, internal and external rotation, flexion, and extension motions as well as trunk rotation and squat motions. Following the measurements, each joint kinetic datum will be compared bilaterally on each player and between the athletes who have history of musculoskeletal issues and those who do not. Based on this study, we can find mobility and joint alignment patterns that may affect their athletic performance and indicate further injuries during the season.

Poster U99 – Bella Whiston
Mentor: Nick Lamoureux
Title: *The intrinsic and extrinsic factors that affect patients motivation to participate in the rehabilitation process post-injury*

INTRODUCTION: Low adherence to physical therapy threatens the effectiveness of evidence-based approaches, leading to further injury, increased medical expenses, reduced independence, and lowering quality of life (Jack et al., 2010). Understanding the motivational factors that influence adherence can help practitioners better connect with patients and develop strategies to improve compliance.

METHOD: Survey responses were collected from 8 participants (50% female, aged 61±10.7years) from local physical therapy clinics in Kearney, Nebraska to understand specific barriers and motivators that affect total participation in prescribed physical therapy exercises. Motivation was assessed using the Behavioral Regulation in Exercise Questionnaire (BREQ-3), which is a commonly utilized questionnaire for analyzing exercise motivation (Friel and Garber, 2019). Barriers were assessed using Likert scale responses to commonly reported barriers to exercise participation.

RESULTS: Identified regulation (motivation related to the benefits of activity) was found to be the strongest form of motivation for physical therapy patients (4.44 +/- 0.97). Integrated regulation (3.72 +/- 0.66), as well as Introjected (3.59 +/- 0.5) and Intrinsic regulation (3.59 +/- 0.99) are the next strongest forms of motivation. The most common barrier to not completing prescribed at-home exercises was not having enough time (2 +/- 0.87). Other barriers such as forgetting to do prescribed exercises (1.86 +/-1) and daily stress (1.63 +/- 1.32) were also prevalent within the surveyed population.

CONCLUSION: Providing time management strategies and incorporating identified regulation support may improve participant adherence. Open conversation with providers about patients' goals, discussing the ongoing benefits of prescribed modalities/exercises, and reminding them of why they attend can help emphasize outcomes that the patient cares about. Improving this aspect of the rehabilitation process may benefit the rapport and adherence of many physical therapy clients.

Poster U100– Yota Sakuma
Mentor: Quincy Johnson
Title: *Approaches for Enhancing Athletic Performance: An Analysis of Performance, Recovery, and Wellness Within NCAA Division II Athletic Populations*

The presence of sports analytics in professional sports has become a factor that determines victory or defeat. Therefore, it is worthful to accurately measure athlete readiness and performance. **PURPOSE:** The purpose of this project is to evaluate athlete readiness, wellness and recovery, jumping performance and sports performance in order to determine phases of the season where performance is higher or lower. **METHODS:** 26 (n=26) University of Nebraska-Kearney female soccer athletes participated in this study. Recovery wellness, countermovement jump (CMJ), and sports performance tracking (SPT), data collected by the University of Nebraska at Kearney performance team were analyzed for to address the purpose of this study. **RESULTS:** Recovery wellness varied from pre-season to post-season as 75.02, 77.96, and 77.58. Significant differences were observed in soreness from pre-season (3.36) to post-season (3.79). Sport-specific data indicated that increases in sprinting distance throughout the season, with average sprint distances increasing from 14.13 yards to 30.88 yards from pre-season to in-season, and average sprint efforts nearly doubling from 0.47 to 0.83. CMJ provided that the left-right difference increased from 15.86 yards to 17.42 yards from pre-season to mid-season and decreased to 10.00 from mid-season to post-season. **CONCLUSION:** Recovery wellness scores for all measures except stress and illness increased from pre-season to post-season. Hours slept, nutrition, and illness values were highest in mid-season. Sleep quality, energy, soreness, and mood values were highest in post-season. CMJ performance improved from pre-season to mid-season and declined from mid-season to post-season. In

regards to SPT data, all numbers increased from pre-season to in-season. In particular, the three figures related to sprints, which are high speed run distance, average sprinting distance, and average sprint efforts increased respectively.

Poster U101– Kelly Snelling
Mentor: Shannon Mulhearn
Title: *The UNK Daily Mile*

Introduction: The purpose of this study is to explore the potential of utilizing PETE students as college physical activity (PA) champions to (a) prepare them for the future role and (b) to see if we can increase feelings of connectedness to the campus. For this, UNK adopted and promoted the Daily Mile (UNK-DM) to college students and the surrounding community. Methods: The student PA Champion hosted six live UNK-DM's this Fall, each starting at different buildings. Historical facts were shared each building at these events. Videos of routes and events were posted on social media and 'likes' and views were recorded. Attendees at events were provided a QR code linked to the registration and site for logging participation. All registered participants were sent a pre-questionnaire for baseline PA levels and perceived campus connectedness. The PA Champion maintained reflections of their leadership experiences. Results: Forty unique participants joined at least once at live events and logged almost 500 miles. Of the social media accounts, Instagram produced the most exposure and engagement. Twenty-four participants completed the pre-questionnaire thus far. Leadership reflections suggest enjoyment in the process of sharing healthy options with the campus along with some feelings of disappointment in the low response rates from the campus community. Next Steps: We made the UNK-DM design more predictable for participants, meeting at the same location/time bi-weekly this semester. Post-questionnaires will be solicited at the end of the semester. We are also looking into creating an app for easier logging of miles.

