

# Schedule of Events

**March 31, 2022**

Nebraskan Student Union Ponderosa Rooms



## Thursday, March 31

**7:30 - 9:00 am** ..... Students set up posters, Ponderosa A&B

**10:00 am - 3:00 pm** ..... Open poster viewing, Ponderosa A&B

**10:00 am - 11:00 am** ..... Natural & Physical Sciences Poster Presentations & Judging

**11:00 – 12:00 pm** ..... Behavioral & Social Sciences Poster Presentation & Judging

**12:00 – 1:00 pm** ..... Professional & Applied Studies Poster Presentation & Judging

**1:00 – 2:00 pm** ..... Fine Arts & Humanities Poster Presentation & Judging

**11:00 am to 2:00 pm** ..... Oral Presentations-Ponderosa C&D

**2:00 PM** ..... Dance Performance – Sandhills Room

**4:00 pm** ..... Awards Reception

# Undergraduate Oral Presentation Schedule



**Thursday, March 31, 2022**

**Room: Ponderosa C**

- 11:00 am---**Ty Masco:** *Soil Properties, Forage Quality, and Ground Cover Differ Between Native and Restored Prairies* - (Mentor - Gregory Pec)
- 11:15 am ---**Ellie Morrison:** *Potential Hybridization Between Two Species of California Salvia* (Mentor – Bryan Drew)
- 11:30 am ---**Leigh-Anne Lehman:** *Examination of Sex-Specific Differences in Type 2 Innate Lymphoid Cells and Adaptive Immune Responses Following Peanut Exposure* (Mentor – Joseph Dolence)
- 11:45 am ---**Kaelinn Friesen:** *Prevalence of Bacterial Pathogens in Eastern Nebraska Tick Population* (Mentor – Julie Shaffer)
- 12:00 pm ---**Kiley Anderson:** *The Poetry and Public Persona of Phillis Wheatley* (Mentor – Maria O'Malley)
- 12:15 pm ---**Caralyn Bundi:** *The Fourth Horseman of the Apocalypse - Pestilence* (Mentor – Denys VanRenen)
- 12:30 pm ---**Caitlin Armbrust:** *Women in Modernist Literature Who Enable the Patriarchy & How it Applies to Women Today* (Mentor – Annarose Steinke)

- 12:45 pm --- **Gracie Luebbe:** *An Analysis of the Traits Which Form the Identities of Three Women within There There* (Mentor – Janet Graham)
- 1:00 pm ----- **Courtney Ostrander:** *Acceptability of GrandPad in Older Adults: Preliminary Results of a Case-Study* (Mentor – Ladan Ghazi Saidi)
- 1:15 pm ----- **Charlotte Griffith:** *Management of Depression and Anxiety in Patient Aphasia* (Mentor – Ladan Ghazi Saidi)
- 1:30 pm ----- **Tristan Larson:** *Shoulder Complex and Trunk Dynamic Motion Changes Across the Season will be Beneficial to Identify Their Training Load and Musculoskeletal Stresses* (Mentor – Kazuma Akehi)
- 1:45 pm ----- **Kevin Burd:** *Pros Turned Cons: Correlation Between Celebrity Status and Punishment for Crimes* (Mentor – Thomas Orr)

### **Room: Ponderosa D**

- 11:00 am --- **Sarah Chandler** *Bacterial Disease Presence in Hall County, Nebraska Tick Populations* (Mentor – Julie Shaffer)
- 11:15 am --- **Samantha Mercer:** *Jumping Species: Spilling the Beans on the Next Epidemic* (Mentor – Julie Shaffer)
- 11:30 am --- **Emma Weis:** *Staphylococcus Aureus Persisters Exhibit Increased Survival to Components of the Innate Immune System* (Mentor – Austin Nuxoll)
- 11:45 am --- **Trenten Theis:** *Increased Persister Formation in Staphylococcus Aureus Leads to Increased Survival within a Host* (Mentor – Austin Nuxoll)

- 12:00 pm ---**Elijah Lynch:** *Shadows of Paradise: Dante's Muse and Portrait of a Lady on Fire* (Mentor – Rebecca Umland)
- 12:15 pm ---**Joshua Wetovick:** *Making Music in Alfred Lord Tennyson's Arthurian Epic, "Idylls of the King"* (Mentor – Rebecca Umland)
- 12:30 pm ---**Miranda Niemeyer:** *The Willingness to See: An Analysis of Grace and Edith Abbott's Efforts in Social Work* (Mentor – David Vail)
- 12:45 pm ---**Jonathan Drozda:** *The Significance of Character: Persons and Races of Middle-Earth* (Mentor – David Rozema)
- 1:00 pm -----**Nate Grimm:** *Exploring the Mental Health Needs of University Student-Athletes During COVID-19* (Mentor – Krista Fritson)
- 1:15 pm -----**Maria Bergner:** *A Systematic Review of the Programs and Existing Online Games for Children Aimed to Address the Issues of Racism and Racial Discrimination Across all Minority Groups* (Mentor – Ladan Hui Liew)
- 1:30 -----**Will Babbitt:** *The World War II Correspondence of Rodney "Buddy" Babbitt* (Mentor Jeff Wells)

# Graduate Online Oral Presentation Abstracts



## English

**Christy Thompson**

Mentor: Janet Graham

Title: A Cultural Materialist Suitcase Made of Bone

This essay will unpack the complex themes of immigration labor and identity that the author Faye Myenne Ng weaves throughout her novel *Bone* as she makes readers laugh, cry, and wait throughout a complex timeline integrated with political and historical elements. Ng's novel can be excavated using cultural materialistic tools to explore Leila's journey of grief and acceptance along with the discovery of a suitcase containing ties to her heritage since relevant history is past and present. The four key characteristics of a Cultural Materialistic literary lens are historical context, theoretical method, political commitment, and textual analysis as described by experts Dollimore and Sinfield. The essay focuses on the main character Leila and the lessons within her Bildungsroman journey throughout the complicated timeline as she learns to accept and appreciate her binary identity as a second-generation Asian American. My research on immigration issues and laws will provide insight and parallels to the author's life and showcase key historical elements within the novel that affected thousands of immigrants and their families. The opposition of the cultural and political standard regarding the treatment of women and immigrants in the lower-class conditions is also explored. In essence, the discourse Ng used with the unique reverse chronological timeline marked with key historical elements contribute to Leila's invaluable connection to her cultural and familial roots which are part of her binary identity and ultimate journey to freedom. Within Leila's journey, lessons can be found that may be valuable to one's personal journey in the quest for knowledge and a richer understanding of issues regarding immigration, humanity, and the heart.

# History

## **Braydon Conell**

Mentor: Linda Van Ingen

Title: *The Rise and Influence of the Homophile Movement: A Historiographical Essay*

A turning point for the acceptance of gay individuals in American society was the removal of homosexuality from the list of mental disorders of the American Psychological Association's Diagnostical and Statistical Manual (DSM) in 1973. But this acceptance was neither the end, nor the beginning, of gay activism. During both World War II and the Korean War, gay men were excluded from military service based on sexuality. This exclusion created a gay identity that evolved to having the goal of fighting for integration. This essay discusses what past scholars have discovered about this topic. From seclusion in rural areas to being attacked in urban political culture, gay men and women nevertheless created their own tools for inclusion and liberation. The thesis that will stem from this historiographical essay will discuss the resulting rise of the homophile movement following World War II and the Korean War, focusing on the voices of gay men and women in the Midwestern United States. The focus of this research is from the 1950s through the 1980s, a time traditionally seen as hostile to homosexuals. Yet during this period, a flourishing underground – but increasing visible – movement emerged that extended far beyond the coasts. Coming out of the Vietnam War, these gay activists were posed with new challenges, the biggest of which became the HIV/AIDS crisis of the 1980s. The homophile movement, though not typically the focus of queer politics, was uniquely positioned to help handle the AIDS crisis, something the national government was inept to do themselves.

## **Brandon Eldridge**

Mentor: Torsten Homberger

Title: *Circumventing the Law: The Legal History of Nazi Germany*

The following research details the legal history from the Weimar Republic's time through the rise of Adolf Hitler as he became the Chancellor of Germany, eventual Führer, and led to the extermination of the Jewish people. The traditional approach to the historiography focuses on military, social, cultural, or other aspects of the history of Nazi Germany. The legal steps taken by Hitler and the Nazi party made all the deplorable actions possible. The research's focus details laws, proclamations, and decrees of the Nationalsozialistische Deutsche Arbeiterpartei (NSDAP), known as the National Socialist German Workers' or Nazi Party, and how they circumvented the law to create a fascist state. The legal history includes the creation of democracy and the

constitution of the Weimar Republic. The constitution's analysis includes how the Nazi party wanted to take down this democratic government style. The legal structure of Nazi Germany would not have been possible without Article forty-eight of the Weimar Republic's Constitution. This article allowed for the suspension of civil liberties and subverting the 1919 constitution under "emergency provisions." The research examines this article of the document and emphasizes its importance to allowing Nazi Germany to be conceivable. It shows a step-by-step approach that the Nazis took to enact this plan that would change Germany's trajectory from a representative democracy to a fascist state and dismantle the Weimar Republic's legal structure. The research shows that the Nazi party did not break legal precedence but circumvented the spirit of the law to create a dictatorial regime focused on eliminating undesirables from society. Finally, the legal history emphasizes the infamous Wannsee Conference and how Hitler enacted the plan for mass exterminations using the new legal structure.

## Kinesiology and Sports Sciences

### **Amy Kofoed**

Mentor: Elena Robinson

Co-Author: Scott Unruh

Title: *Management of Achilles Tendinopathy in Patient Presenting with Celiac Disease and Joint Hypermobility: A Case Study*

A 37-year-old female presented with a chronic onset of pain and decreased function in her left ankle for about a year and a half. Initial evaluation revealed left ankle swelling, localized bruising, stiffness, difficulty weight-bearing, and radiating pain in the lower leg. The patient has a history of recurrent subluxations/dislocations within the shoulder, ankle, and knee regions along with previous diagnoses of Celiac disease and joint hypermobility syndrome. Surgical intervention included Achilles tendon debridement and repair, retrocalcaneal bursectomy, and a Haglund's deformity excision. Upon completion of surgery, the patient was treated by athletic training clinicians and students at an injury clinic. Post-surgical treatment focused on management of surgical incisions, increasing range of motion and strength, advancing proprioception for the ankle, and a return-to-activity progression. Within about 14 weeks, the patient showed adequate function and was able to resume daily activities while continuing a home exercise plan. This case portrays evaluation and management of a common chronic condition affected by unique patient history.

## **Olivia Slater**

Mentor: Megan Adkins

Co-Authors: Mila Serefko, Jada Ruff

Title: *Building a Better Online Classroom: An Analysis of Student Feedback Regarding Common Distance Learning Tools and Instructional Strategies*

Online learning has shown significant growth over the last decade and has become a prominent delivery system of course work for students attending Universities. Given the continual increase and importance of online education it is imperative for researchers to understand current and future means to enhance the online learning experience and explore effective teaching strategies best suited for the diverse student population enrolled in online courses. To initiate a better understanding related to online learning, and student perceptions 376 undergraduate and graduate students, identified as completing at least one online course, at a small Midwestern university participated in the study. Participants were prompted to answer 11 close and open-ended survey questions based on their online course experience. Results indicate participants value meeting their instructor virtually or in-person and felt multimodal approaches of teaching improved understanding and interest related to the course. Areas of improvement included the desire for the teacher to incorporate more “real world” activities and assignments, as well as less discussion board and more video interactions with the class. The results of the study have implications for online instructors, instructional designers, and administrators who hope to enhance student engagement in online courses and continue to evolve learning opportunities within the University setting.

## **Carol Wieck**

Mentors: Shannon Mulhearn

Title: *Bringing Quality Physical Education to the Homeschool Community: A Proposed Study*

The homeschool community is a growing community. There are currently 3.7 million K-12 students who are homeschooled in the United States, and the National Home Education Research Institute reported that the percentage of households with homeschooled children has increased from 5.4% to 11.1% from March 2020 to March 2021. These students need access to quality physical education just like other students in the United States, which includes a standards-based curriculum. In the past 10 years, although 1,372 publications mention “Homeschool”, “Physical Education”, and “Curriculum”, only 9 articles were found that also noted “National Standards”.

Additionally, none of the articles is directly related to a physical education curriculum designed for Homeschool families. Therefore, the purpose of the proposed multi-phase community-based participatory research study is to determine the needs of homeschool parents for a standards-based, quality physical education curriculum. This proposal focuses solely on Phase I. Methods: Phase I of this study will use both quantitative and qualitative methodology. Phase 1 will be guided by the following questions: (1) What is currently available to homeschool parents for physical education? (2) What are the criteria for homeschool physical education from the state of Nebraska? (3) What are parent perceptions about the need for physical education curriculum? Implications: Findings from Phase I will be used to inform future phases including curricula designed to address homeschool community needs while also ensuring a connection to national standards.

### **Sophie Mellema**

Mentors: Kazuma Akehi

Title: *Effects of High Intensity Laser Therapy on Passive Knee Joint Range of Motion and Musculotendinous Mechanical Properties*

Context: High intensity laser therapy (HILT) has been used for the treatment of various musculoskeletal conditions, aiming to control pain and facilitate to regeneration of the tissue. However, it is inconclusive how much passive tissue mechanical resistive properties and joint range of motion (ROM) will change after the HILT on thigh muscles. Objective: The purpose of this study is to examine if a 4-week of HILT session influences passive musculotendinous stiffness (MTS) and ROM for the hip extensor muscles comparing to the control. Study Design: Factorial study will be used. Participants: Twelve active female athletes at the University of Nebraska at Kearney and twelve recreationally active college-aged females will be recruited. Each participant should have a chronic hamstring tightness yet have no known musculoskeletal injuries in the dominant side of the leg in the last 6 months prior to the data collection. Procedure: Passive hip flexion ROM and MTS will be measured at two different times (pre- and post-HILT session). ROM and MTS will be measured using a load cell and wireless digital goniometer during manual passive hip flexion motion at 5°/second. Following the initial assessment, participants will be randomly assigned to the HILT or control group. The HILT group will experience a treatment twice a week for 4 weeks. Following the 4-week treatment session, participants will be back for the follow-up assessment. We hypothesized that DTLT would allow a greater increase of ROM and less MTS compared to the control group. Clinical Application: The results of this study would provide better clinical insights of the modern and advanced laser therapy to improve musculotendinous characteristics and joint mobility.

# Teacher Education

## **Paul Dye**

Mentors: Martonia Gaskill

Title: *Virtual Reality, 3D and 2D Learning: A Study in Visual, Interactive Tools in the Field of Medicine.*

The pursuit of improved patient outcomes through the evolution in medical education is ongoing. Traditional, didactic learning methods are still utilized as a primary modality throughout medical learning (Newman & Lattouf, 2020). To address deficits in understanding and retention of learning material, experiential learning methods are increasingly employed with some success (Satterlee, 2008, p. 332). Within the realm of experiential learning are visual technologies, such as touch-interactive, 3D and Virtual Reality that offer new ways of teaching typically challenging concepts. The following presentation will cover the impact of visualization-based learning methods in medical education in relation to educational value, collaboration, conceptual skills and engagement. This impact will be quantified by data gathered from exercises in medical education, utilizing a variety of visualization modalities.

# Undergraduate Oral Presentation Abstracts



## Fine Arts & Humanities

### English

#### **Kiley Anderson**

Mentor: Maria O'Malley

Title: *The Poetry and Public Persona of Phillis Wheatley*

In 1773, Phillis Wheatley's *Poems on Various Subjects* was published in London, becoming the first book to be published by an African American woman. Perhaps even more significantly, Wheatley (1753-1784) was still enslaved at the time of the book's publication. In my presentation, I will examine what Wheatley accomplished politically through her poetry as well as her public persona. First, through a close reading of one of her poems, I will demonstrate the political and discursive significance of Wheatley's poetic and artistic choices. Dissecting Wheatley's poem allows for an investigation into the tension of whether or not Wheatley intentionally subverted the neoclassical poetic form in order to advocate politically and what impact that has on the ultimate political significance of her work. Then, primarily working through the lens of English scholar Lauren Berlant's theory of "diva citizenship," I will consider the ways in which Wheatley's public persona and the imperative that she engage in a sort of performance in order to gain access to the public sphere ultimately influenced the impact her poetry was able to have. The way Wheatley as a person was portrayed publicly fundamentally altered the type of artist that Wheatley as a poet was permitted to be, and in a way, both limited and paved the way for the type of political influence her work was able to have. A close reading of Wheatley's work as well as a historical survey of the cultural and societal forces that shaped her public persona and the way her work was received have implications for our modern-day reading of Wheatley as well as other poets. While Wheatley's work is widely read in college courses covering early American literature, we must consider how the cultural and critical narrative surrounding Wheatley has focused primarily on her person as opposed to her poetry and how that

may negatively impact the objective appreciation we are able to have for her writing. Furthermore, a thorough examination of the forces that positioned Wheatley for the relative literary success she was able to achieve necessitates that we consider the other Black women poets and writers who have been excluded from the literary canon.

### **Elijah Lynch**

Mentor: Rebecca Umland

Title: *Shadows of Paradise: Dante's Muse and Portrait of a Lady on Fire*

No figure is more central to Dante's *Divine Comedy*, to Dante's entire history, than *Paradise's* Beatrice. Her presence, her existence, invented a new way of representing and expressing love – a Romantic form built from images of her brilliance and intelligence that has lingered on throughout the ages: the muse.

Over the last few centuries, the muse has appeared and reappeared in popular art, perhaps most especially in literature. Goethe's *Sorrows of Young Werther*, Mann's *Death in Venice*, though centuries apart, connected their art to Dante's through their muses, explored and developed upon what the muse meant as a figure through art, through metaphor, and through image in their own times, their own eras. In 2019, Celine Sciamma's film *Portrait of a Lady on Fire* modernized the muse again – bringing its own Beatrice to life through the language of cinema, dissecting the muse and the portrait of the muse, connecting the visual and the textual through a shared poetic intention. Its expression, unique as it is, directly connects to Dante's *Commedia* – intertwining myth and man (through Orpheus), the power and scope of the muse (through Heloise's character and Marianne's portrait) – and develops a bond with Dante through its artform, using film as a medium for its muse just as Dante used his poetry. By considering how *Portrait* uses poetry in a cinematic sense, we can see how Dante's muse persists and grows (remains evocative and modern) and how it stays essentially timeless, how the new still reflects Beatrice and her *Paradise*.