Title:

Poster U102 – Piper Steinman
Mentor: Greg Brown
Knowledge of the Female Athlete Triad in Female High School Athletes in Rural Nebraska

BACKGROUND. The Female Athlete Triad consists of three interrelated components: low energy availability with or without an eating disorder, menstrual irregularity, and impaired bone mineral density. The Triad is concerning for young female athletes as peak bone mineral density is attained by age 19, causing teenagers who experience the Triad to be predisposed to bone health disorders at increased rates. Although the Triad was identified in 1992, knowledge remains low, particularly in high school-age

females. PURPOSE. The purpose of this project was to determine knowledge about the Female Athlete Triad in female high school athletes in rural Nebraska. METHODS. Female athletes in two rural Nebraska high schools completed an on-line version of the Nutrition, Health and Athletic Performance Questionnaire developed by Brown et al. (2014). This survey asks participants questions regarding knowledge and experience with topics on the menstrual cycle, exercise, and diet. RESULTS. There were 26 total participants. 12% of female athletes had heard of the Triad, while 8% identified all three components. 19% reported going 3+ months without a period. 24% reported having experienced a stress fracture. 20% reported that they did not eat enough calories. 72% felt pressure to maintain a certain body weight. CONCLUSION. The number of respondents indicating pressure to maintain a certain body weight, disruption of their menstrual cycle, or having experienced a stress fracture were higher than those who had heard of or could identify components of the Triad. These data indicate a lack of knowledge regarding the Female Athlete Triad in female high school athletes in rural Nebraska.

Poster U103 – Paige Steinman
Mentor: Greg Brown
Title: *Female Athlete Triad Knowledge Among Sports Medicine Clinicians in Nebraska*

Background. After the passage of Title IX in 1972, female sports participation skyrocketed. This has been coupled with a dangerous, yet underdiagnosed condition, known as the Female Athlete Triad. The Triad consists of three interrelated components: low energy availability, menstrual dysfunction, and impaired bone mineral density. Studies on Triad knowledge across healthcare specialties have been conducted on the coasts, however, few have been conducted in the Midwest. Purpose. The purpose of this research is to evaluate Female Athlete Triad knowledge in Nebraska sports medicine clinics. Methods. Copies of a survey used by Ackerman et al. in 2015 were delivered to 5 sports medicine clinics and collected 1 week later. No names were requested, and the data were analyzed for knowledge of the Triad components, associated sports, menstrual irregularity and disordered eating classifications, and current scores to assess bone mineral density. Results. A total of 34 participants completed the survey. In response to the open-ended question “What are the three components of the Female Athlete Triad?” less than 12% correctly stated the 3 components. In response to multiple choice questions, 85% selected the sports that put female athletes most at risk for the Triad, 3% identified what is considered menstrual irregularity, 65% identified energy imbalance as a key factor, and 44% identified the bone mineral density score that is used to assess the Triad. Conclusion. Although the Female Athlete Triad was identified in 1992 and has been included in educational materials for 20+ years, these data indicate a lack of knowledge of the

Triad among sports medicine rehabilitation clinicians. The present data indicate that fewer participants in the present survey were able to identify the components of the Triad than those previously reported in physicians, fellows, and residents, indicating a need for education on this topic in Nebraska sports medicine clinicians.

Poster U104 – Alex Novicki
Mentor: Nita Unruh
Co-Author: Elena Robinson
Title: *Emergency Action Plans in High Schools*

This presentation is a continuation of a study on Emergency Action Plans (EAP) in High Schools across the country initially started in 2010. The EAP is a vital component of any risk management plan that should line out fundamental policies and procedures intended to facilitate communication amongst all parties during an emergency, and to effectively coordinate care for a sick or injured person. An effective EAP should also improve response time and quality of care during an emergency. In any risk management plan should have a quality EAP that is not a singular plan for all events. EAPs should be different for each event, site, and condition as risk is different with each event at different sites. Findings from previous studies have suggested most high schools had an EAP but not all were practiced, nor did they have the right personnel (qualified) to manage the EAP. In addition to not having proper EAPs in place, it was found that high schools in rural areas were less likely to have qualified personnel or access to medical services at variety of athletic events. Barriers to EAP implementation at the high school setting can often be attributed to school size, financial limitations, and an overall lack of knowledge or awareness among stakeholders within the athletic programs. The purpose of this presentation is to review current data of EAPs at high schools across the United States as compared to data from previously completed studies. Previously completed studies have examined EAP implementation for emergencies including weather, bomb or fire threat, spinal cord injuries, sudden cardiac arrest, and heat illness. We will examine how state statutes or activities association policy influence the development of athletic EAPs as well as how liability issues can arise from not having an appropriate risk management plan in place.

Poster U105 – Jessica Klingelhoefer
Mentor: Megan Adkins
Co-Author: Derek Elton
Title: *HealthyU-Starts with You-Knowledge of Health Care Literacy of Secondary School Students*

The ability to understand, read, and use healthcare information effectively can impact one's present/future health and wellbeing. These are important developmental skills necessary for transitional age students to navigate the healthcare-system during early adulthood. The purpose of this study was to gain insight on current health literacy knowledge among rural high-school seniors. A survey was administered to senior status students at an education facility which focused on the measurements of applied health literacy, self-perceptions of preparedness to access and manage personal health care, and ratings of health-related quality of life. Seventy-five students participated (M=29, F=39, O=7). Descriptive statistics, Pearson correlations, and ANOVAs were used to assess responses. Data was analyzed and interpreted using SPSSv27. (IRB#102021-1). Data showed no significant difference in responses between those of different genders or pursuing healthcare versus non-healthcare careers. Multiple significant correlations were found between student responses with 64% of participants reporting their high school health classes were 'somewhat-helpful' on improving their health literacy. Over half of the students were not confident in their ability to explain the concepts of explanation of benefits (EOB) (54.7%), medical bills (56%), and/or an in-network physician (56%). Fifty-percent of the participants answered 'very confident' in their ability to make physical health decisions and ability to determine nutritional content of food. Students felt 'very-confident' in the areas of self administration of medication (54.7%), and understanding the difference between prescription and non-prescription medications (50.7%). These findings suggest participants perceive themselves as moderately health literate and knowledgeable about navigating health(care) related topics. This study illustrates the present status of transitional age student health literacy in rural areas with normal financial status. Future research may include connections of health literacy to family or community members and/or perceptions of knowledge compared to actual understanding.

Poster U106– Derek Elton
Mentor: Megan Adkins
Co-Author: Derek Elton
Title*: Physical Activity Motivation and Body Mass Index Among Undergraduate Pre-Health Students*

BACKGROUND: While many people understand participating in physical activity (PA) can provide a host of benefits, individuals continue to remain inactive. This notable disparity has led to inquiry on how behavioral motivation impacts PA participation.

Motivation is thought of as the initiation/direction of behavior that can be maintained/terminated. As with other habits, many factors influence the initiation/maintenance of PA, this is especially true with Body Mass Index (BMI) as those with higher BMI may find exercise more unenjoyable. This negative affective experience would then lead to less activity in the future. Understanding how BMI influences the motivation to participate in PA specifically in individuals educated about the benefits of PA could help improve intervention strategies. PURPOSE: Determine how external factors influence motivation to participate in PA in a sample of undergraduate pre-health students. METHODS: Undergraduate pre-health students completed an online survey. A cross-sectional research design was used to examine variables: Motivation, Physical Activity, and BMI. Statistical analysis were used to assess associations and variable differences established at $p < 0.05$. RESULTS: Significant differences were revealed between genders with males reporting higher levels of motivation associated with social ($p= 0.002$), competence ($p= 0.036$), and enjoyment ($p= 0.034$) subsets. Among BMI categories, those classified as 'normal' reported higher levels of appearance ($p= 0.006$) and 'normal' and 'obese' categories reported higher levels of fitness motivation ($p= 0.003$). The presentation will expand on how these differences contribute to PA behaviors. CONCLUSION: Differences in PA motivation were found among gender and BMI categories which align with the literature. This study controlled possible internal motivation variables by exploring those who understand the benefits of PA, which is absent in the literature. Previous research indicates that BMI inversely effects affective response to exercise. Understanding how BMI influences specific motivational constructs may improve compliance of future interventions.

Poster U107 – Britney Brosius
Mentor: Kazuma Akehi
Title*: Muscle Fiber Recruitment Effects of LIT-BFR Training in Patients after Anterior Cruciate Ligament Reconstruction*

Context: Low-intensity training-blood flow restriction (LIT-BFR) training is a rehabilitation modality used to improve tissue healing process in patients after orthopedic surgery such as anterior cruciate ligament (ACL) reconstruction. BFR works by placing a cuff around the proximal end of the exercising limb and compressing to reduce arterial inflow and occlude venous outflow, which creates a hypoxic environment for enhanced metabolic functions. This therapeutic technique has been shown to improve muscular strength, hypertrophy, endurance, protein synthesis, and metabolism. BFR also induces neuromuscular adaptions as well as improves cardiovascular capacity and performance, relative peak torque and power output, pain

outcomes, and muscle fiber recruitment and diameter. Purpose: The purpose of this study is to analyze the muscle fiber recruitment effects of LIT-BFR in the early phases of ACL rehabilitation of Division II college athletes. Method: Collegiate student-athletes will be recruited to participate in this study. Participants will be recruited immediately after ACL injury and prior to ACL reconstruction. BFR training will begin a week after their ACL reconstruction surgery. Participants will be asked to perform a set of exercises with the implementation of BFR. Muscle fiber recruitment will be measured using electromyography (EMG) for 4 weeks. Clinical Application: BFR is a growing therapeutic technique in the early stage of rehabilitation. However, there is little consistent research on muscle fiber recruitment outcomes. The data collected from this study would improve our understanding of the positive effects of BFR.

Poster U108 – Gabrielle Oborny
Mentor: Kazuma Akehi
Title: *Analyzing lower extremity kinetics and kinematics using the three-dimensional motion analysis for collegiate student athletes after knee ligament reconstruction surgery*

Context: During 4-12 months post-knee ligament reconstruction surgery, patients perform dynamic and functional knee rehabilitation but there could be functional deficits between the reconstructed side of the limb and the non-injured side. However, there are still limited studies on joint kinetics and kinematics during the early stage of knee rehabilitation. Objective: The purpose of this study was to analyze the kinetics and kinematics of ankle, knee, and hip joints during the standardized dynamic athletic motions in collegiate athletes who have experienced knee ligament reconstruction surgery. Setting: Controlled laboratory. Participants: Eleven participants who has undergone knee arthroscopy and its rehabilitation between 4 and 12 months of post-knee surgery were recruited. Procedure: Subjects performed dynamic double-leg exercises such as body-weight squat, overhead squat, and vertical jump on the 3D motion capture system. Joint kinetic and kinematic data such as ankle, knee, hip, and trunk ROM (°), dynamic knee valgus angle (°), weight distribution (%), ground reaction force (GRF; N), joint torque production (N), rate of force development (RFD; N), and net impulse (Ns) were measured during the exercises. Results: There were significant differences on jumping knee torque ($F_{3,18}=6.16$, $P=<0.01$), and hip ($F_{3,18}=4.88$, $P=0.01$) and ankle ($F_{3,18}=4.40$, $P=0.02$) flexion ROM in the loading phase of vertical jump by the stages of rehabilitation. There were no statistical differences in the other joint kinetic and kinematic data on each exercise and the stages of rehabilitation ($P>0.05$). Clinical Application: These results showed a poor loading strategy during vertical jump in the early stage of knee rehabilitation after the knee ligament

reconstruction surgery. Teaching and training appropriate loading and landing strategy is the key to be successful in knee rehabilitation.

Poster U109 – Jake Ellis
Mentor: Shannon Mulhearn
Title: *Histories Behind Top Collegiate Rivalries in the United States*

From the time Rutgers beat Princeton in the first college football game in 1869, collegiate events have become engrained in American culture. Many rivalries even carry their own unique following. After looking into the most often noted rivalries in Division I football, five were selected for this investigation into their backstories.

“The Game”, Michigan vs. Ohio State, dates back to when Michigan was applying to be a state and Ohio wanted the land that is now Toledo. The “Iron Bowl”, Alabama vs. Auburn, got its name from the game being played near Birmingham which has a history of steel production. This matchup began in 1893 and also carries some political history where the state used post-civil war money to create new colleges. Land ownership became the focus and the state legislature who was made up of many Alabama alumni was angry when Auburn received federal funding.