### **Caitlin Armbrust**

Mentor: Annarose Steinke

Title: *Women in Modernist Literature Who Enable the Patriarchy & How It Applies to Women Today*

Virginia Woolf, Zora Neale Hurston, and Eileen Chang. Three names who have undoubtedly left a permanent impression on the literary world. These modernist writers wrote not only to entertain readers, but to give insight into the life of women and to argue for change. Even though the backgrounds of Woolf, Hurston, and Chang are drastically different, they all shared feminist beliefs. Beliefs that patriarchal societies control women by boxing them into their gender role. But what Woolf, Hurston, and

Chang do differently within their works, is the inclusion that women are just as guilty of upholding the patriarchy as men. This argument is most evident in their works, *Mrs Dalloway*, *Their Eyes Were Watching God*, and *Love in a Fallen City*. Woolf wrote *Mrs Dalloway* to criticize women who perpetuate the patriarchal society by making examples of her female characters, Sally Seton, Lucrezia Smith, and Clarissa Dalloway, who forgo feminist ideas, condemn unmasculine men, and value social standing over equality. Hurston wrote *Their Eyes Were Watching God* to show how a patriarchal society affects African American women through her protagonist Janie and her three marriages. Chang wrote *Love in a Fallen City* to illustrate how worldwide the epidemic of the patriarchy is and how it goes back generations to the point of it becoming customary in cultures using Bai Liusu as an example. The takeaway from *Mrs Dalloway*, *Their Eyes Were Watching God*, and *Love in a Fallen City*, is that for feminists to succeed in overthrowing patriarchal societies and replacing them with social equality or for feminism to exist at all, all women, regardless of age, ethnicity, and background, must work collectively to dismantle the patriarchal system that plagues human societies.

### **Gracie Luebbe**

Mentor: Janet Graham

Title: *An Analysis of the Traits which Form the Identities of Three Women within There There*

Contemporary works of literature such as *There There* by Tommy Orange depict the trials of people with multicultural backgrounds. These trials, involving issues with Indigenous identity and motherhood, can be viewed under the lens of intersectionality. Intersectionality is a theory created by Kimberle Crenshaw which states that people are predisposed to a set of characteristics and social categorizations like ethnicity or gender which will inherently place them in disadvantageous spots. Three women characters from *There There* each fall under the social categorizations of women of color who are also single mothers which are key components of their identities. These characters' story arcs are followed through the story and are presented with many obstacles which test their self perceptions and abilities to navigate their lives as multicultural women and mothers. Viewing the obstacles they face as effects arising from the causal agents of intersectionality allows for greater comprehension of how these women's identities, and the identities of their children, can be heavily influenced by their respective traits.

## **Carolyn Bundi**

Mentor: Denys VanRenen

Title: *The Fourth Horseman Of The Apocalypse - Pestilence*

Writing about the contemporary COVID-19 pandemic, Zadie Smith describes the different stages of the pandemic. She describes her busy city life that comes to a halt at the beginning of the pandemic. During this halt, she contemplates fertility. She writes “I had ‘cycles’. They did not. I was to pay attention to ‘clocks’. They needn’t.” (Smith, 4). Smith also explores the shock the virus had on Americans in her essay “The American Exception”. She suggests that death wasn’t a new realization amongst the Americans, instead, they expected the death toll to be isolated to people in the “wrong place, wrong time. Wrong colour. Wrong side of the tracks. Wrong postcode, wrong beliefs, wrong city... wrong attitude to the police officer” (13). She criticizes American society for only caring about the death of the white and privileged. She continues to state that “death is absolute...[and] irrespective of position” (13).

Smith creates a metaphor in her final essay, “Postscript: Contempt as a Virus”. She suggests that contempt is a silent virus that is easily transmittable and spreads quickly. She suggests that contempt is “less flashy than hate” (73), it consumes the host because just like the virus, contempt doesn’t discriminate between its hosts. Smith focuses on the events that lead to the murder of George Floyd as an example of the consequences of contempt. She writes, “the... infection comes the moment the store in question calls the cops and the voice down the line asks after the race of this master criminal... the answer ‘black’ immediately carries with a heavy load” (76). This passage suggests that simple identifying quality is enough to treat another human being like their need to breathe is a nuisance.

This supports my readings of Mary Seacole, a nineteenth-century Jamaican-Scottish nurse, and businesswoman. Once she left Jamaica and went to England, she knew she would have difficulty convincing the British army that “an unknown Creole woman would be useful to their army” (Seacole 70). When Seacole arrived at the war office, she was rejected by Florence Nightingale. Seacole writes “had there been a vacancy, I should no have been chosen to fill it.” (73). Being a stubborn woman, she makes her own way to the Crimean war and sets up a British Hotel to support the soldiers independently. However, she ponders, “Was it possible that the American prejudices against colour had some root here?” (73). Seacole also notes that her skills would have been made to use in her country but even with references and people to vouch for her, she couldn’t get employment with the British Army. Both Seacole and Smith note trends that have been around for hundreds of years. Abram X. Kendi’s “Stamped From the Beginning” suggests that colour prejudice existed in the ancient world when Aristotle claimed that Africans had “burnt faces... and viewed as ugly” (Kendi 17).

As a counterexample, Colson Whitehead doesn't distinguish his characters by skin colour. In his zombie-filled eutopia, race doesn't matter. Their aim is to live to the next day. He suggests that plague is a symptom of society, people mindlessly navigate through life. He does however make distinctions between the different zombies and how they are killed. Whitehead writes "Buffalo's still trying to figure out what makes one person become your regular pain-in-the-ass skel... and what makes another into a straggler. That one percent" (119) This is a reflection of attitudes toward foreign bodies. This also signifies fear of the unknown, fear of those from an outside population.

Smith, Seacole and Whitehead all criticize the treatment of those who are not familiar to use and the pressures of dealing with epidemics and pandemics exacerbate these attitudes. Smith believed that a vaccine might be possible if these instances are not ignored, if the injustices are revealed with each generation there might be widespread herd immunity might be achieved but colour prejudice is so deep-rooted that she doesn't believe it can be eradicated.

### **Joshua Wetovick**

Mentor: Rebecca Umland

Title: *Making Music in Alfred Lord Tennyson's Arthurian Epic, "Idylls of the King"*

Alfred Lord Tennyson's *Idylls of the King* is not only a rich and widely-celebrated retelling of the Arthurian legend, but also a Romantic tale of the mysticism and charm of music. For my project, "Making Music in Alfred Lord Tennyson's Arthurian Epic, 'Idylls of the King'", I am researching and analyzing music in Tennyson's *Idylls of the King*. My areas of research and analysis fall under three main points: Tennyson's foundations in music and the music of his era, structural analyses of the songs from musical and poetic perspectives, and analyses of the songs within the context of their idylls and their relations to the work as a whole. My further research dives into other musical motifs from texts that may have inspired Tennyson, such as Celtic myth and other works. My analysis is unique because, as a trained musician, I can approach the work from both a literary perspective and a musical perspective. There have been some scholarly works about music in *Idylls of the King*, but the topic is largely unexplored. I intend to not only offer my analyses of the sparsely discussed topics, but also of the unexplored musicality of the work.

# History

## **Miranda Niemeyer**

Mentor: David Vail

Title: *The Willingness to See: An Analysis of Grace and Edith Abbott's Efforts in Social Work*

This project highlights the vast contributions of Nebraska natives and social justice activists Grace and Edith Abbott. The Abbott sisters are fundamental figures in the history of public health, education, and the expansion of social welfare in the first three decades of the twentieth century. During their work in politics, the Abbotts saw severe problems in child labor, immigration, and women's rights and argued for public reforms.

This project's analysis of primary sources illustrates the many accomplishments of the Abbotts during their lifetime such as founding the U.S. Children's Bureau, writing the Social Security Act, and providing a new array of jobs for aspiring social workers. These federal acts of service underscore the Abbotts's persistent influence on society.

My project's research highlights the Abbotts' ongoing reform efforts that go beyond the scope of legal barriers to bring more comprehensive social change. From Grand Island Nebraska to the Hull House in Chicago Illinois, to holding high government positions, Grace, and Edith Abbott show how two small-town sisters can defy social, legal, and financial barriers to make a difference in millions of lives and create a solid foundation for the continuation of social welfare development.

# Philosophy

## **Jonathan Drozda**

Mentor: David Rozema

Title: *The Significance of Character: Persons and Races of Middle-Earth*

Roughly 2,300 years ago, a man named Aristotle wrote Nicomachean Ethics in which discussion concerning man's function takes place. One of Aristotle's primary goals in this work was to figure out what it means for man to be happy ("Happiness is a certain sort of activity of the soul in accord with virtue"). Using practical insights from Aristotle's work, a critical analysis of the beings in The Lord of the Rings was conducted. J.R.R. Tolkien's races in Middle-earth are not merely different kinds of creatures as is the case with the animals found on one's commute to class or work. The races of Middle-

earth are different expressions of a person. From this recognition of these different races being comprised of many persons, the philosophical thought of Karol Wojtyła (more commonly known as Pope Saint John Paul II) was employed from his work *Love and Responsibility* to better interpret the significance of each member of these races constituting a person. Among the philosophical analyses done by Karol Wojtyła concerning the person used in this research are his insights into proper treatment and the worth of a person

("It must be said that the person as a subject differs from even the most perfect animals by his interiority and a specific life, which is concentrated in it, i.e., an interior life").

The analysis conducted in this research examined which beings of Middle-earth constitute a race (many persons of the same kind) and what virtues and vices each race was most prone to have as a factor of being a person in that specific race. This was done to better understand the races of Middle-earth and why J.R.R. Tolkien decided to have these different races in his books.

## **Behavioral & Social Sciences**

### **Psychology**

#### **Nate Grimm**

Mentor: Krista Fritson

Title: *Exploring the Mental Health Needs of University Student-Athletes During COVID-19*

The COVID-19 pandemic has had a tremendous effect on the world of athletics. At the beginning of the pandemic, factors like strict health measures and protocols, social isolation, and uncertainties about the future negatively affected athletes' well-being (NCAA Research, 2020). The present study explores if student-athletes' mental health, specifically depression, anxiety, and reaction to competition has improved as the pandemic restrictions/impact decreased. Additionally, I examine the impact that participation in team meetings with a psychologist had on these factors. To research this, 166 student-athletes (18-24 years old) attending a Division-II University from the Midwest completed three different questionnaires, the PHQ-9, GAD-7, and SAS-2, across three successive semesters. A MANOVA revealed a significant decrease in

anxiety and depression among these athletes as pandemic restrictions decreased. Furthermore, an additional MANOVA revealed athletes involved in team meetings reported higher levels of worry, concentration disruption, and somatic anxiety. Possible explanations of the finding are discussed. Identifying the effects of the COVID-19 pandemic can further assist professionals in developing strategies to boost student-athlete mental well-being and performance during major disruptions to the lives of student-athletes.

## Sociology

### **Maria Bergner**

Mentor: Hui Liew

Title: *A systematic review of the programs and existing online games for children aimed to address the issues of racism and racial discrimination across all minority groups.*

Racism is a broad topic that has been well studied and documented for many years, so much so that myriads of branches of studies have sprung up underneath this topic. Racism and racial discrimination are found to be some of the common stressors in the lives of many children with growing evidence of negative associations between racial discrimination and the cognitive development of these vulnerable demographic which it carries through into adulthood. Addressing racism and racial discrimination is of utmost importance and should be one of the core priorities in public health particularly for children, yet little progress has been made in terms of programs to address racism and racial discrimination and its implications on the cognitive development of children and adolescents particularly those that extend the discourse beyond the Black-White framework.

This research aims to examine the programs created in addressing the issues of racism and racial discrimination in children between the age of two to twelve across all minority groups.

Drawing on literature review of quantitative data of four programs and identifying existing online games that aim to address racism and racial discrimination for children between the age of two to twelve, I examine three questions (1) What program/ approaches have yielded favorable outcomes? (2) What are the problems/challenges with the development of/implementation of such programs? And (3) What online games are currently in existence that focus on racism and racial discrimination and what age groups were the online games developed for?

Findings from the literature review of quantitative data of four programs and identifying existing online games show the correlation between the use of technology, the education system, and the discourse of racism. Schools are key settings in the lives of children, school communities, teachers, peers, and guardians greatly influence children and adolescents' beliefs. Additionally, although such programs are implemented by the education system, data showed that programs that are done at school, if not implemented and strengthened at home, would not be effective in addressing the issues of racism and racial discrimination.

These findings shed light on the potential of educational programs to improve the perceptions of children on the discourse about racism and racial discrimination. These findings also provided qualitative evidence of the potential use of technology in affecting behavioral change both negatively and positively.

## Natural & Physical Sciences

### Biology

#### **Ty Masco**

Mentor: Gregory Pec

Co-Author: Shaylee Johnson

Title: *Soil Properties, Forage Quality, and Ground Cover Differ Between Native and Restored Prairies*

Understanding key ecological differences between native and restored prairies is essential to effectively managing these systems. In particular, we lack understanding of the interactions, whether positive, negative or neutral, that may exist between seemingly independent components of prairie ecosystems such as soil properties, grass forage quality, and ground cover. In this study, we investigated a suite of soil properties and grass forage quality metrics across native remnant and recently restored prairies in central Nebraska. Soil properties (i.e., soil macro- and micro-nutrients, soil moisture, soil water potential, soil organic matter, and pH) along with grass forage quality measures (i.e., crude protein, neutral detergent fiber, total digestible nutrients, ash, and relative forage quality) were compared between native remnant and recently restored prairies. Additionally, vegetative cover estimates were used to infer any changes in aboveground plant productivity within both native remnant versus recently restored prairies. Overall, recently restored prairies had higher soil nutrient availability and higher grass forage quality than native remnant sites. Interestingly, we found a positive relationship between soil nutrient availability and

percent neutral detergent fiber, an indicator of feed value, across grass species in both native remnant and restored sites. Furthermore, vegetative grass cover was higher in recently restored prairie sites while herbaceous plant cover was higher in native remnant sites. Taken together, these findings increase knowledge about prairie restoration dynamics from both an above- and below-ground perspective which can provide additional information about the management of native and restored prairies.

## **Trenten Theis**

Mentor: Austin Nuxoll

Title: *Increased Persister Formation in Staphylococcus Aureus Leads to Increased Survival Within a Host*

*Staphylococcus aureus* is a gram-positive bacterium responsible for 3 million cases of infection in the United States every year. A major concern with *S. aureus* is the possibility of chronic recurring infections or relapse in indwelling device biofilm mediated infections. One potential reason for this is the presence of persister cells - a dormant type of cell that exhibits high tolerance for antibiotics. Recent studies have shown a connection between low intracellular ATP/low membrane potential and persister cell formation. Specifically, this decrease in ATP, and therefore the increase in persister cell formation, comes from an interrupted tricarboxylic acid (TCA) cycle. However, persister cells' role in pathogenesis remains unclear. To investigate this, a biofilm mediated catheter model was performed with C57Bl/6 male and female mice. Results showed female mice were trending towards more frequently clearing HG003 wild type *S. aureus* compared to *fumC* (TCA cycle gene) knockout *S. aureus*. To investigate this trend, a biofilm kill assay was performed. In this assay, the *fumC* knockout biofilm exhibited similar survival compared to HG003 *S. aureus* biofilm, whereas in planktonic cultures the *fumC* knockout exhibits increased survival. This gives support for only a trending difference in the mouse model and gives footing for the hypothesis that biofilms are made of persister cells. To investigate this hypothesis, we looked at expression of a persister cell marker within a HG003 biofilm. Increased *cap5A* (a known persister cell marker) expression was shown in a mature biofilm compared to an immature biofilm. To investigate if reduced killing of a biofilm was due to the presence of persister cells, HG003 *Pcap5A::dsred* biofilm was sorted into high, middle, and low fluorescence after antibiotic treatment. The cells with the most *cap5A* expression exhibited higher survival compared to cells with the lowest levels of *cap5A*. Persister cells were previously shown to have reduced membrane potential, therefore membrane potential in biofilms was examined. Cells grown in a biofilm exhibited a 22-fold increase in the number of cells exhibiting low membrane potential compared to planktonically grown cells. These results may help uncover why methicillin susceptible

*S. aureus* may be difficult to treat in a clinical setting, especially during an indwelling device biofilm mediated infection.

**Kaelinn Friesen**

Mentor: Julie Shaffer

Title: *Prevalence of Bacterial Pathogens in Eastern Nebraska Tick Population*

As cases of Rocky Mountain Spotted fever (*Rickettsia rickettsii*) have increased over the last five years in the state of Nebraska, little is still known about the type of spotted fever group (SFG) *Rickettsia* and their occurrence in the Nebraska tick populations. *Dermacentor variabilis* and *Amblyomma americanum* both found in Nebraska carry a variable number of infectious diseases and different forms of SFG *Rickettsia*. Many SFG *Rickettsia*'s present symptoms like other common diseases making them hard to diagnose. Knowing what diseases are prevalent in the area will be important for easier and more accurate health care diagnosis. Ticks were collected in Eastern Nebraska in different locations along the Platte River and tested for different forms of SFG *Rickettsia* and other known tick transmitted diseases such as *Ehrlichia ewingii*, and *Francisella tularensis*. This information will help us to identify risk in different areas of Eastern Nebraska.

**Ellie Morrison**

Mentor: Bryan Drew

Title: *Potential Hybridization Between Two Species of California Salvia*

Hybridization in plants is common worldwide, particularly in areas where closely related species are sympatric. One genus where hybridization has been detected is *Salvia* (Lamiaceae; mint family). *Salvia* is a diverse genus consisting of about 1,000 species and is defined primarily by having only two stamens, each with their anther sacs separated by elongated connective tissue. The genus has diversity centers around the world, including the Mediterranean, Mexico/Central America, northern and central South America, and temperate Asia. The genus also has a smaller species radiation in western North America, centered in California, and there has been documented evidence of hybridization between some species of *Salvia* within California. For this project we investigated potential hybridization between *Salvia columbariae* and *Salvia greatae*, two species with an overlapping distribution in the Orocochia Mountains region of California. These species are in different sections of subgenus *Audibertia*, and hybridization has not yet been documented between sections of this subgenus. To examine this relationship, we ran polymerase chain reaction testing to compare phylogenies from nuclear ribosomal DNA and chloroplast DNA. The resulting

phylogenies did not show evidence of hybridization between these species. Although no hybridization was found, it is possible that additional sampling could yield different results.

### **Emma Weis**

Mentor: Austin Nuxoll

Title: *Staphylococcus aureus* Persisters Exhibit Increased Survival to Components of the Innate Immune System

*Staphylococcus aureus* is an opportunist pathogen which causes foreign device mediated infections that are recurrent or relapsing in nature. The phenomenon of relapsing infections caused by susceptible bacteria is hypothesized to be due to the presence of persister cells. Persister cells are a subset of dormant-like cells that survive antibiotic treatment. Little is known about the interaction between persister cells and the innate immune system. Based on previous findings of a *fumC* knockout exhibiting increased persister cell formation and increased survival to antimicrobial peptides, we hypothesized that the *fumC* knockout will survive better to other components of innate immunity. Following macrophage infection, the *fumC* knockout had increased survival compared to wild type *S. aureus*, HG003. Reactive nitrogen species (RNS) were measured in macrophages infected with either the *fumC* knockout or with HG003. RNS levels were similar between both strains indicating the same macrophage response to both strains. By examining the growth under various conditions, it was revealed that *fumC* had increased growth in subinhibitory concentrations of NaNO<sub>2</sub> and paraquat. Furthermore, the *fumC* knockout had increased survival to lethal NaNO<sub>2</sub> and paraquat concentrations. These results indicate that a *fumC* knockout survives RNS better leading to enhanced survival within a macrophage.