“Bedlam”, Oklahoma vs. Oklahoma State, is one of the long-standing rivalries whose name is difficult to unwrap. The word bedlam means uproar and confusion and the possible origin of the title may be a comment in the OK State newspaper that was referring to the partying and mayhem that ensued following the 1904 meetup. In Utah, the “Holy War” which happens when Brigham Young University meets Utah, refers to the religious influence in the state. Although there is a recent push to change this name, a meetup between the two schools at a bowl game in Vegas was the perfect setting for the “Holy was in Sin City”. Finally, the “Backyard Brawl” where West Virginia and Pittsburg fight it out. Between these two schools are nine national titles and their geographic locations are only 70-miles apart which leads to their recruitment happening within the same “backyard”.

Poster U110 – Braden Rich
Mentor: Erin Sweeney
Title: *Does Playing Multiple Sports in High School Help Academic Performance*

A literature review was conducted on finding correlations between playing multiple high school sports and academic success. The search engines used for this literature review included Google Scholar and ProQuest. The University of Nebraska-Kearney library gives students plenty of opportunities to find research that is easy to find and

credible. The articles found and used in the literature review were peer-reviewed and contained surveys of high school student athletes. The journal articles contained facts and research about the impact of playing multiple sports on academic success. Keywords used to find these sources included multi-sport athlete, sports, academics, high school, and GPA (Grade Point Averages). The literature revealed that playing multiple sports in high school has a positive correlation with academic success. Students who played multiple sports had a higher GPA and were less likely to drop out of school. Findings from this research can be used to show students and parents that playing multiple sports and high school can lead to success in the classroom. Some people want to think that playing multiple sports can be a distraction for academics, but these studies showed otherwise. Overall, this research is a starting point for a project that can look more into how playing multiple high school sports can affect mental health, injuries, as well as athletic success.

Poster U111 – Braden Miller
Mentor: Kate Heelan
Title: *Do Oral Contraceptives Impact Lean Muscle Mass Gains in College-aged Females*

There are approximately 100 to 150 million females currently using oral contraceptives (OCs) (Iversen, Lisa, et al., 2017). Oral contraceptive use has been linked to a reduction in testosterone among females (Crewther, et al., 2018). Testosterone is the primary anabolic hormone within the body that plays a significant role in muscle growth, muscular strength, and fat loss (Riechman, et al., 2021). Crewther et al., (2018) found that female athletes using OCs averaged 35% lower testosterone levels compared to female athletes not using OCs. In another study, oral contraceptive use impaired lean mass gains in young females after 10 weeks of resistance training and the extent of the impairments differed based upon the androgenicity of the OCs (Riechman, et al., 2021). I plan on replicating this study with UNK female students to determine how various OCs impact salivary testosterone and lean muscle mass gains after an 8- week resistance training program. We will recruit 30 healthy UNK female students (18–29 years old) and have them report the type of OCs they use, or do not use. They will have salivary testosterone, body composition, upper and lower body strength measured at baseline and after they complete an 8-week whole-body resistance training program (3 days, 3 sets, 6–10 repetitions, at 75% of maximum strength, 13 exercises). We will group the females based on no-OC use, low androgen OC and high androgen OC and compare fat free mass, fat mass, testosterone and strength pre-post based on grouping. My hypothesis is that the more androgenic the OC, the less testosterone and the more it will suppress lean muscle mass gains from the exercise program.

Poster U112– Carson Walker
Mentor: Gregory Brown
Co-Author: Alex Korte
Title: *Physiological effects of caffeine during exercise on UNK students*

Background. Caffeine is a commonly used substance in the diets of many athletes to delay fatigue or improve performance. Caffeine has been shown not to increase muscle strength, muscle power, or maximal oxygen consumption (VO2 max), but does seem to delay the onset of fatigue in a dose dependent manner. Interestingly, caffeine seems to be more effective at delaying the onset of fatigue in upper body exercise (i.e., bench press) but not lower body exercise (i.e., leg press). Methods. 20 students currently enrolled at UNK will be tested for body composition using an InBody system, aerobic fitness through a YMCA submaximal bicycle test, body explosive power through vertical jump testing, and a timed pushup test for upper body muscle strength and endurance. A few days after the fitness testing in a double-blind cross over manner, participants will ingest 200 mg caffeine or a placebo, wait 1 hour, then engage in two sets of 10 burpees and a final set of burpees to fatigue. Time to complete the sets of burpees, the number of burpees completed during the third set, and changes in blood lactate from before the first set of burpees to after the final set of burpees will be compared to evaluate if there were any effects of caffeine. Data collection for this project is currently underway.

Poster U113 – Alex Korte
Mentor: Gregory Brown
Co-Author: Carson Walker
Title: *Effects of caffeine on power output and musculoskeletal endurance on students enrolled at UNK*

Background. Caffeine is a commonly used substance in the diets of many athletes to delay fatigue or improve performance. Caffeine has been shown not to increase muscle strength, muscle power, or maximal oxygen consumption (VO2 max), but does seem to delay the onset of fatigue in a dose dependent manner. Interestingly, caffeine seems to be more effective at delaying the onset of fatigue in upper body exercise (i.e., bench press) but not lower body exercise (i.e., leg press). Methods. 20 students currently enrolled at UNK will be tested for body composition using an InBody system, aerobic fitness through a YMCA submaximal bicycle test, body explosive power through vertical jump testing, and a timed pushup test for upper body muscle strength and endurance. A few days after the fitness testing in a double-blind crossover

manner, participants will ingest 200 mg caffeine or a placebo, wait 1 hour, then engage in two sets of 10 burpees and a final set of burpees to fatigue. Time to complete the sets of burpees, the number of burpees completed during the third set, and changes in blood lactate from before the first set of burpees to after the final set of burpees will be compared to evaluate if there were any effects of caffeine. Data collection for this project is currently underway.

Poster U114 – Colton Roberts
Mentor: Bryce Abbey
Title: *Reliability and Validity of Sports Performance Tracking GPS Units*

Background: Global Positioning System (GPS) technology has seen an increased use in collegiate athletics in recent years. As the technology becomes cheaper and easier to access, more and more college are able to gain access for use with athletes. Individual companies have been using similar devices on different frequencies with different wearing patterns as a way to try and optimize the data that can be collected when used within athletics. The reliability and validity of the devices have seen little research to ensure the data being collected is within an acceptable range. Reliability and validity studies are currently being conducted across the nation to find the best and most optimal way to utilize the data that is being collected and assure it Is usable and accurate data.

Purpose: The purpose of the project is to determine if the data being collected by the Sports Performance Tracking GPS units being used by the University of Nebraska at Kearney athletics is reliable and valid over an extended period of time.

Methods: This project includes completing CITI training, followed by collecting data, requesting data from similar studies conducted at the university level, and analyzing peer reviewed articles regarding reliability and validity studies that were conducted with similar devices.

Results: Articles and data are being reviewed and an evidence table is being created.

Marketing, Agribusiness & Supply Chain Management

Poster U115 – Ryan Johnson
Mentor: Ngan Chau
Title: *Student Well-being and Mental Health: An Exploratory Study of College Students at UNK*

Student well-being and mental health have been increasingly a concern at higher education institutions, especially during and after COVID-19 pandemic. The purpose of this research project is to examine a recent assessment of student health at the University of Nebraska at Kearney (UNK), with a focus on students' perception of their overall well-being and mental health. The assessment was primarily based on a survey developed by the American College Health Association (ACHA) - i.e., the National College Health Assessment (NCHA). The survey has been administered on a sample of 359 students at UNK. Additionally, we interviewed a health practitioner at UNK Student Health & Counseling to gain a better understanding of the trends and procedures related to well-being and mental health on campus. The results show there were significant differences among different student groups regarding their overall well-being and mental health. As a result, there is a need to provide tailored supporting services for students at UNK. When it comes to the patterns amongst those who were struggling with their mental health and well-being, it appears addressing procrastination could potentially benefit students in the long run.

Poster U116 – Emma Bond
Mentor: Ngan Chau
Title: *Calculating GHG Emissions from Transport: A Case Study at CSS Farms*

The transportation sector is responsible for about one third of greenhouse gas (GHG) emissions, the largest amount among U.S. economic sectors in 2019. This is largely due to the burning of fossil fuels for the operation of vehicles such as cars, trucks, airplanes, and ships. Our study focuses on freight transport using semi-trucks for commercial purposes. The purpose of our project is to examine different GHG accounting techniques and apply appropriate framework to calculate GHG emissions for transport activities at CSS Farms, one of the leading chipping potato growers in the agricultural industry in the United States. Our method is based on the Global Logistics Emissions Council (GLEC) Framework and the emission factors provided by the Environmental Protection Agency (EPA) for GHG emissions calculation. Our

framework accounts for three direct GHGs from transportation activities: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The analysis of the GHG emissions from multiple farms could provide CSS Farms a better understanding of their operations and further develop strategies to reduce these emissions. These new insights not only improve their transportation costs but also help strengthen their sustainable practices.

Teacher Education

Poster U117 – Carlos Duran
Mentor: Rochelle Reeves
Title: *Do Universities Adequately Prepare Preservice Biology Teachers for Classroom Instruction?*

Our study examined how universities prepare preservice secondary education majors in biology. We examined three high school biology teachers based on their school size, Grand Island Northwest (Class B), Hastings High School (Class B), and Minden High School (Class C). We would have liked to have Classes A-C (Class A largest, Class C smallest), but due to a lack of responses from Class A high schools, we decided on two Class B's and a Class C school. Each accepting teacher was given a questionnaire. Two of the three teachers graduated from the University of Nebraska Kearney with degrees in 7-12th biology education. Each cooperating teacher shared lesson plans, labs, and activities in how they teach biology. We also obtained data from each school regarding student passing percentages. We interviewed each teacher and asked them questions on how their university helped in their preservice journey to becoming biology teachers. All three teachers mentioned a disconnect in teacher education courses and felt they were not properly prepared for teaching. In response to this revelation, we reached out to the Teacher Education Department at the University of Nebraska Kearney. We spoke to the secondary education advisor as well as the Transitional Certification Program at UNK. After interviews with each, both parties agreed there is a disconnect in teacher education courses and wish to dissolve that feeling shared in preservice secondary education majors.

Poster U118 – Tessa Eldridge
Mentor: Alice Cahill
Title: *Scatterplots in Relation to Behavior*

Scatterplots are a mathematical graphing tool that includes data between two variables, each of which is plotted on an x and y-axis. After plotting, the data within a scatterplot may be used to establish a relationship or a correlation between two variables. With many uses, behaviorists and other professionals that may encounter various behaviors, such as educators and applied behavior analysis therapists, may be able to use scatterplots to their advantage. Similar to data collected through antecedent, behavior, consequence (ABC) data collection, a scatterplot may aid in the process of identifying triggered stimuli that correspond to behavior that otherwise may not be identified in relation to student behavior. During data collection, an individual who works closely with a student may use timed intervals to collect data while looking for specific stimuli and behavior over the course of a few days or weeks. Data from the observations will then transfer and be graphed onto a scatterplot as a tool to establish correlation between stimuli and behavior, or a lack thereof. From there, the data and correlation establish between variables may be used to contract behavioral intervention plans in the case that an individual displays maladaptive behavior. However, through exhaustive and extensive research, scatterplots have not been heavily researched within the academic world and are not a common teaching practice within teacher education programs. The goal of this project is to identify why higher education institutions are not using this tool within their education programs while addressing the important of scatterplots from a behavioral standpoint.

Poster U119 – Elizabeth Smith
Mentor: Phillip Lai
Title: *The Social Emotional Profiles of Children with Unilateral Perinatal Stroke: A Literature Review*

In this literature review, the focus will be on the similarities and differences between children with unilateral perinatal strokes (PS) when it comes to social-emotional behaviors. Children with unilateral PS in our study have an injury on one side of their brains. The side of lesion creates a left hemisphere injured (LHI) group and a right hemisphere injured (RHI) group. For this literature review, 8 different sources, both academic journal articles and websites, were utilized for this review. These sources primarily focus on social-emotional behaviors by looking at four parental questionnaires: 1) Children's Behavior Questionnaire, 2) The Salk Institute Sociability Questionnaire, 3) Multidimensional Personality Questionnaire, and 4) Social Responsiveness Scale. These questionnaires allow for a deeper understanding of

knowledge within the field of child development. In the literature review, prior researchers have found that studying children with early brain injuries allows for the advancement of knowledge with respect to brain development, cognition, and brain plasticity. In addition, an infographic by the American Stroke Association stated that about 65% of children with PS will have permanent neurological deficits. By conducting this research through this literature review, I will gain relevant knowledge and experience that will apply to my chosen career field of Speech Language Pathology.