### **Leigh-Anne Lehmann**

Mentor: Joseph Dolence

Co-Authors: McKenna Vininski and Sunanda Rajput

Title: *Examination of sex-specific differences in type 2 innate lymphoid cells and adaptive immune responses following peanut exposure*

An understanding of the mechanism in which peanut (PN) initiates immune responses to generate PN allergy is limited. In addition, the impact sex differences have on the development of PN-specific immune responses is unknown. It has been shown that PN, commonly found in household dust, sensitizes mice via inhalation. This study compared male and female 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. Cells were stained

with antibodies to identify ILC2s by flow cytometry. Interestingly, ILC2s were sensitive to sex differences with ILC2s in female PN-exposed lungs having a significantly more abundant response than ILC2s in male PN-exposed lungs. Plasmablasts and T follicular helper cells were also examined in the lung draining lymph nodes (dLN) using an 11-day mouse model. These populations responded similarly to sex differences, finding a reduction in plasmablasts and T follicular helper cells in the dLN of PN-exposed male mice when compared to their female PN-exposed counterparts at 11-days. This data suggest that testosterone plays a role in decreasing PN-specific adaptive immune responses, possibly through negatively influencing ILC2-mediated responses. Overall, this study provides critical insight into how sex differences could play a role in regulating PN-specific immune responses.

### **Samantha Mercer**

Mentor: Julie Shaffer

Title: *Jumping Species: Spilling the Beans on the Next Epidemic*

*Dermacentor variabilis* is the primary native tick species in Nebraska and a vector of intracellular pathogens, including several spotted fever group rickettsia and Francisella tularensis. Our objective was to survey female *D. variabilis* ticks collected along the Platte River in south-central Nebraska during the 2021 tick season to determine the bacterial pathogen prevalence. Total DNA was extracted from 332 female ticks for PCR analysis and confirmation of pathogen identity using amplicon sequencing. Out of 332 females, 41% (139) tested negatives to the pathogens. The presumptive positives consisted of 30% (102) Rickettsia amblyommatis, 2% (8) Ehrlichia chaffeensis, 6% (23) Rickettsia montanensis, 1% (4) E. chaffeensis and Rickettsia amblyommatis, 1% (2) F. tularensis, and Rickettsia rickettsii was not detected. This increase in *R. amblyommatis* may be due to increased overlap of Amblyomma americanum and native *D. variabilis*. Higher concentrations of *A. americanum* have been collected each year since 2016. This information indicated that there will be an increase in clinical cases of tick spotted fever disease.

### **Sarah Chandler**

Mentor: Julie Shaffer

Co-Author: Sam Mercer

Title: *Bacterial Disease Presence in Hall County, Nebraska Tick Populations*

The Amblyomma americanum and Dermacentor variabilis tick species are established along the Platte River in Nebraska. Of concern are the pathogens they vector. *A. americanum*, the Lone Star tick, can host such bacteria as Ehrlichia chaffeensis, Francisella tularensis, Anaplasma phagocytophilum, Rickettsia amblyommatis, and the

yet unknown causative agent of Southern Tick Associated Rash Illness. *D. variabilis*, the American Dog tick, typically hosts *Rickettsia rickettsii* and *Francisella tularensis*, but recent research done has also shown evidence that bacterial pathogens may be jumping between tick species. To further study the presence of these bacterial diseases and their transfer between species, tick specimens were collected in Hall County, NE. Previous research on *A. americanum* and *D. variabilis* has been focused on Buffalo and Dawson Counties, while Hall County lies just east of Buffalo County and extends the range of the study. During the summer 2021, 431 ticks were collected, identified, and DNA extracted. Within these specimens, two invasive tick species, the Gulf coast tick and Black legged tick were collected, underlining the concern of new tick-borne disease in Central Nebraska. Future research will focus on the analysis of positive bacterial DNA present in the samples via multi-plex PCR and DNA sequencing.

# Professional & Applied Studies

## Communications Disorders

### **Courtney Ostrander**

Mentor: Ladan Ghazi Saidi

Co-Authors: Heng Wu and Gina Blackman

Title: *Acceptability of GrandPad in Older Adults: Preliminary Results of a Case-Study*

Social isolation and loneliness affect both physical and psychological factors in one's life (Boru, 2017). A lack of social isolation can increase the chance of depression and anxiety in older and younger adults (Budzynski-Seymour, et al., 2019). Aging in general has negative effects such as causing a decline in cognition and increasing the chances of acquiring dementia (Lara et al., 2019).

Many of the psychological, cognitive, and communicative effects of isolation and loneliness were brought to the forefront with COVID-19 when everyone was forced to isolate. This isolation raises concerns about cognitive and psychological function in aging adults.

Technology has made virtual communications possible. However, most older adults find it difficult to use digital devices and technology. GrandPad is designed to be user friendly for older adults, and among other features, it enables simple video chatting for seniors in a safe and secure setting. In this study, we use a survey and interview an

older adult and their caregiver about their experience using GrandPad, and their acceptability of the device.

Participant for this study is an older adult and her son who has used GrandPad for four months. We will use an adapted Acceptability tool embedded in Qualtrics. The participants will receive the survey via email and will be interviewed via zoom. The results of the survey and interview will be discussed.

**Charlotte Griffith**

Mentor: Ladan Ghazi Saidi

Title: *Management of Depression and Anxiety in Patient Aphasia*

Aphasia is an umbrella term for a group of acquired language disorders caused by Traumatic Brain Injury (TBI), and cerebrovascular accidents, commonly referred to as strokes (National Aphasia Association, n.d). The type of aphasia determines how substantial language impairments can be. It also determines whether the impairment is based in comprehension, expression, or both (National Aphasia Association, n.d). These impairments can be related to both spoken and written language. People diagnosed with aphasia have high chances of developing depression or anxiety (Morrison, 2016). With strokes as the leading cause of aphasia, people with this disorder have often been left out of research on post-stroke depression (PSD) due to ethical concerns, as well as difficulty (Kontou, 2009). This study seeks to understand what speech-language pathologists (SLPs) in the United States of America do, or do not do, to manage aphasia cases with symptoms of depression, anxiety, or both. A qualitative study was conducted through two Qualtrics surveys. The surveys were adapted from a study in the United Kingdom (Northcott, Simpson, Moss, Ahmed, & Hilari, 2017). During URF 2020, a survey was sent to the Nebraska Speech Language Hearing Association (NSLHA). During SSRP 2021, the survey was adapted a second time and an attempt to contact each speech-language hearing association (SLHA), in each of the 50 states and the District of Columbia, was made. This attempt was made via email or through a contact link on their website. Participants were questioned about: experiences with patients with aphasia; number of patients per caseload that have aphasia with depression, anxiety, or both; how they felt referring patients with aphasia to mental health practitioners (MHPs), and more. The data from URF and SSRP was then combined. Results indicate the following: Most participants were white female speech-language pathologists who have worked in the field of communication disorders for a minimum of 10 years. Most claimed around 50% of PWA per caseload had psychological difficulties, such as depression or anxiety. Most speech-language pathologists in the study did not believe client confidence was part of their role. However, excluding text responses, most SLPs stated the main

barrier for making a referral to a MHP was mental health professionals provide only a limited service (i.e.: assess for suicidal risk rather than offering therapy). The data analysis is ongoing and will be completed by the Research Day. We will discuss the results in the context of the existing literature.

## Kinesiology and Sports Sciences

### **Tristan Larson**

Mentor: Kazuma Akehi

Title: *Shoulder Complex and Trunk Dynamic Motion Changes Across the Season will be Beneficial to Identify their Training Load and Musculoskeletal Stresses*

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 more prone to throwing related shoulder injuries. The purpose of this research is to examine the kinetic and kinematic changes on the shoulder and trunk across D2 collegiate softball players throughout the softball season. A three-dimensional motion analysis will be conducted to identify mobility and alignment of the shoulder joint complex and trunk during upper extremity dynamic motions. The motion assessment will be performed every 4 weeks starting at the beginning of the season until the end of the season. Additionally, their training load and numbers of throws or pitching for each subject will be documented to analyze the relationship between training load and shoulder kinetic and kinematic changes across the season. This is relevant to be able to know their training load and amount of stress that may apply to a shoulder across the season, and to evaluate how those loading influence on their shoulder complex and trunk motion before reaching to their thresholds to be injured.

### **Kevin Burd**

Mentor: Thomas Orr

Title: *Pros Turned Cons: Correlation Between Celebrity Status and Punishment for Crimes*

There are conflicting opinions on whether athletes receive a double-standard compared to the general public when it comes to punishment for crimes. Research from McKelvey & Matthew suggests that professional athletes spend less time in prison than the general public for identical crimes, "Any non-athlete in our society who commits a similar crime as a professional athlete seems to spend considerably more

time in the criminal justice system” (2001, p. 92). Meanwhile, opposing research seems to showcase that NFL players have lower rates of crime compared to the general male population altogether. The purpose of this study is to determine how the celebrity perception of athletes correlates with the punishments they receive after committing a crime. Professional athletes like O.J. Simpson, Aaron Hernandez, and many others have had obscure criminal trials due to their celebrity status as NFL players.

Athletes are revered by many in society as role models and heroes, but is this really how they should be looked at? One opinion from Drucker (1997) suggests, “sports heroes are merely pseudo-heroes, and are only compared to the heroic because of celebrification in the mass media.” Can this glamorization of athletes result in them feeling like they are above the law? To answer these questions, surveys will be sent out to UNK students, where they will analyze different professional athletes, along with solve hypothetical and real-life ethical dilemmas. The answers from this survey will then be utilized in a chart similar to a celebrity-hero matrix, based off of what Dr. Joshua Shuart created in his 2007 study looking at how athletes’ celebrity scores effect consumers’ intent to purchase their products. This data will then be deciphered to see if there is a relationship between an athlete’s celebrity status and punishments they receive for crimes. Students participating in the survey will also be able to identify as a student-athlete if applicable to see if there could be a difference in opinions among student-athletes and standard students.

# Graduate Posters – Online and In Person

## Biology

### **Poster G1 – McKenna Vininski**

Mentor: Joseph Dolence

Co-Authors: Sunanda Rajput, Nicholas Hobbs, Joseph Dolence

Title: *Androgens Negatively Regulate the Allergic Immune Response to Peanut*

Peanut (PN) allergy is an ongoing public health problem. Knowledge about the allergic mechanism has increased in recent years; however, the underlying factors that influence the development of PN allergy are not well understood. Many different diseases show a sex bias, including allergic asthma. Previous PubMed meta-analysis on published food allergy prevalence shows that there is a female sex bias in adulthood. This evidence suggests the role of androgens in suppressing allergic immune responses to food allergens. This project aims to determine if such a sex bias exists in PN allergy using an established PN sensitization mouse model. We found a sex difference, with WT females developing stronger allergic responses to PN than their male counterparts. Furthermore, the effect of androgen signaling in offering protection against PN allergy was examined using testicular feminization mutant (Tfm) male mice that are unable to signal through the androgen receptor (AR). Tfm mice developed allergic responses to PN significantly worse than WT males. To further understand the influence of androgens, we subjected WT mice to hormone manipulation to observe the change in response. WT mice were gonadectomized and implanted with capsules containing opposite sex hormone, dihydrotestosterone (DHT) in females, as well as replacement of hormones, DHT in males. We were not able to recapitulate the protection against PN allergy using this experimental strategy, suggesting that gonad-specific factors independent of the hormones being replaced are driving androgen-specific protection. Overall, this data strongly suggests that sex differences exist in the development of PN allergy and these differences are driven by androgens.

## **Online Poster – Hadassha Tofilau**

Mentor: Surabhi Chandra

Title: *Diabetic Triple Negative Breast Cancer: Polyamine Enzymes, Ornithine decarboxylase and Spermine oxidase as Potential Targets*

Co-existence of diabetes & BC can be lethal, leading to higher mortality (15-40%) than BC alone. TNBC is highly refractive, heterogenous, & resistant to most chemotherapies. Polyamines, which are ubiquitous in most cells, have been shown to be elevated in cancer, though their role in diabetic BC has not been explored. We hypothesized that diabetic conditions increase TNBC cell proliferation through modification of enzymes (ODC & SMOX) in the polyamine pathway. The objective was to determine potential targets in the polyamine pathway to mitigate TNBC advancement in diabetic conditions. For this, MDA-MB-231 & MCF10-A cell lines were used. Both were treated with low (5mM) & high glucose (25mM) concentrations & effects on polyamine levels, polyamine enzyme, & cell proliferation were monitored. Polyamine levels were assayed using reverse phase HPLC, cell proliferation assessed using fluorescence-based assay, & polyamine enzyme expression monitored at mRNA & protein level using RT-PCR & Western Blots. Polyamine enzyme activity was analyzed at Johns Hopkins. Under diabetic conditions, putrescine levels were elevated in MDA-MB-231 cells (135%), correlated with higher cell proliferation (123%). Polyamine enzyme activity of ODC increased & SMOX decreased in concert with changes observed at protein levels with high glucose exposure. a-DFMO, 5mM, was effective in reducing polyamine levels & cell proliferation, however re-supplementation of polyamines (SPD & SPM) restored cell proliferation, indicating that DFMO is only cytostatic. MCF-10A cells showed elevation in cell proliferation with high glucose. DFMO prevented this increase; no apparent change was observed in polyamine levels. The polyamine biosynthetic enzymes (ODC & SMOX) play active roles in increasing cell proliferation under high glucose conditions in TNBC. DFMO caused only cytostatic effects, creating a need for a more targeted approach to regulate polyamine levels & mitigate diabetic TNBC growth.

## **Poster G2 – Blase Rokusek**

Mentor: Kimberly Carlson

Co-Authors: Britney de Leon, Sunanda Rajput, Nicholas Hobbs, Kimberly Carlson

Title: *Potential for Viral Replication Within the Brain of Nora Virus-Infected Drosophila Melanogaster*

Nora virus (NV), a positive-sense single-stranded picornavirus, was first described less than two decades ago when it was found to infect *Drosophila melanogaster*. Since its discovery, viral replication appeared to be largely confined to the gut, and insects

infected with NV did not show any obvious symptomology. Recently it was shown that NV infected *D. melanogaster* exhibit declines in geotaxis, viral nucleic acids can be isolated from the hemolymph of infected flies, and viral small interfering RNAs can be isolated from the brains of NV infected flies. In light of this evidence we hypothesized that NV is capable of invading the nervous system, like other picornaviruses, to infect the brains of *D. melanogaster*. In the present study, we collected female adult flies from chronically infected Canton S laboratory stocks. At 5 to 7 days post-eclosion we removed the heads from the bodies in groups of 10-15 flies and extracted RNA. We amplified the NV ORF1 by means of RT-PCR and confirmed the presence of NV in the heads of infected flies by gel electrophoresis. We also removed heads from bodies of 10-15 flies and extracted RNA at various time points over the course of adult infection. We are in the process of utilizing qRT-PC to compare the viral load between heads and bodies throughout the infection. We predict that viral load in the heads will follow a similar biphasic pattern, as seen in the body at large, though there might be some delay initially as the virus must travel from the gut to the hemolymph, before making its way to the nervous system. Finally, we are optimizing protocols to dissect the heads of infected flies and section them on a cryostat. We will use immunohistochemistry and confocal microscopy in an attempt to visualize NV within the brains of infected flies. Confirmation of viral replication within the brain of NV-infected flies would further our understanding of this endemic fruit fly virus that chronically infects laboratory stocks.

## Communications Disorders

### **Online Poster – Kayleen Kouma**

Mentor: Philip Lai

Title: *Assessing and Evaluating Social Interaction between Parents and their Children with Autism Spectrum Disorder: A Literature Review*

A research team was gathered to collaborate the strengths and interests of various researchers throughout the NU system. The aim of the current study is to investigate the effectiveness of treatment strategies administered by parents of children with autism spectrum disorder (ASD). A literature review was conducted using 11 articles to gather preliminary information related to the current study's specific goals: to examine the mental health profile of parents of children with ASD, the effectiveness of interventions administered by the parents, and to monitor real-time brain activity during parent-child interactions to further evaluate treatment effectiveness. This literature review highlighted key characteristics of children with ASD which include lower social-emotional tendencies, lower likelihood of approaching familiar individuals, reduced awareness of the social rules of conversation, less positive facial expressions (smiles),

and more morphological errors in language when compared to typically developing (TD) children. Children with ASD have also been found to avoid looking at adults in distress. In one article, the High Functioning Autism group was rated by their parents on the Children's Behavior Questionnaire- short form as higher in Anger/Frustration and Discomfort when compared to the Williams Syndrome (WS) and TD groups of children. These characteristics are imperative to consider as they directly relate to parental mental health and intervention effectiveness. Children with ASD will likely demonstrate avoidance when their parents are in distress. Research has indicated that social support played a significant role in lessening the degree of perceived challenges in parents which positively affects both their mental health and treatment effectiveness. One of the articles described the various neuroimaging techniques most frequently used in ASD research. The most prevalent neuroimaging technique for this study's aim included the fNIRS.

### **Online Poster – Gina Blackman**

Mentor: Ladan Ghazi Saidi

Title: *Intervention of Episodic Memory in Older Adults: An IGB Approach*

Most (90%) older adults prefer to age in place (at home), for as long as possible and expect to do so for the next 10 years. We investigate an intervention that combines innovative technology (GrandPad) and Intergenerational Bonding (IGB). GrandPad is a tablet with embedded WiFi adapted for older adults. IGB is a novel intervention that creates an opportunity for UNK Communication Disorders students (CDS) and older adults to bond. CDS will offer intervention to older adults of the community. The intervention that we propose comprises of effective treatment techniques that are regularly used in clinical practice. This study focuses on library research on Episodic Memory, as one of the interventions used in the IGB project. Episodic memory is the recall of personal experiences containing information on an event that occurred in the individual's life and it has a direct link to specific times and places. It is important to treat episodic memory as it allows an individual to recall the experiences that are an important part of life, as well as provide a sense personal history and shared history with other people in their life. Library research was done on peer-reviewed research articles containing key the words episodic memory, older adults, and intervention. Episodic memory intervention tasks that were most often seen throughout the studies were face name association, text memory, and word list recall. It was also found that emotionally touching music and sung texts could enhance memory by binding visual properties with emotionally charged information. Intervention was found to be most successful when done in short sessions, with small groups. The library research revealed that episodic memory strategies rely on visual imagery, semantic knowledge, and organization. The information gathered in the library research will guide episodic memory treatment strategies of face name association tasks in the IGB project.