Fine Arts & Humanities

Art & Design

Poster U120– Karina Boatright
Mentor: Derrick Burbul
Title: Kearney Becomes Art City

My undergraduate research project is creating multiple layered photographs called “Kearney Becomes Art City.” The concept of this project is to create an artistic representation of the "city of Kearney." I came up with the idea of overlaying images with numerous layers like Photoshop does, except in an analog manner. I am using two layers for my creation. The base layer of the photograph is the platinum print. This is one of the traditional photo processing methods from the 19th century. I am using this technique to print landscapes of Kearney, Nebraska, on paper and mold them into cylinders. The second layer is a photograph made of a coating of silver gelatin photographic emulsion on a glass surface. I am using glass for the second layer because it is transparent, which makes the base image visible. Thus, I am able to combine two images to represent one scene. This idea allows me to use different materials and creates the illusion of one photograph, challenging the viewers mind as to what makes up a place. This creation breaks the principle of photography. It is usually two-dimensional, but this project shows that photography can be three-dimensional. My curiosity of the creation led me to explore the creation of multiple-layered images with traditional photograph processing and create "Kearney Becomes Art City." This project has led me to progress independently and problem solve. For example, black color of platinum prints relates to temperature. I joined a workshop of

traditional processing print and learned how to create black color to express the wide range of gray scale. I identify my problems and talk about them with my mentor to find solutions. My mentor is supporting me to progress instead of giving me instructions. This has given me a lot of knowledge about teaching in higher education. The biggest changing of this project is putting cyanotype on the glass. There was a risk that the gelatin used for the adhesive would come off. So, I decided to put the cyanotype on platinum print paper and use liquid silver emulsion with toning on the glass. Thus, I could layer cyanotype on platinum print.

Communication

Poster U121 – David Zelnio
Mentor: Tiffani Luethke
Title: *Vocational Branding*

A person's vocational choice affects lifestyle and is significantly intertwined with mental health and physical well-being (Backhaus, 2004; Hackett & Betz, 1995; Osipow, 1986). Research on Social Cognitive Career Theory (SCCT) reveals both objectives (experience/facts) and perceptions (beliefs/notions) connect people to vocational/career choices (Kaminsky & Behrend, 2014; Lent, et al., 2000; 2002). SCCT also lists environmental factors like education, experience, finances, and location that impact individual choices. However, to date, a formal system for branding a vocation does not appear to exist in the literature, even though the United States (U.S.) has hit its biggest labor shortage since World War II (Dean, 2018).

Through a review of the existing literature and grounded theory interviews, I'm introducing a new term called, "Vocational Branding," defined as a set of stories, facts, and ideas that communicate the personality, traits, and realistic benefits and challenges that surround a vocation/career. Vocational Branding has implications for helping overcome worker shortages in certain fields by increasing the number of applicants in a given community. Additionally, increased applicants for a specific position will decrease the cost-per-hire (SHRM, 2018). This type of branding will often require competing entities to combine efforts to define and build a specific vocation.

Most study interviewees who promoted vocations were rarely given cohesive messages defined by an organized branding effort (except the military). This research also introduces a new Vocational Branding model which incorporates relevant aspects of Keller's Customer-Based Brand Equity Model (CBBE; Keller, 2001), Young

& Rubicam BrandAsset Valuator, Milward Brown BrandDynamics Model (Matin, 2016), and Equity Engine (Marketing Journal, 2016). The Vocational Branding model steps include (1) defining the brand, (2) building advocates, (3) engaging in brand-building activities, and (4) a brand should constantly evolve and improve. A feedback loop is recommended within the Vocational Branding model with consideration towards refining the brand continuously.

Poster U122 – Kristen Wetovick
Mentor: Mary Harner
Co-Author: Mary Harner
Title: *Connecting scientific research with public communication at UNK*

The University of Nebraska at Kearney has opportunities to combine research with creative activities for undergraduate students on campus across different departments. I set out to create graphic elements and media to the benefit of research projects with visually appealing and engaging elements for cohesive projects. While working with the Witnessing Watersheds team, I created the Kearney Outdoor Learning Area (KOLA) website, crafted instructional videos for Eight Legged Encounters, and developed print material for Cool Critters. Through this work, I have gained a more diverse portfolio with projects I would have otherwise not been a part of through UNK classes and organizations on campus. These projects have allowed me to collaborate with students and faculty within different departments at UNK and have also allowed me to collaborate with more students within the Communication Department. Many students are unaware of the opportunities to combine research with creative projects. By working together with members of other departments, I have gained a better understanding of the research process, have had the opportunity to explore new creative mediums in practical settings, and have been able to set an example for other students to follow by bringing creative individuals into scientific communication.

Poster U123 – Elizabeth Neukirch
Mentor: Tiffani Luethke
Title: *The Phenomenology of Online Relationships*

The present study uses phenomenology, one of the most popular qualitative research approaches, to explore online dating. More specifically, I sought to understand the shared lived experiences of individuals who first connected with their intimate partner using a virtual platform. To date, I have interviewed seven individuals using a semi-structured interview protocol. I transcribed the interviews and used thematic analysis, assisted by MAXQDA coding software, to analyze the data. Emergent themes

included: (1) people find it convenient to connect with others online, (2) individuals are able to complete daily tasks while not having to go out of their way to meet new people, and (3) the use of online platforms help ensure safety and decrease the fear of rejection. These findings may provide implications for better understanding why some people choose to meet others through online forums and could improve safety features for those who choose to use such platforms.

Modern Languages

Poster U124– Jake Boley
Mentor: Franziska Brech
Title: *German Culture and Education*

The purpose of this research is multifold. The overarching goal is to better understand and distinguish aspects of German culture. In order to understand this broad topic, three smaller objectives will be researched. What is the structure and the objectives of the German education system? How is their education system similar and different with the American system (to help put their learning system in perspective)? How does their education system contribute to their culture? In order to find the answer, research will be done in two unique ways. Literature research will be conducted using library, government, admission requirements, and the internet. The other way research will be conducted is through a survey that will be administered to young adults in Germany this summer during a study abroad session. Hopefully, this research has provided insight into the inner workings of Germany's education system and culture.

Music, Theatre, & Dance

Poster U125 – Mitchell Lierman
Mentor: Darin Himmerich
Title: *Recording and Compiling a Student Audio Resource Library*

Independent film-making and video production platforms are a potent marketplace for content creators to find audiences and build careers. As activity in this sector of the entertainment industry has increased, the demand for both paid and open source content creation resources has followed. While stock image and video libraries have

connected with creators, audio libraries remain behind in adoption among content creators despite demand for audio elements. For this reason, the audio library creation process must change to meet consumer's ease of use expectations, with quality of resources, file organization, and end-user accessibility representing key areas for library producers to improve. This project considers the audio library development process through the stages of audio recording, post processing, file identification, categorization, storage, and publication. These stages can be grouped as content creation, description, and accessibility, each of which corresponds with one of the key areas of improvement identified above. Equipment selection during recording stages influences file quality, especially across files within large libraries. Attentive descriptions and naming conventions can improve the searchability of files for the demanding production schedules creators face. Finally, publication under the Creative Commons Attribution 3.0 Unported (CC BY 3.0) license allows users the freedom to adapt library components to their needs, free of charge, by directly downloading the file from the library's cloud repository.

Poster U126 – Tyler Clay
Mentor: Anne Foradori
Title: *The Orpheus Legend on the Lyric Stage*

There are seventy-four operas that have been based on the mythological story of Orpheus and Eurydice. The original Ancient Greek myth, written by Ovid and Virgil, is about a demigod who is the son of Apollo and a muse. It is said that Orpheus fell in love with a woman named Eurydice. Tragically, Eurydice accidentally stepped on a viper and perished. Orpheus travels to the underworld to rescue his love. After playing a song about his grief, Hades' wife was moved. As a reward for his music, Hades charged Orpheus with a task. If Orpheus could lead his beloved to the surface without looking back at her, she would be free. Sadly, Orpheus failed his test and lost Eurydice forever.

Why does this story still fascinate librettists and composers? One answer might be because of the debate and speculation that surrounds details of the story. There are many approaches to the telling of this myth. For instance, Gluck's Orfeo ed Eurydice is a tragic opera that focused on the feeling of sorrow that Orpheus felt over the death of his beloved. Offenbach's Orfeé aux Enfer is a satirical comedy that poked fun at the story as well as the hierarchy of gods in Greek mythology. The plot of Hadestown is very similar to the original myth with changes in the setting to make it more accessible to a modern audience. Monteverdi's Orfeo was one of the first Orphean operas and recounted the original myth almost in its entirety. Harrison Birtwistle's The Mask of Orpheus is a contemporary opera that explores the inconsistency of the myth. It

involves three different scenes performed in tandem, depicting every version of the story that has been recorded.

Largely focused on libretti, this project explores over 400 years of Orpheus on the lyric stage.

Poster U127 – Cole Perkins
Mentor: Anne Foradori
Title: *Russian Government Influence on its Opera Composers: 1874-1951*

This research project focuses on operas by three Russian composers corresponding to distinct periods in Russian/Soviet history. The first, Boris Godunov (1874) written by Modest Mussorgsky (1839-1881) is considered a masterpiece of 19th century Russian opera.

It was essential for composers of opera to have the approval of the Imperial Court, without whose support, a composer could not hope to have their works produced. By the time Mussorgsky wrote Boris, western European composers were enjoying more freedom in the works they could create and the support of having new works in production as soon as they were composed.

The second work examined in this research comes from the time of Josef Stalin. Dmitri Shostakovich's opera, Lady Macbeth of the Mtsensk District (1934) is a lengthy work with a dark and sinister plot about a lonely woman who poisons her father-in-law and kills her husband to take a lover. Although it was a critical success and popular with audiences, the work became a vehicle for denunciation of Shostakovich and his music by the Communist Party. It was only performed after significant revision and a title change.

The first half of the 20th century found Russia steeped in war and revolution. The Russian Revolution (1917-1923) overlapped WWI and ended centuries of Imperial rule, setting into motion political and social changes that would eventually lead to the Soviet Union. Igor Stravinsky emigrated to the United States (1939), where he obtained American citizenship and remained until his death in 1971. His last opera, The Rake's Progress (1951) was a work that was a complete departure from his Russian roots, employing a libretto by an American and a British writer and written in a neo-classical style. The Rake's Progress represents Stravinsky's departure from his heritage and embraced of a more worldly view of music, inclusive of many styles, languages, and genres.

This project examines these three celebrated operas by Russian composers against the backdrop of Russian-Soviet political history, considering socio-political and economic factors that shaped Russian opera over an 80-year period.

English

Poster U128 – Theresa Ascherl
Mentor: Rebecca Umland
Title: *The Convergence of Science and Magic in Diana Gabaldon's Outlander Novel*

Outlander, written by Diana Gabaldon is "a phenomenally successful nine-novel series (to date) with wide audience appeal. In addition, it has served as the basis for a popular Netflix TV series, with eight planned seasons, and several spin-off stories and novels. When asked at a ComiCon conference why she thinks this is true she said, "Depending on who I was talking to - if it was a young woman, I'd say, oh, historical romance - you know, men in kilts. If it was a slightly older lady, I'd say it was historical fiction. If you like Shogun, you'll love this. If it was a young man, I'd say, oh, it's fantasy - you know, time travel, things like that, swords. And if it was a slightly older gentleman, I'd say, oh, it's military history" (Aye, Sassenach? Gabaldon's Appeal Is Timeless). While these are all reasons for the book being popular, I believe Gabaldon's own background in the hard sciences, the historical period she chose for her setting, and the literary device of time travel all come together to create a tension that contributes to the success and timelessness of this work, particularly because it shows the convergence of earlier beliefs in magic with emerging science. Progress is a natural fascination of societies. Improvements in technology seem to be moving faster and faster, with that also comes the progress of scientific understanding specifically in the medical field. Diana Gabaldon uses this idea of progress in the study of medicine and science to create literally work that explores the tension created by a 20th century nurse who is trained in the medicine of the 20th century (such a vaccinations, antiseptics, etc.) and a 18th-century society that is highly superstitious about not only illness but also all other aspects of their lives. I explore this idea through the use of the narrative method timeslip, the importance of the stones, how medicine and magic interact with one another, and the implications of knowing the future.