### **Online Poster – Alison Gansemer**

Mentor: Ladan Ghazi Saidi

Title: *Fighting Dementia*

Fighting Dementia is a research project that investigates how learning a second language helps with aging, cognition, and memory. This is a longitudinal study that takes around five months to complete, four months for the language learning aspect, and an additional for scheduling evaluations and MRI scans. Participants contact the research assistant through either phone or email. They are then sent an eligibility email that contains two surveys about MRI safety and other language knowledge. If the participant is eligible for our study, then the research assistant sends out a more in-depth email about the study, the consent form, and another survey to collect demographic information. A zoom evaluation is then set up between the research assistant and the participant. During that zoom evaluation, the participant takes MoCA, semantic and phonemic fluency, non-word repetition, MMSE, and Gorilla tasks (Simon, Stroop, and Digit Span test). The research assistant then schedules an MRI scan time in Lincoln for those participants who are in group 1. Those who do not want to or cannot do an MRI are placed in group 2. This group does everything group 1 does, but the MRI. The research assistant inputs all the data through the evaluations and tasks into a SharePoint document. The research assistant then enrolls the participants into Rosetta Stone in their desired language. Over the next four months, the research assistant checks in every week to see their learning process on the Rosetta Stone software. Once a participant is close to the end of their four-month language learning portion, the research assistant reaches out to perform the same evaluation on them. The research assistant analyses the data and saves them in SharePoint documents. If the participant is in group 1, they get scheduled for another MRI scan. This study is ongoing. Some preliminary results will be presented and discussed.

## **Counseling and School Psychology**

### **Poster G3 – Jason Baker**

Mentor: Sharon Obasi

Title: *Lost in Transition: Female Veterans' Education After Service*

In the last two decades, few studies exist regarding female veterans transitioning from the military into higher education at either two- or four-year colleges. Using Schlossberg's Transition Theory, a life transition theory, and data from the Veterans Administration (VA), secondary data analysis suggests female student veterans are not

taking advantage of resources and services designed to help students. Previous research indicates that female veterans attending college had more positive attitudes toward seeking help, especially for psychological challenges when compared to their male counterparts (DiRamio, Jarvis, Iverson, Seher, & Anderson, 2015). Other research has determined that female veterans have a difficult time connecting to the campus (Heitzman & Somers, 2015). Military culture is predominately masculine and by allowing females to serve in previously male-only military occupation specialties some females are now serving in direct combat alongside males. This exploratory project highlights how the needs of female veterans are not being met by many two- and four-year colleges and suggests how higher education institutions can better support female veterans during their transition, while they are enrolled in college. This project has a significant impact not only on current female student veterans but also for those that will be transitioning out of the military and into classrooms in the future.

### **Online Poster - Heidi Teahon**

Mentor: Em Meyer

Title: *I want to help but... School Psychologists and Social Justice*

Social justice is a concept that most, if not all, school psychologists support, yet there is a lack of knowledge regarding how this term is implemented in current school psychology practice. Researchers conducted a study with 63 participants aged 20 and above. All study participants were school psychologists who currently practice in the United States. Using quantitative research methods, our study explored 59 practicing school psychologists' experiences with implementing socially just practices in the school they are currently assigned to work at. Participants completed a web-based survey of 16 questions where they ranked challenges/barriers and opportunities/assets to implementing social justice advocacy in practice. Researchers sought this information because they wanted to learn why school psychologists say, "I want to help but..." so that they could respond to current practitioner needs in this area.

Researchers hoped to address the challenges current practitioners face in this area, as well as leverage the assets/challenges in this area, so that school psychologists today can become fully equipped to support all students' needs. Researchers analyzed participant responses by years of experience in the field, school location, and type of student needing advocacy. The types, or groups, of students most commonly in need of advocacy are students with disabilities, LGBTQ+ students, low-income economically marginalized students, culturally and linguistically diverse students, and racially and ethnically diverse students. Therefore, these are the groups that were explored in the present study. The implications of this study include informing school psychology training models for social justice. Throughout the course of this study, researchers sought ways that training programs can be more effective at preparing practitioners for

advocacy work. Another implication of this study is inspiring greater acknowledgement and emphasis on social justice research in school psychology.

## History

### **Online Poster – Meg Merithew**

Mentor: Jeff Wells

Title: *The Experience of German Prisoners of War at Camp Concordia Kansas*

During World War II, the decision was made to bring Axis Prisoners of War to the United States. In following the Geneva Convention, sites were scouted and POW camps were constructed across the United States. Concordia Kansas became one of many sites of a German Prisoner of War Camp across the country that was in operation from 1943-1945. This is not a traditional military view of camp life but a look into the social and cultural aspects of the Camp. This study uses the diary of the German POW Franz Kuester, oral histories of prisoners and townspeople, and newspaper articles from the period. The German POWs had an active life in the camp, which included sports, movies, a social club, a library, and an orchestra. German Officers were allowed to take accredited classes through the University of Kansas. The enlisted POWs were used to work on neighboring farms to help with the labor shortage that were prevalent throughout the United States. The German Officers had a choice to work or not, but many did. This brought them into contact with many Kansans and friendships formed that lasted well after the war. Though camp life was sometimes dangerous, with “kangaroo courts” being held and the suspicious death of a POW. Once the radical prisoners were removed from Camp Concordia, life improved at the camp. The German POWs housed at Camp Concordia overall had a pleasant experience, with some German POWs feeling grateful to have been sent to the camp.

## Kinesiology and Sports Sciences

### **Poster G4 – Dayton Sealey**

Mentor: Megan Adkins

Co-Authors: Megan Wingler, Eli O'Dey

Title: *Position-specific Game Demands in Division II College Womens Soccer*

The purpose of this study was to examine the game demands of division II college women's soccer and the differences between positions. The results will have

implications for the sports staff in preparing athletes for competition and improving performance.

Fifteen members of the University of Nebraska-Kearney women's soccer athletes wore SPT global positioning system (GPS) trackers during 20 competitions throughout the 2021 Fall soccer season. Since individual playing time varied game to game, only athletes who had 50+ minutes of playing time in that game were included in this analysis. For each position total distance, hard running distance (10.1 mph – 13.4 mph), sprint distance (>13.4 mph), hard running efforts (HE), and sprint efforts (SE) were examined during the full match, not including warm-ups. Players were divided into 3 positions: defenders (n=5), midfielders (n=6), and forwards (n=4).

Defenders had the highest average total distance ( $7792 \pm 1171$  yds), followed by midfielders ( $7272 \pm 1424$  yds) and forwards ( $6174 \pm 1171$  yds). Defenders also had the most hard running yards ( $365.8 \pm 190.2$  yds) and hard running efforts ( $17.9 \pm 9.5$  HE) when compared to forwards ( $322.3 \pm 176.1$  yds,  $16.7 \pm 8.9$  HE) and midfielders ( $227.9 \pm 108.2$  yds,  $11.1 \pm 6.3$  HE). Sprint distance and sprint efforts was highest in forwards ( $63.8 \pm 54.7$  yds,  $2.9 \pm 2.9$  SE) followed by defenders ( $39.6 \pm 41.0$  yds,  $1.6 \pm 2.3$  SE) and midfielders ( $27.7 \pm 27.9$  yds,  $0.9 \pm 1.4$  SE).

These findings highlight the position-specific game demands in collegiate women's soccer. More specifically, although defenders cover more total distance, forwards engage in more high-speed efforts throughout a match. Coaches and sports performance staff should take the difference in position demands into account when designing practice and training sessions so that athletes are better prepared for their specific demands of a game.

### **Online Poster – Taylor Rogers**

Mentor: Kazuma Akehi

Title: *Relationship Between Athletes Playing Positions and Body Type on the Prevalence of Low Back Pain in Competitive Collegiate Athletes*

The prevalence of low back pain (LBP) has been reported among athletes in several sports with the high prevalence rate among football (FB) players being reported at 60%. It could be thought that sports such as FB, wrestling, and throwing events in track and field could put greater loads on the lumbar spine. High pressure movements in FB, twisting and high velocity during field throws, and heavy lifting and hyperextension motions in wrestlers, are examples of the underlying mechanisms that may result in the development of LBP. The direct effects of this LBP could also lead to life-long implications for athletes. The purpose of this study was to determine whether colligate football linemen had a higher prevalence of LBP compared to other positions in football. Similar body type and athletic work/motion compared to linemen such as

heavy weight wrestlers and throwers was studied to determine if there were differences among the sports. The health history survey was distributed to the athletes who are in the active roster of FB, wrestling, and track athletes at UNK, and those who are age of 19 years or older. The health history survey was distributed using Qualtrics. Results: The relation between FB positions and the frequency of LBP was not significant (chi-square=3.518,  $P>.05$ ). The relation between FB positions and the intensity of LBP was not significant (chi-square=2.051,  $P >.05$ ). No significant differences were found between the frequency or intensity of LBP between FB positions. The mechanics and muscle groups used in FB influence all positions similarly. Based on the results, athletes have experienced or are experiencing LBP in some degree throughout their athletic career. Even if they have LBP issues, some are not seeking any medical help or dealing with LBP as part of their performance.

### **Poster G5 – Kevin Leahy**

Mentor: Kate Heelan

Co-Author: Kate Heelan

Title: *The Effects of a 6-Week Resistance Training and Plyometric Program on Lower Body Power and Strength Performance Among Young Male Athletes*

The purpose of this study is to evaluate the effectiveness of a 6-week resistance training and plyometric program on power and strength performance among youth males.

11 male athletes (age:12.6 years  $\pm$  0.8 years) were assessed for lower body power and strength at baseline and 6-weeks later using countermovement jumps (CMJ) and Isometric Mid-Thigh Pull (IMTP). The CMJ is primarily used to measure an athlete's explosive lower-body power, where the individual is told to jump as high as they can by bending their knees 90 degrees and using their arms to help propel them as high as possible. IMTP measures lower body maximal isometric strength, requiring individuals to pull on a fixed bar with maximum effort for a continuous 3-5 seconds, with the highest value being recorded following three trials. For 6 weeks athletes participated 2 days/week in plyometric and resistance training. Comparisons were made in CMJ and IMTP between baseline and 6-week assessments using a paired t-test.

We expect to see a statistically significant improvement in lower body power and lower body strength after the 6-week intervention. A 6-week resistance training and plyometric training program is effective at improving lower body power and strength.

## **Poster G6 – Evan DeKok**

Mentor: Kazuma Akehi

Title: *Mixed Martial Arts Stressors: How Weight Cutting, Dehydration, Sleep and Training May Impact Bout Outcomes Inside the Octagon*

Mixed Martial Arts (MMA) is a combat sport that involves a combination of several traditional martial arts formed into one. Most MMA fighters participate in a series of training sessions over a six-to-eight-week period in what is known as a “fight camp” in preparation for a fight. Training camps place high physical demands on the body and mental demands on the mind which are generally caused by stressors such as weight-cutting, dehydration, and strenuous training sessions. During this training camp and often into the final week of the training camp leading up to the competition fighters may experience difficulty when it comes to maintaining a regular sleep cycle. The purpose of this study is to identify the stressors in the MMA during a training camp and determine if stressors impact the outcome of a fight. A 22 question survey-based questionnaire will be sent to volunteer MMA athletes via email. Each stressor variable will be split into its own individual group of survey questions. Totals will be taken from each category, then averaged between participant groups, those who either win or lose their bouts, to determine if there are significant differences in how a stressor affects the outcomes of the bout.

Data from the survey may be utilized to determine if certain factors have a significant impact on bout outcomes, which can allow clinicians in the field of sports medicine to obtain better insight on what stressor may have a higher rate of leading to potential risk of injury/hospitalization. This data may also be used to potentially increase the longevity of an MMA athlete’s career by reducing/mitigating the risk of the stressors on the athlete’s performance inside the octagon by recognizing stressors and altering weight-cutting techniques, sleep cycle patterns and training regimens during training camps.

## **Poster G7 – Mackenzie Burnham**

Mentor: Kate Heelan

Co-Author: Bryce Abbey

Title: *Did the Pandemic Influence Body Mass among Middle School Aged Adolescents in a Rural Midwestern Community?*

Longitudinal data from the CDC suggests that the prevalence of obesity has increased from 19.3% to 22.4% over the pandemic months among 2-19 years of age and the rate of weight gain increased (Lange et al, 2021). The purpose of the current study is to compare the prevalence of obesity and body mass gains among 6th-8th grade children between pre-pandemic and post- pandemic periods in a rural mid-western community.

Students in grades 6-8 (n=1045, age =  $12.8 \pm 0.94$  yrs) participated in school health screenings of body mass and stature in 2017. Students from the same school district in grades 6-8 (n=936, age =  $13.2 \pm 0.84$  yrs) participated in screenings in 2021. To account for the significant difference in age, a weight-for-age ratio was determined. Weight status was defined using CDC age-and-gender growth charts.

Although not significant, prevalence of obesity increased from 17.8% in 2017 to 19.1% in 2021 ( $p > 0.05$ ). Children in the normal weight category had a weight-for-age of  $7.9 \pm 1.2$  lbs/yr in 2017 which was significantly greater in 2021 ( $8.3 \pm 1.2$  lbs/yr,  $p < 0.05$ ). No significant differences were found in weight-for-age between 2017 and 2021 for children with overweight ( $10.2 \pm 1.1$  vs  $10.3 \pm 1.1$  lbs/yr,  $p > 0.05$ ) or obesity ( $13.2 \pm 2.2$  vs  $13.3 \pm 2.3$  lbs/yr,  $p > 0.05$ ).

Although the prevalence of obesity was not significantly greater post pandemic, children in the normal weight category weighed significantly more, had higher BMI and weight-for-age ratios in the post pandemic period. The children in the normal weight category may have experienced greater life changes over the pandemic resulting in less activity and more unhealthy habits than the children with overweight or obesity.

### **Online Poster - Carol Wieck**

Mentors: Shannon Mulhearn

Title: *Bringing Quality Physical Education to the Homeschool Community: A Proposed Study*

The homeschool community is a growing community. There are currently 3.7 million K-12 students who are homeschooled in the United States, and the National Home Education Research Institute reported that the percentage of households with homeschooled children has increased from 5.4% to 11.1% from March 2020 to March 2021. These students need access to quality physical education just like other students in the United States, which includes a standards-based curriculum. In the past 10 years, although 1,372 publications mention "Homeschool", "Physical Education", and "Curriculum", only 9 articles were found that also noted "National Standards".

Additionally, none of the articles is directly related to a physical education curriculum designed for Homeschool families. Therefore, the purpose of the proposed multi-phase community-based participatory research study is to determine the needs of homeschool parents for a standards-based, quality physical education curriculum. This proposal focuses solely on Phase I. Methods: Phase I of this study will use both quantitative and qualitative methodology. Phase 1 will be guided by the following questions: (1) What is currently available to homeschool parents for physical education? (2) What are the criteria for homeschool physical education from the state of Nebraska? (3) What are parent perceptions about the need for physical education

curriculum? Implications: Findings from Phase I will be used to inform future phases including curricula designed to address homeschool community needs while also ensuring a connection to national standards.

### **Poster G8 - Sophie Mellema**

Mentors: Kazuma Akehi

Title: *Effects of High Intensity Laser Therapy on Passive Knee Joint Range of Motion and Musculotendinous Mechanical Properties*

Context: High intensity laser therapy (HILT) has been used for the treatment of various musculoskeletal conditions, aiming to control pain and facilitate to regeneration of the tissue. However, it is inconclusive how much passive tissue mechanical resistive properties and joint range of motion (ROM) will change after the HILT on thigh muscles. Objective: The purpose of this study is to examine if a 4-week of HILT session influences passive musculotendinous stiffness (MTS) and ROM for the hip extensor muscles comparing to the control. Study Design: Factorial study will be used. Participants: Twelve active female athletes at the University of Nebraska at Kearney and twelve recreationally active college-aged females will be recruited. Each participant should have a chronic hamstring tightness yet have no known musculoskeletal injuries in the dominant side of the leg in the last 6 months prior to the data collection. Procedure: Passive hip flexion ROM and MTS will be measured at two different times (pre- and post-HILT session). ROM and MTS will be measured using a load cell and wireless digital goniometer during manual passive hip flexion motion at 5°/second. Following the initial assessment, participants will be randomly assigned to the HILT or control group. The HILT group will experience a treatment twice a week for 4 weeks. Following the 4-week treatment session, participants will be back for the follow-up assessment. We hypothesized that DTLT would allow a greater increase of ROM and less MTS compared to the control group. Clinical Application: The results of this study would provide better clinical insights of the modern and advanced laser therapy to improve musculotendinous characteristics and joint mobility.

## Teacher Education

### **Poster G9– Rylan Mahoney**

Mentor: Tammi Ohmstede-Schmoker

Co-authors: Trisha Lenhart, Josey Blessin, Brianna Brock

Title: *Social Justice Awareness and Social Justice Media Engagement Among Pre-Education College Students*

Our research was to seek a better understanding of social justice awareness in pre-educators, the role of social media, and how they educate themselves in current topics. We hypothesized and found that social media would be the most used platform and through a self-report questionnaire, we were able to obtain ranking information on social media platforms. Findings are helpful for future research on media impact on pre-educators.

The purpose of this study was to investigate social justice awareness among pre-educators from pre-service programs. With the recent cultural influx of social justice awareness, there has been an equivalent emphasis on social justice advocacy. In order for systemic change to occur, social justice awareness cannot stop evolving once the individual enters the classroom. In the communities that schools exist in, multicultural competency continues to be an asset that is put into practice for the professionals working with students and families.

Teachers and other professionals working with students are generally consumers of continued education, and anti-racist/social justice-based learning. Materials for these topics have recently been readily available in large quantities in all mediums, including but not limited to social media, journal articles, and formal continuing education courses. This vast array of resources raises questions of which mediums are pre-educators gaining information from, and of what quality is this information? Self-education is both expected and encouraged in academia and education-based professions but asking from which sources is this self-education originating has not been readily explored.

Though the data collected from this research was insufficient in terms of generalizing or drawing conclusions, it lays the foundation for continued exploration into the types, quality, and quantities of information being consumed by pre-educators and educators in relation to social justice awareness and advocacy.

### **Online Poster – Jamie Waller**

Mentor: Phu Vu

*Title: Waller's Math Mini's*

This action research project examined the impact of using ability grouping/small group rotations on fourth grade students' engagement and math performances in a small rural school. Collected data for this study included three different sources to increase the credibility and validity of research findings. Our results indicated that students were more engaged while the teacher used ability grouping/small group rotations in the classroom and their math scores were higher. Discussion and the teacher's reflection were also included.

# Undergraduate Posters



## Behavioral & Social Sciences

### Criminal Justice

#### **Poster U1 – Benjamin Slaymaker**

Mentor: Kyle Harshbarger

Title: *The Relationship Between Higher Education and Police Officer Job Performance in Nebraska*

The purpose of this study is to examine if there is a correlation between the job performance of officers and the level of education those officers have attained. This study will be comparing officers without any kind of secondary education degree with officers who have college degrees.

#### **Poster U2– Alexis Bernthal**

Mentor: Jessica Peterson

Title: *Criminal Justice Readings and Studies on Discretion*

The criminal justice system handles an extensive array of people whose backgrounds and identities vary. Many of the decisions made, that affect the lives of those involved in the criminal justice system, are subject to the discretion of those who work within the criminal justice system. This Spring semester of 2022, I, Alexis Bernthal, am looking at academic articles that attempt to explain procedures and patterns within the criminal justice system. The academic articles I have been assigned cover processes and discretionary elements specific to police, courtroom actors, officers, managers, and mediators. Based on my findings within these scholarly articles, the variability of discretion appears to be inevitable. My aim is to look for linkages across the

multilayered workgroups of the criminal justice system. By the end of the Spring 2022 semester, I will have explored different dimensions of work, specifically discretionary, within the criminal justice system. I will prove this through the construction of an annotated bibliography. Additionally, I will choose a specific group within the criminal justice system to become a focal point for my future research project on discretion and its effects on those within the realm of criminal justice.

## Political Science

### **Poster U3 – Braden Peterworth**

Mentor: Chuck Rowling

Title: *The Evolution of Presidential Discourse on Human Rights*

The end of World War II provided the world an opportunity, for the first time, to bring Human Rights into center stage of the international community. The atrocities committed by the Nazi regime violated any previously recognized notion of Human Rights by the international community, subsequently this is when Human Rights find their way into international documents. The goal of this paper is to provide a background of Human Rights at the international level, help explain how Human Rights have been classified into two distinct groups, and finally how United States Presidents have, over time, evolved in the way that they discuss the notion of what classifies as a Human Right. I attempt to show how the notion of what is considered a Human Right has change over time, once only including Negative Human Rights now is considered to include more general Positive Human Rights. More specifically, how major Presidential speeches can be used to explore this evolution of Human Rights throughout the 20th and 21st Century.

### **Poster U4 – Caleb Hendrickson**

Mentor: Chuck Rowling

Title: *“Making American Exceptionalism Great Again”: How Joe Biden Sought to Restore the Idea of American Exceptionalism during the 2020 Presidential Election*

This study examines how Joseph Biden embraced the modern jeremiad during the 2020 presidential campaign and, in doing so, sought to restore the concept of American exceptionalism. Specifically, I conducted a quantitative content analysis of every campaign speech Biden delivered in the months leading up to his election to assess whether he differed from recent oppositional candidates for the presidency (e.g. Kerry in 2004, Obama in 2008, Romney in 2012, and Trump in 2016) in the manner and extent to which he invoked American exceptionalism. I find that Biden differed

markedly from Trump, who routinely portrayed America as unexceptional and 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) and, in some ways, was even more vocal in his embrace of American exceptionalism, consistently portraying America as unique and superior, and emphasizing its role as a model and leader in the world. We discuss how these findings contribute to our broader understanding of the modern jeremiad and American exceptionalism within the modern presidency.

### **Poster U5 – Alexis Chavez Monasterio**

Mentor: William Aviles

Title: *Why Stop the Violence? The Role of Prison Privatization in the Mexican Drug War*

The Mexican Drug War (2006-2019) was an American fueled effort to militarize police to fight against drug syndicates in Mexico. The consequences of this effort have been positive for some, yet detrimental to many. The Mexican Drug war has caused several unintended consequences, including the forced displacement of Mexican people as a result of increased violence. Because of this forced displacement, several new markets have emerged which have created a monetary incentive behind continuing the violence that causes this forced displacement. One of these expanding markets is for-profit prisons in the United States, which gain billions in revenue from incarcerating illegal detainees who seek refuge in the United States. To display the connection between for-profit prisons and the Mexican drug war, this research first examines scholarly literature that: (1) links the Mexican Drug War to other forms of for-profit privatized business (2) examines the growth of the global police state (3) provides empirical data on the Immigration Industrial Complex and (4) studies specific cases tying the Immigration Industrial Complex to the Mexican Drug War. Then, I apply the power structure approach to examine the policy networks linking the Immigrant Industrial Complex with the US influenced Mexican Drug War.

### **Poster U6– Haley Mazour**

Mentor: Joan Blauwkamp

Title: *The Intersection of Religion and Politics in Central Nebraska*

Religion and politics in the United States are deeply interconnected and cannot truly be separated from one another. In political science, scholars have long sought to understand how they impact one another both at the institutional and individual levels. This project seeks to understand how religious and political beliefs and behaviors intersect among people in central Nebraska. The survey conducted asks participants a

wide variety of questions regarding their political and religious beliefs and behaviors. This is an accumulation of research conducted over the last few years that has attempted to decipher this relationship at the national level. That data collected from this survey will help determine if those patterns remain consistent locally.

**Poster U7 – Lucia Castro-Jacobo**

Mentor: William Aviles

Title: *From Workers to Community Members: The Case of Lexington and Crete*

Many rural towns in the last 30 years have seen a rapid growth in immigrants due to new meat packing plants opening up. In Lexington, Nebraska Hispanics make up over 50% of the town's demographic. The boom of immigrants saved the town from economic drought and revived the community. Studies on immigrant communities have tried to answer the question on how the change in demographic has caused "White Flight" which is when the town's native white citizens move their families to a less diverse school. Other research focuses on how crime rates have changed or solely emphasize the economic benefits the immigrant community members have in their towns. The focus of this paper is to focus on the immigrant community narrative as well as analyze factors such as economic and social capital attainment to try to piece together what helps implement the immigrant individuals from being seen as a worker to a community member. We will be comparing Lexington and Crete Nebraska as they share similar demographics and have a meatpacking plant in both towns. We hope to further research on the integration of the immigration community through this analysis.

**Poster U8 – Brooke Hostler**

Mentor: William Aviles

Title: *Why do Central Americans Migrate North, Despite the Decline of Violence?*

The fast-growing rate of migration from Central American countries such as Guatemala, Honduras, and El Salvador, have contributed to an all-time high of immigration over the last 20 years. The high rates of migration can relate to gang violence and overall safety. In the qualitative research, women in Central America have faced more gender-based violence and domestic violence from spouses, including femicide, this would be one of the factors toward why many women and children migrate to the United States. Many families also migrate to the United States for more job opportunities, it was found that individuals living in low-income households are related to immigration and will have access to basic living utilities. This helped me from my question of, why are Central Americans coming to America despite the fact of violence continue to improve. To address this question I compare the micro levels

such as income and education, macro levels as in job opportunities, work conditions, and access to basic living utilities, and other factors such as gender-based violence.

**Poster U9 – Jade Vak**

Mentor: Peter Longo

Title: *Economic Barriers to Rural Nebraska Healthcare*

There are economic barriers to rural Nebraska healthcare and the impact affects nearly every Nebraskan. Data and reports indicated that more and more health care providers are having to leave rural Nebraska. There are numerous reasons as to why, but it appears that financial issues are the greatest factor. This study aims to establish the connection between economic policies and healthcare (quality and accessibility). Specifically, this study investigates how the economy is affecting the quality of rural Nebraskan's health currently and for generations to come.

**Poster U10 – Earlen Gutierrez**

Mentor: Peter Longo

Title: *Envi Environmental Racism & COVID-19: The Need for Better Governmental Policies*

The COVID-19 pandemic halted social and economic activities in 2020; the streets were empty, businesses were closed, and for a brief moment, the environment was able to breathe. However, due to the United States' quest for market productivity and profit, governmental leaders often chose to disregard the severity of the virus and prematurely reopened their economy. This decision disproportionately affected racial minorities' susceptibility to contracting COVID-19. Racial minorities, in the United States, have long been subjected to systemic racism, income inequality, and environmental health issues. This situation was heightened due to COVID-19 policies.

This study will analyze the general connections between environmental racism and COVID-19 policies. Second, I will discuss the relationship between environmental hazards and environmental health issues, especially COVID-19. Third, a comparative analysis approach contrasts how environmental and racial policies in the United States and Canada affect the overall socio-environmental; socio-racial; and socio-economic relations in the respective regimes. Fourth, suggestions for mitigating the harms generated by environmental racism will be offered.

### **Poster U11 – Norah Renner**

Mentor: Peter Longo

Title: *Religion, Civil Disobedience, and Political Polarity in the United States*

Contemporary United States is one of the most politically divisive eras of the nation's history. Such division and controversy in the nation have led individuals to call upon their First Amendment rights and partake in what is often portrayed as acts of civil disobedience. Unfortunately, such pronounced divisiveness within the United States populace, and also between themselves and the government, have led to consistent reoccurrences of verbal and physical attacks in many civil disobedient and activist movements, as well as in the nation's political rhetoric. A plausible contributor to such a deep division in America today is the nation's religious pluralism and the differences that develop in Americans' moral codes and cognitive symbolic boundaries due to individuals' participation in various and different religions or absence from religious participation, in the United States. Hence, the phenomenon examined in this analysis is what role religion has played in deepening the political divide in Contemporary United States. This analysis also investigates what can be learned from political and historical figures Sir Thomas More and Martin Luther King Jr., both religious men, known for their acts of civil disobedience, who were able to carry out non-violent, true civil acts of disobedience despite both individuals having moral codes and cognitive symbolic boundaries that stemmed from their religious beliefs.

### **Poster U12 – Tanner Butler**

Mentor: Peter Longo

Title: *How Much Freedom of Speech Should Politicians have to Incite Violence: A look at Brandenburg v. Ohio*

The United States has faced an epidemic of political violence in recent years, on both side of the aisle with the Black Lives Matter protests and the events of January 6th. Politicians on each side of the aisle have accused each other of inciting this violence. With this, the first amendment is at center stage, with the question being what speech is protected. This question has been answered in 1969 when the Supreme Court decided *Brandenburg v. Ohio*. Here they established the *Brandenburg test* which limits speech that causes imminent lawless action. Fall within this exception speech must be intended and likely to produce imminent lawless action. With this test as our guide, we delve into if this test is the proper one to be applying this test to politicians. Does their power, granting of legitimacy with speeches, ability to get widespread attention, and ability to clarify statements mean the test should be stricter on them. Or as a society do we want our politicians to be truthful in what they say, and deal with the possible consequence. We explore the balancing of these issues similarly to how the Supreme Court did in *New York Times v. Sullivan*.

**Poster U13 – Hunter Rathjen**

Mentor: Peter Longo

Title: *The Ecological Impact of the Proposed Meat Packing Plant in North Platte, Nebraska*

Economic stagnation and fluctuations in the cattle market have created need for new meat packing plants in the state of Nebraska. One of the proposed locations for a new packing plant is the town of North Platte, Nebraska. While there are many implications that the development might have economically, socially, ecologically, and fiscally, the focus of this study is on the effects that a meat packing plant would have on the environment, and particularly, water sources in the North Platte area. Water sources of interest are the wetlands, the river system, and the groundwater that all can be found near the site of the proposed development. The research, conducted as a case study, examines the expected impact reports for other meat packing plants of similar regions and environments, compared with the recorded effects of those meat packing plants after they were approved and constructed. The findings of the study show inconclusive results, but suggest that the economic benefits of the meat packing plants outweigh the adverse effects they have on surrounding sources of water. These results, though neither directly positive nor directly negative, are still applicable to the project in North Platte as it moves forward, and the findings in the other cases are expected to take a similar shape in this one.

**Poster U14 – Katelyn Miller**

Mentor: Peter Longo

Title: *COVID-19 and its Disproportionate Effect on Marginalized Groups*

The focus of my research has been and will continue to be on essential industries including agriculture, meat packing, and the supply chain their policies regarding COVID-19 in comparison to state and federal health and safety regulations. This analysis is then used to determine the disproportionate effect COVID-19 had on marginal groups largely due to the lack of universal implementation of these policies. This analysis is followed by suggestions regarding universal guideline implementation to lessen the detrimental effects on marginalized groups especially in large scale crisis such as the COVID-19 pandemic. To gain an understanding of each of these industries and the policies related to the ultimate outcomes, most research was done through literature review of both news articles and government documents outlining policies and outcomes. After conducting this analysis, a comparative analysis was conducted discussing similar patterns in other countries including Japan and Canada. Further research will be conducted specifically regarding legal protections currently being discussed and implemented to prevent companies within the specified industries from

taking advantage of the obstacles presented by COVID-19 and the detrimental effects on the industries that continue to not only hurt the workers, but also consumers.

**Poster U15 – Joseph Hiatt**

Mentor: Satoshi Machida

Title: *Secondary Social Sciences & Post-Secondary Relationship*

Education across the country is heavily funded by the government and is one of the most prevalent topics discussed throughout our society. Within secondary education, specifically, Nebraska schools offer various social sciences courses. Some secondary and post-secondary institutions across the state of Nebraska are moving to dwindle funds allocated to social science programs. This study explores the relationship between secondary education social science programs and the success of students in post-secondary education. The method for studying this relationship was to conduct a survey where the participants share their beliefs on the value of social science coursework, indicate their experience within the social science disciplines, and share their academic standings and preparedness. The study will address social science coursework and whether or not academic participation in secondary social science courses has a relationship to dictating success in post-secondary academia. In Nebraska, social science programs in secondary schools intend to provide students with a heightened understanding of the world they live in to emphasize making informed decisions regarding issues affecting them, all while equipping them with academic skills that can be applied after high school.

**Poster U16 – Shelby Haney**

Mentor: Satoshi Machida

Title: *Different Communities and their Response to Mask Mandates*

The COVID-19 pandemic resulted in many changes in society, as well as a divide.

Previous studies have shown that citizens in rural areas are less likely to wear masks compared to their counterparts in urban areas. As a result, it has been reported that rural health in the United States is facing challenges in addressing the problem of COVID-19. This research also analyzes the factors that shape rural citizens' orientations toward COVID-19 in the era of the global pandemic. In addressing this question, this study emphasizes the important effect of social media. A large number of studies have widely investigated the impact of social media in various fields, and they have demonstrated that social media can significantly shape citizens' opinions on various issues. Building upon the insights from these studies, one can expect that the use of social media will reinforce existing beliefs toward COVID-19 among citizens in rural communities. Method: A survey will be conducted to members of both rural and

urban communities. Along with demographic factors such as age, gender, ethnicity, and education, the survey gauges the degrees to which rural residents are exposed to social media, as well as their attitudes and behavior toward COVID-19. Data results will be collected and reviewed using Qualtrics, an online survey tool. Application: The data collected from this study would help us better understand the behaviors of rural vs urban communities when it comes to major changes in society, and also help us answer the question of why. These results could be used in further studies of rural vs urban communities, and political behavior.

### **Poster U17 – Cuauhtemoc Molina**

Mentor: Satoshi Machida

Title: *American Nationalism and the Urban-Rural Divide: A Survey Analysis*

The proposed research focuses on the factors that lead to nationalism in the United States, specifically in rural America. Scholars have noted the presence of an urban-rural divide in recent years, with non-metropolitan populations politically contrasting with big cities in elections. Importantly, this difference appears to hold even when accounting for other individual traits such as age, gender, or race. The proposed study aims to examine the details of this urban-rural divide. In other words, while scholarship has clearly established political disparities based on geography, this project seeks to examine specific beliefs. For this study, the belief is patriotism. The US is typically renowned for its citizens' love of country, and the degree of that attitude among the American populace has large implications for politics. Depending on how an individual characterizes national pride, people can have variations in political behavior, notably seen in the level of nationalism, i.e., a sense of national superiority. It is imperative, then, that the collective understanding of this topic is deeper than conventional wisdom. To test the relationship between the urban-rural divide and attitudes toward the US, the present project will conduct an online survey and analyze its data. When combined with a review of existing literature, the research may shed light on the topics of patriotism and nationalism as well as contribute to an explanation of how Americans' national attitudes develop.

### **Poster U18 – Melisa Gonzalez**

Mentor: Satoshi Machida

Title: *Identity and international students' experience in Nebraska*

Despite the fact that the United States is considered a multicultural country that does not embrace an homogenous behavior, it is crucial to recognize that in Nebraska there is predominant political ideology and a notorious shortage of diversity where 81% of the population is white (Bureau, 2021). In this case, one can expect that those factors

might be significantly influential for the adaptation process that international students at UNK face, perceiving potential behavioral modifications and identity changes in order to fit within the atmosphere that the location offers to guarantee a suitable college experience. Building upon these insights, the phenomenon of acculturation that has been implemented in studies related to populations of indigenous peoples, refugees, immigrants, and the one emphasized in this research, international students, provides a solid framework by analyzing the changes that individuals experience as they move from their society of origin to a dominant society of settlement (Skuzza, 2007). The importance of this research relies on developing a better understanding of the current dynamics of acculturation happening at UNK, recognizing the vulnerability that foreign individuals have when they settle in places such as Nebraska where most people support the Republican party along with conservative and religious values. To prove this hypothesis, this study conducts a survey experiment among the active international students at UNK. The proposed research makes a relevant contribution to the community intending to promote better alternatives that emphasize inclusiveness toward the international community at the university.

### **Poster U19 – Ashley Roemmich**

Mentor: Peter Longo

Title: *Red Alert: A Case Study of HOLC Redlining Maps in Omaha, Nebraska and Their Impact on the Climate Crisis*

Racial discrimination is embedded in American history. The New Deal created many opportunities for American citizens, but it also led to racial discrimination in housing. The Home Owner's Loan Corporation (HOLC) alongside the Federal Housing Administration's (FHA) use of "redlining" maps in order to delegate where best to allocate mortgages to prospective homeowners ultimately did more harm than good, classifying predominately non-white areas as "hazardous" (the lowest grade) and white, affluent areas as "best" (the highest grade). Racial segregation is not limited to any region. This research explores housing discrimination in Omaha, Nebraska and the HOLC's "redlining" maps' relevance today. Omaha has a dissimilarity index of 61.3%, with 0% being total integration and 100% being total segregation. This affects many areas of everyday life, one of which will be the focus of future research – climate racism. Areas that experience redlining also experience elevated levels of diesel particulate exhaust and hotter temperatures, indicating historical redlining falls well within the purview of climate racism. These maps and zoning restrictions will be used to discover the impacts that housing discrimination and forced segregation have had, as well as the imminent dangers they pose to the future of the environment amidst the climate crisis.

# Psychology

## **Poster U20 – Josie Koubek**

Mentor: Christopher Waples

Title: *The Examination of Mindset and Feedback Sign on Self-Efficacy*

Mindset theory has long been popular in the field of education but is underexplored in the context of work. Mindset theory proposes two different frameworks for beliefs about the stability of one's characteristics (e.g., intelligence): fixed and growth (Dweck, 2015). Those with a fixed mindset perceive their abilities as unchangeable, whereas those who hold a growth mindset believe them to be malleable and cultivable through effort. The goal of this empirical study was to examine how an individual's mindset may influence responses to a task and associated performance feedback. Feedback was manipulated to convey excellent or poor performance, after completion of a creative or clerical task. Participants' resulting self-efficacy was measured and examined for differences amongst groups. Though data collection is on-going, preliminary analysis reveals a significant interaction between feedback sign (+/-) and mindset, such that those with growth mindsets reported increased self-efficacy after positive feedback, while those with fixed mindsets showed a decline. Task type and feedback sign also displayed a significant interaction, wherein efficacy for the clerical task was less resilient in the face of negative feedback than was efficacy for the creative task. Implications, limitations, and future research directions will be presented.

## **Poster U21 – Cooper Blunck**

Mentor: Christopher Waples

Title: *Examining the Effects of Social Situations on the Emergence of Maximal Performance*

Performance is characterized by complex dimensionality, part of which stems from differences between how a person performs on a typical day and how they perform when maximizing their potential. A variety of factors can impact the emergence of typical and maximal performance, including social and motivational cues (Sackett et al., 1988). There is a literature gap regarding how competitive and cooperative task frames influence typical and maximal performance outcomes. The goal of this empirical study is to address that gap by examining the effects of cooperative or competitive task instructions while also varying the physical presence of a peer. The experimental task consists of a timed math task involving simple mathematical operations involving single- and double-digit integers. Data collection has begun and is

expected to finish in the middle of March, and it is expected that those participating under competitive instructions will be more likely those provided cooperative instructions to display maximal performance. Further, it is expected that the physical presence of a peer will serve to strengthen the difference between competitive and cooperative participants.