Poster U129– Kiley Anderson
Mentor: Amanda Sladek
Title: *Authoring Oneself: A Study of Authorial Identity in Student Academic Writing Through Textual Analysis*

In a 2009 article examining how students view authorial identity in academic writing, Pittam et al. define authorial identity as "the sense a writer has of themselves as an author and the textual identity they construct in their writing" (154). Whether and how students construct authorial identity in the academic writing they are completing for classwork has a significant impact on both the quality of the work produced and the level of satisfaction and amount of knowledge they gain from completing it. In my project, I utilized corpus linguistic analysis in an effort to uncover patterns of authorial identity development and understand how factors such as grade level, native language, and discipline may affect the authorial identity a student possesses. To do this, I accessed student papers from the University of Michigan's Corpus of Upper-Level Student Papers, divided by discipline, and sorted them using NVivo, a qualitative research software. Using NVivo alongside AntConc, a free corpus linguistics tool, I was able to study the occurrence of personal pronouns used throughout papers in multiple disciplines and compare the results and track patterns. This allows for a view into students' perspectives of themselves as part of a larger scholarly community and how they convey that in their own writing, which plays a significant role in their authorial identity. Furthermore, through a close reading of student papers within the discipline of English, I aimed to determine if there is a link between authorial identity and effective citation and quotation practices. My poster outlines my methodology and research questions, provides visual and written representations of the data I have collected so far, and suggests questions and areas for future research.

Poster U130 – Coleman Riggins
Mentor: Amanda Sladek
Title: *Gender Bias in English Academic Writing*

Through the concordance tool, AntConc, I have scanned academic English journals dating back to the 1970s for the use of gendered nouns and compared it with the use of gender-neutral nouns. This study's purpose is to track the evolution of language through the lens of gender. Concordance tools like AntConc scan uploaded documents and provide a list of words. AntConc provides a range of words that can be read to determine context as well which this research also utilizes. Gendered nouns refer to words like "man" or "woman" that heavily lean towards either a more masculine or feminine meaning. A gender-neutral noun would be like the word "person," which conveys the same meaning without having an inherently masculine or feminine

meaning. This study avoids focusing on the use of masculine or feminine nouns referring to a specific person and only focuses on the generic (referring to a large, unspecific population) uses of these nouns. Looking at the academic journals, College Composition and Communication, College English, Composition Studies, Research in the Teaching of English, and the Journal of Basic Writing, this research studies them and tracks our progress through them. Publications from every five years since 1970 were pulled for concordance research and then I analyzed the use of gendered and gender-neutral nouns, tallied them, and created graphs to document the results to see where patterns or shifts seem to overlap and why that might be. From there, I analyzed potential reasons for these shifts in the language, whether it be on the editorial level from some of these journals or on a societal level. In the end, we have a documentation of results highlighting the change in the use of gendered nouns in academic writing over the past fifty years.

History

Poster U131 - Logan Osmera
Mentor: Will Stoutamire
Title: *Loup City's Jenner's Park: A History*

Our progress on Loup City's Jenner's Park has been incredibly promising as of now. Our original goals of determining the Jenner brother's motivations, how they obtained the items for their park and the item's fate after the park's closure have expanded as more information about the park and the Jenner brothers has come to light, with the project now including a focus on the Jenner brothers and what form and shape the park took on.

In total, we have collected 70 photographs, 114 newspaper clippings, complete scans of the official 1927 Jenner's Park guide and a 1982 thesis paper about the park, several maps and atlases, and a video from the show The Nebraska Trail. We collected these materials via research trips to both History Nebraska in Lincoln and to the Sherman County Historical Society and Jenner's Park itself, both in Loup City, and from online archives such as Newspapers.com and History Nebraska's collections.

With these materials and research trips, we put together a few resources to get a clearer picture of the park and the brothers. These include a collections database with 507 entries, detailing every object claimed to be in the park's two museums via the 1927 guide, including the object's name, origin, age, and material. We have also created a rough map of the park and have been in contact with other institutions to

further research the Jenner brothers and the park's past, such as King's College in London, which one of the brothers claims to have graduated from.

With these resources and materials, the plan is to present these findings via a poster at Research Day. The poster itself will present a brief history of the park and the Jenner brothers, the park's museum's collections, as well as a couple other aspects of the park.

Undergraduate Performances

Bailey Manhart
Mentor: David Nabb
Title: *A Musical Journey with the Concerto for Eb Saxophone and Orchestra, Op. 109*

The purpose of this study is to study and perform The Concerto for Eb Saxophone and Orchestra Op. 109 by Alexander Glazunov. This work presents many technical challenges the Concerto offers to the soloist. My interest in this piece started in 2016 with my attempt to learn and perform an excerpt for high school District Music Contest. Since then, I have revisited the Concerto countless times with UNK Saxophone Professor Dr. David Nabb.

On October 7, 2022 I performed the Concerto at UNK's Concerto/Aria Competition, this performance was recorded, and I was chosen as a winner. On February 1, I applied to perform the Concerto in a masterclass given by University for Illinois Saxophone Professor Dr. Debra Richmeyer at the 2023 NASA (North American Saxophone Alliance) Biennial conference on April 1, 2023 at the University of Southern Mississippi in Hattiesburg, MS. The October 7 competition win gave me the opportunity to rehearse the work with KSO (Kearney Symphony Orchestra) and perform it with the with KSO March 7, 2023.

In my UNK Student Research Day performance, I will orally discuss as well as demonstrate with my saxophone specific outcomes from my study of the Concerto the April 1 masterclass with Dr. Richtmeyer. Dr. Richtmeyer will be giving me live, real-time feedback in the class. I will go through her comments and discuss how these new ideas influence my saxophone study and my understanding of this work.

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