## **Poster U22 – Mackenzie Hagemeister**

Mentor: Evan Hill

Title: *Serotonin N-Acetyl-Transferase Inhibitors for Circadian Rhythm Disorders*

The circadian rhythm (CR) responds to the environment through physiological changes, including the sleep-wake cycle. Circadian rhythm is associated with changes in melatonin, which in turn are controlled by the suprachiasmatic nucleus (SCN). Abnormal melatonin leads to disruption in the CR, which causes or contributes to various sleep disorders and seasonal affective disorder (SAD). SAD correlates with winter daylight hours and an overproduction of melatonin (Lewy, et al., 2006). Additionally, melatonin has been correlated with major depressive disorder (MDD), bipolar disorder (BD), and schizophrenia (SZ). Moreover, human genetic evidence indicates a relationship between CR dysregulation and mood disorders. None of the existing treatments for CR disorders directly target the synthesis of melatonin. Enzymatic activity in the pineal gland catalyzes the conversion of serotonin to melatonin and developing compounds that slow melatonin synthesis (inhibitors) has been a target of interest for treating mood and sleep disorders. Melatonin's function has been studied, but most data is still theoretical. The development of cell permeable inhibitors would allow researchers to determine the effects of melatonin, and lack thereof, in a biological system.

Zebra Fish (ZF) are a preferred species for studying CR due to lower costs, quick maturation (90 days to adulthood), and fewer ethical considerations compared with higher animals. ZF larvae will be used to determine effects of 3 previously published inhibitors on melatonin synthesis as well as sleep activity. We hypothesize there will be an increase in "nighttime" activity and an inverse relationship with respect to melatonin. We will quantify endogenous melatonin on LC-MS assay that I am currently developing with Dr. Thomas. We will compare our results with those published for SNAT genetic knockouts in ZF larvae (Gandhi et al., 2015).

### **Poster U23 – Hayden Nelson**

Mentor: Julie Lanz

Title: *The Treatment of Trauma-Related Symptoms for Law Enforcement Officers and Their Romantic Partners Through a Mindful Meditation App.*

The job environment for law enforcement officers (LEOs) is especially stressful (Price, M., 2017). Due to the potential for exposure to danger, workplace stressors can lead to a variety of trauma and anxiety-based symptoms for LEOs (Sener et al., 2021). Treating these symptoms is imperative to the continued successful performance of LEO's. However, modern stigmas against mental health treatment may keep individuals from pursuing the help they need. The development of accessible treatment platforms, such as the Smiling Mind mindful meditation app, may be a way to close the gap between hesitant individuals and needed interventions. Using a 2x2 mixed-subjects design (pre-post and single or in a relationship), we hypothesized that reported anxiety would decrease after a 6-week mindfulness intervention (H1). We also predicted that dyads would see a greater benefits than single LEOs (H2). After analyzing responses from 51 individuals, participants reported significantly lower anxiety after the intervention ( $p < .05$ ). There was no significant difference between single and coupled individual's decreases. This suggests that single LEOs may not need additional support in order to treat trauma onset by high-stress working environments.

### **Poster U24 – Ibinye Green**

Mentor: Megan Strain

Title: *Athletic Injury and Imposter Syndrome*

Imposter Phenomenon, sometimes referred to as Imposter Syndrome, is defined as the feeling as if one does not belong in a certain position and/or that they do not deserve the success they have (Bravata et al., 2020, p. 1252). Although ever-present in areas such as the workplace or the education system, the focus of the current study was to determine the extent to which collegiate athletes within the University of Nebraska at Kearney who have sustained an injury experience Imposter Phenomenon or a change in confidence levels upon return to their sport (e.g., Williams & Krane, 2008). Additionally, given past work demonstrating gender differences in the context of perceptions of male and female athletes (e.g., Hively & El-Alayli, 2014) we will test to see if there are differences in experiencing imposter syndrome among male compared to female athletes. We provided UNK athletes with a link to an online survey which prompted them to share personal demographic information (gender, sport, years of experience, etc.), information about their injury (what kind, recovery period, etc.), their confidence levels upon returning to their sport, and finally, their symptoms of Imposter Syndrome in the context of athletics. We expect that among those who have

experienced injury compared to those who have not, there will be lower confidence, increased imposter syndrome, and that these effects may be worse for women.

### **Poster U25 – Noah Pierson**

Mentor: Evan Hill

Title: *Constructing a More Affordable Apparatus for Zebrafish Monitoring*

The high costs of research equipment can make many types of research inaccessible for Universities with smaller budgets. A zebra box is a specific type of lab equipment that was need by UNK for zebra fish research. High costs makes this type of equipment out of reach for our campus which lacks the necessary funds to buy a commercial Zebra box. By constructing our own low-cost zebra box, we will be able to conduct new lines of research on campus using a zebra box apparatus. This box can lead to a variety of projects as it is also customizable without needing to spend more funds on additional components. This commercial zebra box would require a large portion of existing laboratory resources. Access to this customizable Zebra box allows for laboratory resources to be allocated to other important functions within the department. Construction of your own lab equipment is valuable but comes with labor and expertise issues. If managed this equipment could grant access to lab equipment that was otherwise too expensive or didn't exist for commercial purchase.

## **Natural & Physical Sciences**

### **Biology**

#### **Poster U26 – Macy Hill**

Mentor: Paul Twigg

Co-Author: Paul Twigg

Title: *Changes in Microbial Diversity in Response to a Corn-Bioenergy Grass Rotation*

Plots of switchgrass for bioenergy production have been constantly cultivated at the Eastern Nebraska Research, Extension, and Education Center (ENREEC) since 1998. Plots of cultivar Summer have been in place since 1998 and cultivar Liberty plots were established in 2005. Harvest and soil property data for these plots has been collected every season. Some plots have been rotated with no-till corn and have varying nitrogen application regimes. For this project, we identified and randomized plots of no-till corn and switchgrass for comparison. Two inch diameter soil cores were taken to a

depth of at least 60 cm with three replicates collected per plot and three randomized plots. The cores were separated into 0-10 cm, 10-30 cm, and 30-60 cm segments. Samples of each segment were collected. The rest of the segment was processed to determine soil characteristics and nutrient levels. Microbial DNA was isolated from each sample and replicate using the Qiagen Powersoil Pro kit. The DNA samples from the 0-10 cm layer yielded the highest concentrations with the 10-30 cm segments yielding about half as much, and the 30-60cm segments yielding about one tenth of the 10-30 cm sample. The samples are currently undergoing 16S amplicon indexed sequencing at the University of Minnesota Genomics Center. This work is funded by grant OIA-155741: RII Track 1-Center for Root and Rhizome Innovation from the National Science Foundation (NE EPSCoR) and by a grant from the NU Foundation.

### **Poster U27 – Macey Schroeder**

Mentor: Benjamin Pelissie

Title: *Growing Buffalobur (Solanum rostratum) in the Lab, Under Controlled Conditions*

The Colorado potato beetle (CPB) is a worldwide superpest of potato crops and other cultivated Solanaceae, that quickly develops resistance to any pesticide used against it. Understanding how CPB evolves resistances so readily is a crucial goal not only to better control its populations, but also to shed light on the evolutionary processes involved pests' rapid adaptation in general. Before moving onto potato in the mid-19th century, CPB was found only in the Great Plains and lower Rocky Mountains, feeding on indigenous Solanaceae plants, especially the buffalobur, *Solanum rostratum*. Solanaceae are notorious for secreting strong chemical defenses against herbivores which the latter must bypass to feed successfully, often by evolving specific, effective cellular detoxification mechanisms. Therefore, one possible explanation for CPB's success adapting to any new toxic compound is the potential facilitating effect of adapting to feeding onto potato in the first place. Although testing such hypothesis is possible experimentally via dedicated experimental evolution protocols, very little is known about the life history of the buffalobur and no protocol to grow it in controlled conditions is available yet. Some of the main challenges include breaking seed dormancy without stratification, identifying growth substrates that maximize biomass production, and establish sustainable production synchronously with CPB populations raised in the lab. Here we will present preliminary results from germination experiments aimed at bypassing seed cold stratification by applying a gibberellic acid treatment to the seeds. Note that the time of writing this abstract, data are still being collected and analyzed.

### **Poster U28 – Bodin Wilson**

Mentor: Brian Peterson

Co-Author: Logan Dietrich

Title: *Phenology of Antler Velvet Shedding in Central Nebraska White-Tailed Deer*

Deer hunting is an important cultural and economic contributor to Nebraska. Overall, hunting contributes approximately \$800 million in annual revenue to the state, with \$8.7 million from the sale of deer permits. Nebraska provides an extended hunting season compared to other states. By starting on the 1st of September, hunters have a unique opportunity to harvest bucks with antlers in velvet. Velvet corresponds to the period of antler growth, which occurs annually in male deer. Our objectives are to establish the phenology of shedding velvet from antlers for male white-tailed deer and compare timing and duration between age classes and two river drainages. Our study will use camera traps on properties with high densities of deer along the Platte and South Loup rivers. In 2021, we observed data that shedding occurred during a narrow period between 5-16 of September from a small sample size. Going forward, we will increase the number of camera traps, thus increasing sample size to develop a more robust velvet shedding phenology that can be used by property managers and the Nebraska Game and Parks Commission as they set regulations and promote this unique harvest opportunity.

### **Poster U29 – Mary Fiala**

Mentor: Surabhi Chandra

Co-Authors: Luke Hamilton, Mahesh Pattabiraman, Surabhi Chandra

Title: *Screening of Non-Purine Ligands Binding to Adenosine Receptors A1, A2A, A2B, and A3*

Adenosine receptors (ARs) are G-protein coupled receptors (GPCRs) which have been shown to have therapeutic potential. ARs are made up of four subtypes, A1, A2A, A2B, and A3. A3AR ligands have previously been indicated to lower inflammation, prevent or treat cancer, and produce antihyperalgesic effects in many preclinical pain models, specifically for neuropathy. We have previously published in animal models that ferulic acid dimer, a non-purine compound with the 3-methoxy phenyl moiety, has non-opioid antinociceptive properties through primarily binding to A3ARs. Current literature suggests that the antinociceptive properties of a natural compound, incarvillateine, which contains the 3-methoxy phenyl moiety is mediated through ARs, however there is a lack of sufficient evidence of in vitro binding of such compounds at ARs. We thus hypothesized that compounds with the 3-methoxy phenyl moiety show binding to ARs, with an affinity in the submicromolar range. For this study, we performed fluorescent competitive binding assays using cells transfected with ARs: Chinese Hamster Ovary (CHO) cells for A1 or A3 receptors and Human

Embryonic Kidney (HEK) cells for A2A or A2B receptors. The compounds tested included trans cinnamic acid analogs and curcumin analogs. The compounds were synthesized using cavitand-mediated photoisomerization and cavitand-mediated photodimerization. Our fluorescent binding protocol employed the separation method, in which the unbound ligand was removed after equilibrium was reached, via PBS wash.

The binding assays performed suggested that 3-methoxy cinnamic acid dimer was the most effective in binding to A3ARs, while the monomer did not bind as well. There was very little to no binding observed at the other receptors. Other analogs of trans cinnamic acid and curcumin did not show binding at any of the ARs so far. In conclusion, 3-methoxy cinnamic acid dimer binds to G-inhibitory coupled adenosine receptor, A3. Future studies will investigate structure-activity-relationship of 3-methoxy phenyl dimers to demonstrate why dimerization leads to superior binding compared to similar monomeric compounds.

### **Poster U30 – Nicole Mittman**

Mentor: Keith Geluso

Co-Authors: Mary Harner, Carter Kruse

Title: *Vertebrate Use of Common Muskrat (Ondatra zibethicus) Structures in the Sandhills of Nebraska*

The Common Muskrat (*Ondatra zibethicus*) is a medium-sized rodent native to streams, ponds, and other wetlands of North America. Muskrats commonly build structures and houses in the water using surrounding herbaceous vegetation and mud. Due to the island-like nature of these structures, they also are used by vertebrates other than muskrats. Although many species likely use these structures, little has been reported in the scientific literature. We studied the diversity and frequency of species that use muskrat structures in the Sandhills of Nebraska. Lakes in this region generally lack surrounding trees and woody debris, so we suspected that muskrat structures are especially important features for vertebrate species. Currently, we are reviewing camera trap photographs of muskrat structures on various lakes in the Sandhills from 2019 and 2020. So far, we have recorded over 20,000 counts of vertebrates on structures, representing 44 species, including waterfowl, songbirds, raptors, reptiles, mammals, and amphibians. Behaviors exhibited by species at muskrat structures included feeding, basking, preening, resting, and raising young. We still have thousands of photographs to examine for additional behaviors and species. Presence of muskrats appears to create important island habitats for many wetland species in the Sandhills, suggesting that muskrats are ecosystem engineers and keystone species in the region. Since muskrats are sometimes considered pests or trapped for

their pelts, understanding the importance of the muskrat's indirect effects on other vertebrates is critical if and when manipulating their populations.

### **Poster U31 – Phoebe Dunbar**

Mentor: Keith Geluso

Title: *Snapping Turtle (Chelydra serpentina) Movement and Hibernacula Associated with Borrow Pits in Central Nebraska*

Snapping turtles (*Chelydra serpentina*) are widely distributed across North America, inhabiting many wetland habitats. Individuals hibernate six to eight months of the year and may travel outside warm season home ranges to overwinter in hibernacula with high dissolved oxygen concentrations, low predation, and colder temperatures in non-freezing water. In central Nebraska, many human-made borrow pits, excavation sites from sand/gravel mining developed into lakes/ponds, have been created in the Platte River valley, now comprising 27% of the surface water area in the valley. This abundant human-made habitat may be an available niche to turtles. We trapped turtles in central Nebraska, tagged three snapping turtles with radio telemetry transmitters, and triangulated their locations weekly through the fall, and occasionally in winter. We observed that two turtles moved between water bodies at least once in the fall and two snapping turtles moved from borrow pits to overwinter in natural habitats- a slough and a channel of the Platte River. Another site quality that may influence overwintering turtle selection is natural versus human-made habitat. Natural habitats may contain the qualities turtles require for hibernacula. This study will provide hibernation start and end dates, home ranges, and life history other details, as little is known about snapping turtles in Nebraska. While development in the Central Platte River Valley such as barrow pit excavation for road construction may destroy habitat for some species, it may open a new niche for other species, such as snapping turtles.

### **Poster U32 – Emma Collins**

Mentor: Kimberly Carlson

Co-Authors: Blase Rokusek, Bethany Burklund, Joseph Dolence

Title: *Development of a Peanut Allergy Model using Drosophila Melanogaster*

Peanut (PN) allergy is a common and often life-threatening food allergy in the United States. Mice are traditionally used to study PN allergy, but this can be expensive and time-consuming. *Drosophila melanogaster*, on the other hand, have proven useful to study human diseases and disorders due to their similar genome while eliminating the issues encountered using mice. For these reasons and due to the ease of use and manipulation, *D. melanogaster* were chosen as the organism in which to analyze immune regulated genes possibly affected by exposure to PN. The genes that were

picked were Relish (rel), Cactus (cact), Dif, and Dorsal (dl) because these are immune genes in the Toll pathway that have NF- $\kappa$ B homologs in humans that are activated in an allergic response. The control condition was exposure to 5% sucrose, while the experimental condition used to induce PN allergy was 5% sucrose + 5% PN flour. One hundred and fifty virgin CantonS NV+ (Nora virus positive) females each were put into eight-pint cages (4 for each condition). The females were aged for 3 days in the pint cages with regular food before being exposed to the two conditions. At day 3, the food vial was replaced with vials of cotton balls either soaked in 5% sucrose alone or with PN flour. Every 24 hours for 7 days, the vials were replaced with fresh solution, dead flies collected and counted, 10 live flies collected, and all flies frozen. All live samples were used to extract RNA to determine if the immune regulated genes were affected. qRT-PCR was performed on days 0 and 6 and found a significant upregulation of Cactus and a significant downregulation of Dif. There were no significant changes in the Relish or Dorsal genes. In addition, survival curve analysis showed that the addition of peanut had no effect on the survival rate of the fly species. This is the first demonstration that *D. melanogaster* elicits an immune response to PN exposure and possibly can be used as a model for PN allergy in the future.

### **Poster U33 – Britney de Leon**

Mentor: Kimberly Carlson

Title: Determination of Prevalence of Nora Virus in *D. Melanogaster* within the Central Nervous System or Body Cavity

Nora virus (NV) was first described less than two decades ago when it was found to infect *Drosophila melanogaster*. It has since been found to infect a variety of insects. NV is a positive-sense, single-stranded picornavirus that is transmitted horizontally by the fecal-oral route. Since its discovery, viral replication appeared to be largely confined to the gut, and insects infected with NV did not show any obvious symptomology. Recently it was shown that NV infected *D. melanogaster* exhibit declines in geotaxis, viral nucleic acids can be isolated from the hemolymph, and viral small interfering RNAs can be isolated from the brains of NV infected flies. In light of this evidence we hypothesized that NV is capable of invading the nervous system, like other picornaviruses, to infect the brains of *D. melanogaster*. In the present study, we collected female adult flies from chronically infected Canton S laboratory stocks. At 5 to 7 days post-eclosion we removed the heads from the bodies in groups of 10-15 flies and extracted RNA. We amplified the NV ORF1 by means of RT-PCR and confirmed the presence of NV in the heads of infected flies by gel electrophoresis. We also removed heads from bodies of 10-15 flies and extracted RNA at various time points over the course of adult infection. We are in the process of utilizing qRT-PC to compare the viral load between heads and bodies throughout the infection. We predict

that viral load in the heads will follow a similar bimodal pattern, as seen in the body at large, though there might be some delay initially as the virus must travel from the gut to the hemolymph, before making its way to the nervous system. Finally, we are optimizing protocols to dissect the heads of infected flies and section them on the cryostat. We will use immunohistochemistry and confocal microscopy in an attempt to visualize NV within the brains of infected flies, to confirm viral replication within the brain. Given the importance of fruit flies to genetic and immunological research, it is necessary to study the intricacies of this endemic fruit fly virus that chronically infects laboratory stocks. The present study will further the understanding of NV replication over the course of infection, as well as explore the possibility for neuro-invasion by the virus in *D. melanogaster*.

### **Poster U34 – Tyler Shaner**

Mentor: Joseph Dolence

Co-Author: Sunanda Rajput

Title: *Dendritic Cells Display Sex-Specific Differences in Ability to Mount Immune Response to Peanut*

The mechanism of how peanut (PN) initiates immune responses to elicit PN allergy remains limited. PN is commonly found in household dust, and we have shown that PN exposure via inhalation sensitizes mice. Little is known about how dendritic cells (DCs), a type of immune cell critical to initiate adaptive immune responses, function in response to airway exposure to PN. Even more unclear is how sex differences impact the DCs ability to respond to PN. This study compared male and female mice exposed to PN in 3-day mouse models to elucidate how sex differences impacted the response of DCs to PN. To study, lung draining lymph nodes (dLN) were collected from BALB/c male and female mice after exposure to PN flour by inhalation three times during a 3-day period (days 0,1,2). Single cell suspensions were stained with antibodies to identify DC-specific responses to PN by flow cytometry. We started by examining DCs more broadly using the classic CD11c DC stain before zeroing in on whether differences existed in different CD11c+ subsets, namely CD103+ (cDC1s) and CD103- (cDC2s), two DCs that have been implicated in capturing PN to mount PN-specific responses. Interestingly, both cDC1s and cDC2s were reduced in male mice exposed to PN when compared to their female PN-exposed counterparts. These results strongly suggest that testosterone modulates immune responses against PN exposure. Future studies will build on this fascinating data to allow us to better understand sex differences associated with PN allergy.

### **Poster U35 – Zane Carlson**

Mentor: Joseph Dolence

Title: *Development of Vaping Peanut Allergy 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 both in vitro and in vivo model systems to ask whether vaping can influence the ability of the immune system to mount allergic immune responses against PN in an inhalation model. This research shows that exposure to vape juice kills A549 cells. Most fascinatingly, we show data herein that suggests that exposure to vape juice containing 3 mg/mL nicotine decreases the ability of the immune system to generate PN-specific IgE responses. 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. These unexpected findings suggest that either the vape juice or the nicotine (or both) negatively impacts the ability of the immune system to respond to mount allergic reactions. In the future, we plan on exposing A549 cells to vape-treated media and the mice to vape-conditioned solutions to PN to examine whether exposure to vapor induces similar results to vape juice exposure.

### **Poster U36 – Mariam Garcia Escobar**

Mentor: Austin Nuxoll

Co-Author: Kaitlyn Pineda

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, mediated through indwelling medical devices. Antibiotic treatment of these infections is often unsuccessful, leading to chronic, relapsing infections with poor patient prognosis. A likely explanation for these observations is the presence of persister cells (a subpopulation of dormant cells). High persister isolates have been shown to occur 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. To eliminate variability, multiple samples in triplicates and quadruplets were utilized and grown in fresh Tryptic Soy Broth (TSB). Before running the samples through centrifugation, they were neutralized to obtain a pH within a range of 8.30 and 8.35, as recommended in the assay instructions. Preliminary data collected has demonstrated the seemingly correlational relationship between a dysfunctional TCA cycle and increased persister formation. However, results have demonstrated unaccounted variability through the utilization of a master mix and the microtiter plate. To prevent this variability from recurring, a buffered media, TSB MOPS, was utilized to grow the microorganism. In future experiments, cuvettes will be utilized to help in the detection of the factor leading to variability.

### **Poster U37 – Jacquelyn Hinze**

Mentor: Austin Nuxoll

Co-Authors: Justine Pitzer, Omar Lozano, Vanessa Lo, Kyle Dittmer, Jake Guschenritter, Hector Palencia, Austin Nuxoll

Title: *Screening Derivatives of the Novel Antibiotic Teixobactin for Effectiveness Against S. aureus*

While the discovery of new antibiotics has never been more vital, very few in the past decade have been synthesized, tested, and put on the market. One reason for this is that until recently, most species of bacteria (from which antibiotics can be harvested and synthesized) have been difficult to culture. New technology, such as the iCHIP, has increased culturability considerably and has led to the isolation of novel compounds such as teixobactin. Teixobactin is one of the first few natural antibiotics discovered within the last three decades, and it inhibits cell wall synthesis not unlike vancomycin and nisin. The objective of this study was to determine whether teixobactin could be synthetically modified to increase antimicrobial activity. The modifications focus on three different portions of the molecule: the D-NMe-Phe1 amino acid, the D-allo-END10 site, and the macrolactone teixobactin pharmacore. Antimicrobial activity against *Staphylococcus aureus* was assessed through minimum inhibitory concentration (MIC), assays and minimum bactericidal concentration (MBC) assays. The compounds were then tested against *S. aureus* persisters and biofilms - two notoriously difficult to eradicate populations. Compounds C1 and C3, which were the molecules with modification to the first amino acid decreased bacterial survival 1 to 2 logs more than biofilms treated with either rifampicin or vancomycin. Additionally, C1 and C3 were able to eradicate persisters by 72 hours while populations treated with rifampicin had  $1 \times 10^8$  CFU/mL. In this study, compounds C1 and C3 showed promise and will be tested for eukaryotic cell toxicity to determine their potential as an antibiotic.

**Poster U38 – Marissa Baker**

Mentor: Nicholas Hobbs

Title: *Effect of Age and Food Deprivation on Anxiety-like Behavior in Mice*

Stress and anxiety motivate and influence behavior, but the mechanisms by which they do so are not fully understood. Hormones are a key biological factor that mediate behavior. Androgens, such as testosterone, act through the androgen receptor (AR) to ameliorate anxiety-like behaviors in rodents, as wild-type (wt) males exhibit lower anxiety-like behavior relative to wt female mice and male mice with dysfunctional ARs (tfm male mice). Gonadal hormone levels are affected by both an animal's age as well as its nutritional state. An animal's nutritional state is determined by the amount of food consumed as well as its quality. Therefore, the objective of this study is to determine if food deprivation induces anxiety-like behavior in juvenile and adult wt male, wt female, and tfm male mice and if such behavior is associated with changes in gonadal steroid hormone levels. Mice were isolated one week before anxiety testing to prevent influence of social interaction. Adult (about 11-13 weeks old) and juvenile (about 5-6 weeks old) mice were assigned to one of three treatments: 6 hr food deprivation, 24 hr food deprivation, or continuous access to food. Anxiety-like behavior was measured using an elevated plus maze (EPM). Adult male wt mice that were food-deprived for 24 hrs tend to spend more time in the open arm of the EPM compared to adult female wt mice that were also food-deprived for 24 hrs suggesting testosterone plays a role in modulating anxiety related behavior. Further analysis of behavior, brain tissue, and blood hormone levels will allow for clarification of the specific mechanism through which behavior is modulated.

**Poster U39 – Terrell Garraway**

Mentor: Nicholas Hobbs

Title: *Effect of the Presence or Absence of Androgen Receptors on the Response to Scent Markings in Testicular Feminization Mutant Mice*

Most mammals use olfactory behaviors to either attract or indicate interest in mates. One such behavior is scent marking. Testosterone, an androgen hormone, plays a role in masculinization of the brain by binding to androgen receptors (AR). However, it is unclear whether the presence or absence of AR in male and female rodents affects their olfactory behaviors, including scent marking, towards opposite-sex conspecifics. We hypothesized that the presence or absence of AR in both subject and scent donor mice affect scent marking behaviors in mice. We exposed male and female mice to scent marks of an unknown mouse for 10 minutes, then recorded the number of over-marks made on those scent marks. Our preliminary results showed that wild type (wt)

female mice (two copies of a functional AR gene) and tfm male mice (a dysfunctional AR gene) had a higher frequency of over-marking male scent marks. We predicted that the wt males would have a higher frequency of over-marking to female scent marks. Our results suggest that AR plays a role in establishing male-typical patterns of scent marking. This study provides further support of the role of androgens in organizing and activating sex specific behaviors in mammals.

### **Poster U40 – Jonathan Wentz**

Mentor: Letty Reichart

Co-Author: Melissa Wuellner

Title: *Observed Waterbirds Differ Between Connected and Disconnected Coves on Harlan County Reservoir, Harlan County, Nebraska*

Reservoirs provide a mosaic of habitats, including coves. Water quality and prey resources, including zooplankton, may differ between coves based on their connection regimes to the main reservoir. Harlan County Reservoir is an irrigation and flood control impoundment of the Republican River in Nebraska. Recent research has identified differences in fish communities between coves that more consistently remain connected to the main reservoir versus coves that may become disconnected. Some coves become disconnected over time when sediment berms accumulate at the mouth of these coves, relative to reservoir water elevation. However, to our knowledge, no study has identified whether bird communities differ between coves. Thus, the objective of this study was to compare waterbird group use between connected coves and disconnected coves within Harlan County Reservoir during fall and spring migrations over 3 years. Visual bird surveys were conducted weekly during the fall and spring migration on six coves of Harlan County Reservoir, three of which were classified as connected, and three of which were classified as disconnected. Connected coves had more fish-eating birds, but fewer ducks and geese when compared to disconnected coves. These patterns of habitat use could be attributed to differences in fish communities, zooplankton presence, or human disturbances between connected and disconnected coves. Our findings provide evidence for potential differences in cove habitat use by birds on Harlan County Reservoir. In addition, these findings are useful to better understand how the mosaic of habitats provide resources for different species. Managers should consider differences in species use of cove habitats on Harlan County Reservoir prior to modifying cove connectedness. Future studies are needed to continue to better understand physical, chemical, and biological differences between connected and disconnected coves on Harlan County Reservoir.

**Poster U41 – Samuel Thede**

Mentor: Letty Reichart

Co-Author: Letty Reichart

Title: *Identification of Grassland Nesting Species Richness and Abundance Within an Agricultural Area of South-Central Nebraska*

Grassland birds have experienced the greatest population decline among avian species within the past 40 years. Multiple factors have led to population decline in grassland nesting species. Encroachment of woody species on the Great Plains has contributed to habitat loss. Species density has declined, and quantity of edge habitats has increased with agricultural activity. A lack of natural fires within grassland habitats has also allowed continued encroachment of woody vegetation. Along with these factors, predation has become more prevalent as meso-predators are pushed out of their habitats and forced to coexist with avian nesting species. Often predation affects ground nesting species during seasons of high rainfall and during the late season once food resources are depleted. For this study, we will determine species richness and species abundance for grassland nesting species within a population in south-central Nebraska. We will conduct this study through systems such as a grid point count and species identification by sight and sound. After we identify species composition, this information will be used to test future hypotheses regarding grassland nesting birds in this region.

**Poster U42 – Mackenzie Smith**

Mentor: Letty Reichart

Co-Author: 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 monoculture, which eliminates hedgerows, windbreaks and grassy field borders that once served as small habitat fragments for nesting bird species. However, dryland and irrigated row-crop production is common in east-central Nebraska, where hedgerows, windbreaks and grassy field borders are still present. Thus, woodland cover exists within habitat fragments on the agricultural landscape in Nebraska. Woodland cover is a significant determinant of bird species richness at both farm and landscape level; however, some species are more likely to be associated with human structures. For example, House Sparrows are cavity nesting species that do well in human-dominated agricultural landscapes, whereas other cavity nesting species, such as Tree Swallows, experience population decline. House Sparrows and Tree Swallows use similar nest

cavities; although, House Sparrows outcompete Tree Swallows for available cavity nesting sites.

In this study we will estimate species richness and species abundance for cavity nesting birds within small habitat fragments of agricultural land in south-central Nebraska. We will use species point-count plots to detect cavity nesting species and document the avian community within this landscape. We predict to observe the following cavity nesting species: Downy Woodpeckers, Eastern Bluebirds, Eastern Screech Owls, European Starlings, Hairy Woodpeckers, House Sparrows, House Wrens, Northern Flickers, Red-bellied Woodpeckers, Red-headed Woodpeckers, and Tree Swallows. We predict that House Sparrows and European Starlings will be the most abundant cavity nesting species within this region, because these species are more abundant in areas where human structures are present. Following identification of cavity nesting species in this area, we will begin to test hypotheses regarding habitat use of cavity nesting species within this landscape.

### **Poster U43 – Audra Kippes**

Mentor: Yipeng Sui

Co-Author: Yipeng Sui

Title: *Cannabidiol Activates Atherogenic Human Pregnane X Receptor*

Cannabidiol (CBD), a non-psychoactive component of cannabis, has been used clinically as an anticonvulsant, antipsychotic, analgesic, and anti-inflammatory drug. CBD acts as a ligand for a variety of psychological receptors of the endocannabinoid system in humans and is implied to induce arterial vasodilation. However, it is unknown if CBD is associated with an increased risk for cardiovascular disease, such as hyperlipidemia. Pregnane X receptor (PXR), a master nuclear receptor of xenobiotic metabolism, has been implicated in affecting lipid homeostasis and atherosclerosis. PXR can be activated by various chemicals including endogenous hormones, dietary steroids, pharmaceutical agents, and xenobiotic compounds. However, whether CBD activates PXR remains unclear. In this study, we identify CBD as a potent agonist for human PXR and investigate the mechanism by which CBD interacts with PXR, using cell-based reporter assay in human hepatic HepG2 cells. We seek to combine in silico ligand-PXR docking studies with site-directed mutagenesis to identify the key residues within PXR's ligand-binding pocket that constitute points of interaction with CBD. We also strive to examine the effects of CBD on the regulation of PXR target genes in human intestinal LS180 cells. Our future in vivo study in mice aims to investigate the impacts of short-term CBD oral gavage on lipid metabolism and the influence of long-term CBD feeding on atherogenesis. Our study advances the understanding of the mechanism by which CBD activates and interacts with human PXR and suggests a potential link between anti-psychotic drugs and cardiovascular disease.

**Poster U44 – Corral McClintock**

Mentor: Dustin Ranglack

Title: *Kearney, Nebraska's Urban Wildlife: An Urban Wildlife Information Network Partnership*

In partnership with the Urban Wildlife Information Network (UWIN), my research aims to identify what wildlife use the area within and around the city of Kearney, NE. The rapid growth and expansion of urban environments worldwide calls for a better understanding of the effect that urbanization has on wildlife. Conducted in cities on a national and international level, the UWIN seeks to understand the ways in which animal behavior/presence is impacted by urbanization. Gaining an understanding of the behaviors of wildlife in urban environments is crucial to successfully create city plans that allow for and enhance coexistence of wildlife and people. Specifically, my work includes taking inventory of required supplies/materials, coordinating with UWIN in meeting their outlined requirements for membership, and working on setting up a transect grid for future deployment of trail cameras. Although deployment of trail cameras (which will be used to monitor and track the activity of wildlife) will not be attainable for this upcoming April, this precursing work will enable successful and smooth deployment of cameras in the coming summer and fall semester. Trail cameras will be used to identify the wildlife present in the area. Throughout the project, I will continue to monitor and log wildlife crossing events at each site. This information will be compiled for our research use and publication and will be submitted to the UWIN database for contribution to larger scale research. Understanding wildlife responses to urbanization across cities will enhance city planning efforts to create more wildlife-friendly development.

**Poster U45 – Naara Ramirez**

Mentor: Letty Reichart

Co-Author: Dawson Kosmicki

Title: *Molecular Sex Identification of Confusing Baltimore Orioles*

Before the late 20th century, determining the sex of birds was limited to karyotyping and discerning morphological traits. More recently, molecular techniques, including PCR, are commonly used to determine molecular sex of individuals. Most birds are sexually dimorphic, exhibiting different colors and patterns in their feathers as adults. However, some are not differing in this way, or resemble each other at different stages. An example of birds exhibiting confusing coloration is found in the Baltimore Oriole. While the adults of these mid-sized songbirds are sexually dimorphic in general, young males (i.e., one year old) and older females (i.e., greater than 3) are difficult to

distinguish from one another. The resemblance is so strong, in fact, that it can be exceptionally difficult to tell them apart. It is thus helpful to use molecular techniques to determine the sexes of these individuals. Our objective for this study is to use molecular techniques to determine the sexes of indistinguishable Baltimore Orioles that were trapped from May – June, 2016-2019.

#### **Poster U46 – Dana Dubas**

Mentor: Joseph Dolence

Co-Authors: Joseph Dolence, Sunanda Rajput

Title: *Examination of Sex-Specific Differences in Neutrophils Following Peanut Exposure*

The mechanism of how peanut (PN) initiates immune responses to elicit PN allergy remains incompletely understood. It is unclear whether neutrophils react to PN in the development of PN allergy. Furthermore, the degree to which such responses to PN by neutrophils are impacted by sex differences is even more unclear. We address these two questions to understand more clearly the mechanism by which the immune system mounts allergic responses to PN. Male and female BALB/c mice are exposed to PN flour via inhalation three times during a 3-day period (days 0,1,2). The day following the last exposure, lungs are collected from the mice and processed for staining by flow cytometry. Single cell suspensions were stained with antibodies to identify neutrophil populations found in lung tissue. Currently, we are exposing mice to PN and conducting flow cytometry experiments to obtain data to answer the questions posed above. Given we have strong data from other projects in the lab that sex differences exist in the ability of other innate cells to respond to PN, we are looking forward to analyzing and reporting data on whether neutrophils are impacted by sex differences in their ability to mount a response against PN. Overall, this project will allow us to obtain a greater understanding about how neutrophils respond in our inhalation mouse model of PN allergy.

#### **Poster U47 – Paiton Hancock**

Mentor: Dawn Simon

Title: *Correlation of Veillonella Bacteria with Oral Health*

*Veillonella* is a common species of bacteria found within the human oral microbiome, particularly in association with dental caries. Thus, the presence of *Veillonella* within the oral microbiome may be indicative of an individual's overall oral health. In this study, we aim to understand the prevalence of *Veillonella* in college-aged individuals in the US 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. The prevalence of *Veillonella* bacteria

amongst adults in the United States is unknown. We will utilize one-step PCR to identify species of *Veillonella* within the oral microbiome from tongue biofilm samples. We hypothesize that there will be an increased likelihood of *Veillonella* bacteria in individuals with lower self-reported oral health compared to those with good self-reported oral health. If a correlation does exist, it may provide insight into biological indicators of oral health. *Veillonella* has also been associated with other diseases (esophageal adenocarcinoma, gastroesophageal reflux disease, and Barrett's esophagus), so understanding its prevalence may have consequences beyond oral health.

#### **Poster U48 – Ben Wicker**

Mentor: Dustin Ranglack

Co-Author: Dustin Ranglack

Title: *Bison Scapula with an Embedded Metal Arrowhead from North Central Nebraska: A History*

This project centers around a metal arrowhead found embedded in a bison scapula near Long Pine, Nebraska in 1969, likely originating from the 18th to 19th centuries. This artifact highlights a unique period in American history. The exchange of goods with Spanish, French, and American traders had allowed for rapid advancements in Native American hunting technology, especially with the introduction of reusable steel and brass weapon tips. However, though most Plains tribes were still dependent on the bison for food and supplies, this era also marked the beginning of the end of Native American autonomy. Bison herds would soon dwindle, and American settlers would overtake the Plains. We will use 3D scanning and radiocarbon dating to learn more about the scapula and arrowhead and narrow down the time frame that the bison was killed. This information, alongside data collected about the area where the object was discovered, will clarify the people group this arrowhead may have originated from, as well as who they may have traded with to obtain it. Analysis of the materials and techniques used in the arrowhead's construction will hopefully provide insight into how it was manufactured and where it may have come from. This unique artifact can provide insights into bison hunting cultures of the Great Plains.

#### **Poster U49 – Hillary Vaughn**

Mentor: Surabhi Chandra

Co-Authors: Ayonya Birthi, Surabhi Chandra, Mahesh Pattabiraman

Title: *Cavitand-Meditated Cross-Photocycloaddition of 3-Arylacrylic Acids*

The cavitand-mediated photocycloaddition (PCA) of arylalkenes has been established by us as a reliable method of producing tetra-substituted cyclobutanes. The product stereo- and regioselectivity is governed by supramolecular interactions of the

reactants. Having pioneered this chemistry over the past decade, we are currently expanding the scope of this approach to direct cross PCA between two photoactive arylalkenes. While PCA is a very well-studied and utilized chemistry, very few examples exist in photochemistry literature for the crossed reaction. We present our findings on our effort to understand and tame this reaction to generate novel asymmetric cyclobutane structures. Owing to the similarity of the products to natural pharmacophores truxillic and truxinic acid, the products generated from this reactions have been explored for anti-cancer properties as well.

### **Poster U50 – Jennica Delvaux**

Mentor: Mary Harner

Co-Authors: Keith Geluso

Title: *Camera Trap Documentation of the Kearney Outdoor Learning Area (KOLA): A Biological and Educational Pursuit*

Camera traps are a non-invasive method to observe and collect data for wildlife research. Various studies employ camera traps to document animal presence, behavior, and habitat use. We conducted a regional, observational study of wildlife use of the Kearney Outdoor Learning Area (KOLA) with camera traps. KOLA is located in Kearney, Nebraska near the Platte River and adjacent to Kearney High School. It was designed for experiential education purposes. The area features a constructed retention pond with warm-water input from the school, a flowing creek, restored prairie, and woodland. Our research had two major objectives. Biologically, we examined seasonal use by birds of the artificial pond, and we also gathered camera data at the creek and woodland to supplement the biological inventory of KOLA as a whole. For education, we examined types of questions and activities a high-school science teacher could employ to teach science standards with cameras. To date, we have examined over 24,000 pictures from three cameras and documented at least 9 animal species; data collection is ongoing. Our work contributes to a greater understanding of biodiversity of an urban wetland and wildlife use of a human-made pond with a regional focus on the unique pond at KOLA. Our image archives also may be used in the future to advance understanding of the KOLA wetland, compare future biological inventories, and assist with developing educational activities.

### **Poster U51 – Cali Gunderson**

Mentor: Bryan Drew

Title: *The Overall Effect of Pollinators Versus Visitors of *Salvia azurea**

*Salvia azurea* (Lamiaceae), commonly known as azure blue sage, is a native plant of Nebraska and is common in grassland ecosystems. Due to the unique stamina lever

mechanism in *Salvia azurea*, only certain pollinators can successfully transfer pollen between plants of the species. Differentiating between what organisms pollinate the plant versus what organisms merely visit can help us understand hybridization patterns and species boundaries within the genus. Also, understanding the characteristics that attract different types of pollinators to azure blue sage can help with scientific studies and conservation efforts. This study may be helpful in increasing certain pollinator populations, such as bumblebees, throughout eastern and central Nebraska.

## Chemistry

### **Poster U52 – Avery White**

Mentor: Kristy Kounovsky-Shafer

Title: *Developing Different Types of Inserts to Store and then Elute and Concentrate DNA Molecules*

The fragility of DNA causes problems when trying to concentrate the DNA during routine analysis such as ethanol precipitation, Amicon filters, etc. Long DNA is advantageous as it allows for easier assembly of genomes and to find variations within the genome. Currently, large DNA (>50 kb) is difficult to concentrate. The goal is to be able to protect DNA during cell lysis (using an insert), while also allowing DNA to elute from the insert into solution. The insert is made up of an agarose/alginate gel matrix and the concentrations of sodium alginate, calcium chloride, and agarose were modified. DNA was added to the mixture prior to the mixture hardening. The gel was placed onto a 3D-printed device that is used for elution and concentration of DNA. The 3D printed device had an acrylamide roadblock that concentrates DNA at the acrylamide/solution interface. A voltage was applied to elute DNA out of the insert and into the solution. The DNA was monitored using a blue light transilluminator and a camera to determine if the concentration of agarose and alginate allowed DNA to elute from the insert. The agarose/alginate insert is currently being modified to determine the optimal conditions to elute larger DNA molecules out of the insert.

### **Poster U53 – Esmeralda Mendez-Ortiz**

Mentor: Kristy Kounovsky-Shafer

Co-Authors: Emily Baxter, Kristy Kounovsky-Shafer

Title: *Determining the Concentration of Acrylamide to Develop a Roadblock for a Elution/Concentration Device*

Within our 3D printed elution and concentration device, DNA is stained with YOYO-1 and monitored through fluorescence intensity. In a previous study, the fluorescence intensity was shown to increase as the temperature increased until 50°C and then it started to decrease. In order to determine what happens to the structure of the YOYO-1 stained DNA at these temperatures, the DNA was incubated at a certain temperature and then ran on an agarose gel to determine the mobility of the DNA. The changes in physical characteristics will perturb the mobility of DNA. DNA samples were prepared using a 1 kilobase plus DNA ladder and YOYO-1 dye. The DNA samples were incubated at different temperatures and then loaded into an agarose gel and run. The distance the DNA migrated was measured and converted into mobility. Several sizes of DNA were measured to determine how the mobility varies with temperature.

### **Poster U54 – Jack Linders**

Mentor: Kristy Kounovsky-Shafer

Title: *Dissolution of BAC-Crosslinked Polyacrylamide Gel Utilizing Urea and tris(2-carboxyethyl) phosphine (TCEP)*

3D printed devices are being utilized with polyacrylamide gel to create roadblocks to elute and concentrate DNA. A voltage is applied to the device and DNA is concentrated at the interface between solution and the acrylamide. During the concentration of DNA, some of the DNA is embedded in the acrylamide. To find how much DNA is embedded, the polyacrylamide gel must be dissolved to determine the concentration of DNA. The polyacrylamide gel was changed slightly, using BAC for the cross-linking mechanism. The resulting gel was suspended in a dynamic range of concentrations of Urea and tris(2-carboxyethyl) phosphine (TCEP). The most rapid degradation of the gel matrix resulted from a solution of 2.0M Urea and 0.1M TCEP and required one week to dissolve the gel matrix. One week is not practical, so the gel and solution were suspended in a 60°C water bath. This reduced the amount of time the gel dissolved to four days. Physical degradation prior to suspension in the solvent was also tested but did not significantly reduce the dissolution time.

### **Poster U55 – Zach Zavodny**

Mentor: Michael Moxley

Title: *Kinetic Analysis of Acetylated Human Citrate Synthase*

Human citrate synthase (hCS) is a mitochondrial enzyme that catalyzes the aldol condensation of an acetyl group from acetyl coenzyme A (AcCoA) to oxaloacetate to form citrate. hCS is traditionally discussed as the first enzyme in the tricarboxylic acid cycle and its activity is often used to evaluate mitochondrial density, such as in muscle tissue. Its activity is important for aerobic exercise performance as well as basic

metabolic function as a housekeeping enzyme. It has been shown through several mass spectrometry based physiological studies that hCS is acetylated on several lysine residues located throughout the protein under metabolically stressed conditions. However little follow up studies have been reported on the impact of acetylation on hCS activity. Here we kinetically characterize hCS through rigorous progress curve kinetic modelling and mimic the impact of acetylation of K393, near the AcCoA/CoA binding site, by mutating this residue to a glutamine. The hCS-K393Q mutant displays an increase in the  $K_m$  for AcCoA relative to the WT by at least 30-fold, whereas the  $K_m$  for oxaloacetate was like WT. Altogether our data suggests a much-attenuated binding affinity for AcCoA when hCS is acetylated.

### **Poster U56 – Charlie Polen**

Mentor: Kristy Kounovsky-Shafer

Co-Author: Nate Garringer

Title: *Testing Different Agarose Matrixes to Create DNA Inserts*

In order to use genetic mapping systems, such as Optical Mapping or Nanocoding, to differentiate large variations, large DNA molecules with sufficient information on the ends of the variation are required to complete the assembly of a genome. To fulfill this requirement, one must ensure that the DNA is eluted properly to maintain the full length of the molecule. Inserts were developed to embedded cells into a gel matrix and then digested to remove cellular debris. This prevents DNA from sheering during the process. However, concentrating and eluting large DNA molecules is difficult. In order to test different matrixes that could be utilized for our elution-concentration device, lambda concatemers were embedded in the matrix to observe the matrix's effectiveness in retention and elution of lambda concatemers. Agarose inserts, each containing 2000 ng of Lambda DNA, were created with seven types of agarose matrices: High Gelling Temperature (HGT) agarose, Pulse Field Certified (PFC) agarose, Gold agarose, Megabase agarose, Low Electroendosmosis (LE) agarose, and agarose. To monitor which matrix retained the most DNA, some inserts were left in 1X TE Buffer for one week, while others were left in buffer for one month. The buffer was then removed from the Eppendorf tubes after the allotted time period and measured using an Implen Nanophotometer P330. Elution was tested utilizing a 3D printed device affixed to a glass slide with an acrylamide gel to act as a roadblock to prevent the DNA from traveling through the end of the device. Using an electric field, DNA molecules were eluted from the various agarose matrices into solution and concentrated at the acrylamide roadblock. The solutions and inserts were removed from the devices and their concentrations were measured.

### **Poster U57 – Alethia Henderson**

Mentor: Frank Kovacs

Title: *Investigation of the Oligomeric State of Amino-Levulinic Acid Dehydratase (ALAD) from E. coli Using Non-Denaturing PAGE*

Heme biosynthesis is a critical pathway for most organisms due to the widespread use of heme as an essential co-enzyme. ALAD is an enzyme that catalyzes the second step in the synthesis of the small heme molecule (MW 617). The reaction catalyzed is the condensation of two 5-aminolevulinic acid (ALA) molecules to produce porphobilinogen (PBG), a structural piece used to create the basic heme structure. Defects in ALAD are responsible for several life threatening and poorly understood disorders. The work presented here demonstrates that there is an observable effect of the presence of a histidine tag on the equilibrium between oligomeric states of this enzyme. The histidine tag is seen to stabilize the octameric state even in the absence of Mg<sup>2+</sup>, which is required in the non-histidine tagged version of the enzyme to form a stable octamer.

### **Poster U58 – Grant Hohlfeld**

Mentor: Frank Kovacs

Title: *Site-directed Mutagenesis of Amino-Levulinic Acid Dehydratase (ALAD) from E. coli to Alter the Mg<sup>2+</sup> Site of the Enzyme*

Heme biosynthesis is a critical pathway for most organisms due to the widespread use of heme as an essential co-enzyme. ALAD is an enzyme that catalyzes the second step in the synthesis of the small heme molecule (MW 617). The reaction catalyzed is the condensation of two 5-aminolevulinic acid (ALA) molecules to produce porphobilinogen (PBG), a structural piece used to create the basic heme structure. Defects in ALAD are responsible for several life threatening and poorly understood disorders.

### **Poster U59 – Kalynn Doehling**

Mentor: Frank Kovacs

Title: *Comparing the Activating Effects of Mg<sup>2+</sup> on His-tagged and Non-His-tagged Amino-Levulinic Acid Dehydratase (ALAD) from E. coli*

Heme biosynthesis is a critical pathway for most organisms due to the widespread use of heme as an essential co-enzyme. ALAD is an enzyme that catalyzes the second step in the synthesis of the small heme molecule (MW 617). The reaction catalyzed is the condensation of two 5-aminolevulinic acid (ALA) molecules to produce porphobilinogen (PBG), a structural piece used to create the basic heme structure.

Defects in ALAD are responsible for several life threatening and poorly understood disorders. This work investigated whether or not the presence of a histidine-tag on the enzyme would impact the Mg<sup>2+</sup> activation in any significant way. We cloned a non-histidine-tag version of ALAD and ran assays testing the activation effect. An approximately 4-fold increase in activity was observed for both the tagged and untagged enzyme.

### **Poster U60 – Trevor Dvorak**

Mentor: Haishi Cao

Co-Author: Madeline Riesberg

Title: *Synthesis of Fluorescent Hydrogen Sulfide Donating Molecule*

Hydrogen sulfide (H<sub>2</sub>S) is a cytotoxic gas that has recently been demonstrated as a novel neuromodulator. Endogenous levels of H<sub>2</sub>S have been found to range between 50 and 160 μM in neuronal cells. Considerably lower H<sub>2</sub>S levels that correlate with increases in neuronal damage and degeneration were reported from patients with Alzheimer's disease that was a consequence of cellular oxidative stress, indicating that H<sub>2</sub>S might act as a cellular redox modulator. Thus, accurately measuring H<sub>2</sub>S level becomes a critical issue to understand its biological roles and consider using it as a therapeutic reagent. Currently, the fluorimetric method has proven as a useful assay for detection of H<sub>2</sub>S and hence has attracted widespread interest due to its ability of real-time sensing. This semester, we have been working on a multi-step reaction in order to synthesize an organic molecule that will release H<sub>2</sub>S when exposed to a very specific wavelength of light. If correctly synthesized, this molecule could have a variety of useful applications – particularly in the medical field. One advantage to this application is the specificity that it provides: we can be selective about which areas of the body are exposed to that wavelength of light. This will allow H<sub>2</sub>S to only be released where necessary.

### **Poster U61 – Nolan Gleason**

Mentor: Haishi Cao

Title: Investigate the Bio-Function of H<sub>2</sub>S in Neuron-Related Disease

In this project, we are synthesizing a light-triggered H<sub>2</sub>S releasing agent that is cell permeable and will raise the overall intracellular concentration of H<sub>2</sub>S. The H<sub>2</sub>S releasing agent must keep the levels of H<sub>2</sub>S at 30 mM -100 mM to stay below a toxic level in the cell. The therapeutic potential of H<sub>2</sub>S as a reducing reagent exerting an anti-oxidation function could combat neurodegenerative diseases such as Parkinson disease, Alzheimer disease and Down's syndrome. These diseases come from neuronal damage cause by stress from cellular oxidation to proteins where H<sub>2</sub>S levels

are observed to be low. We expect that the proposed H<sub>2</sub>S releasing agent will provide a new approach to treat disease related to neuron damage.

### **Poster U62 – Abigail Andrews**

Mentor: Haishi Cao

Title: *Investigate the Bio-Function of H<sub>2</sub>S in Neuron-Related Disease*

The focus of this project is to synthesize a light-triggered H<sub>2</sub>S releasing agent that will raise the intracellular concentration of H<sub>2</sub>S. H<sub>2</sub>S can be used therapeutically to treat neurodegenerative diseases, including but not limited to Down Syndrome, Alzheimer's disease, and Parkinson's disease. These diseases are caused by neuronal damage which can be caused by stress from cellular oxidation to proteins where H<sub>2</sub>S levels are low. It acts upon these diseases by acting as a reducing reagent that exerts an anti-oxidation function. We expect this H<sub>2</sub>S releasing agent will provide a new approach to treat diseases caused by neuron damage.

### **Poster U63 – Madeline Riesberg**

Mentor: Haishi Cao

Co-Author: Trevor Dvorak

Title: *Synthesis of Fluorescent Hydrogen Sulfide Donating Molecule*

Hydrogen sulfide (H<sub>2</sub>S) is a cytotoxic gas that has recently been demonstrated as a novel neuromodulator. Endogenous levels of H<sub>2</sub>S have been found to range between 50 and 160 μM in neuronal cells. Considerably lower H<sub>2</sub>S levels that correlate with increases in neuronal damage and degeneration were reported from patients with Alzheimer's disease that was a consequence of cellular oxidative stress, indicating that H<sub>2</sub>S might act as a cellular redox modulator. Thus, accurately measuring H<sub>2</sub>S level becomes a critical issue to understand its biological roles and consider using it as a therapeutic reagent. Currently, the fluorimetric method has proven as a useful assay for detection of H<sub>2</sub>S and hence has attracted widespread interest due to its ability of real-time sensing. This semester, we have been working on a multi-step reaction in order to synthesize an organic molecule that will release H<sub>2</sub>S when exposed to a very specific wavelength of light. If correctly synthesized, this molecule could have a variety of useful applications – particularly in the medical field. One advantage to this application is the specificity that it provides: we can be selective about which areas of the body are exposed to that wavelength of light. This will allow H<sub>2</sub>S to only be released where necessary.

### **Poster U64 – Vanessa Lo**

Mentor: Hector Palencia

Title: *Total Synthesis of (-)-Incarvillateine and Analogs*

An estimated of one out of five adults suffer from pain in the United States. Some of the drugs prescribed as pain relievers belong to the opioid class, such as oxycodone. However, they can be highly addictive, and they can lead to their misuse and addition to other illegal drugs. Unfortunately, the overdose deaths related to the opioid problem is in the rise and reached 70,000 people and it is estimated that up to 90,000 died from overdoses in 2020. This problem encourage scientist around the world to look for non-addictive painkillers. (-)-Incarvillateine was isolated from *Incarvillea sinensis* and shows significant analgesic activity similar to opioids, but without the side effects. It has been used to treat rheumatism and relieve pain in traditional Chinese medicine.

Our group is working on the synthesis of (-)-incarvilline and modified derivatives, toward the synthesis of (-)-Incarvillateine and analogs as potential non-addictive painkillers, in collaboration with another group. Starting with the commercially available (+)-carvone and (-)-incarvilline, forming the ester in the (-)-Incarvillateine, was synthesized by using a reported method. The synthesis of incarvilline and other derivatives in progress will be discussed.

### **Poster U65 – Jakob Gutschenritter**

Mentor: Hector Palencia

Co-Author: Omar Lozano

Title: *Suzuki coupling/NHC cyclization strategy for the synthesis of heterocycles*

The Suzuki coupling is a powerful methodology for the synthesis of a diversity of molecules and it can lead to complex structures when combine with other strategies.

Dibenzo[b,d]oxepins are structures of interest, with anti-tumoral activity and present in some natural products, such as protosappanin A. Different strategies have been applied for the synthesis of the scaffold, Friedel-Crafts and Suzuki- coupling/Stetter, among others. Our group is working in a strategy that uses the Suzuki coupling as one of the key reactions. Preliminary results of our findings will be presented.

### **Poster U66 – Poonam Puntambekar**

Mentor: Mahesh Pattabiraman

Co-Authors: Marissa Hoover, Rahn Johnson

Title: *Cavitand-mediated Photocycloaddition (PCA) Optimizing Reaction Parameters for Yield Maximization*

Photocycloaddition (PCA) of alkenes is a reaction with many fundamental chemistry significance and applied potential. However, this bimolecular reaction is rendered inefficient due to entropic unfavorability. Our lab specializes in achieving efficient and stereoselective PCA of alkenes by using the cavitand-mediation strategy, which takes advantage of proximal positioning of two photoactive reactants within a macrocyclic cavitand. Our past works have provided several supramolecular and photochemical insights into the cavitand-mediated PCA, which was used to synthesize more than fifty novel dimeric compounds. We are now dedicating our efforts towards understanding the reaction dynamics in order to maximize reaction yields by manipulating previously unexplored aspects of the reaction such as overall concentration, temperature, sensitization, and wavelength filters. We present our findings on the influence of concentration changes and temperature on the product selectivity and yields.

### **Poster U67 – Thi Huynh**

Mentor: Kristy Kounovsky-Shafer

Co-Author: Samantha Rau

Title: *Developing a method to concentrate DNA using an Acrylamide Roadblock*

Utilizing long DNA is paramount to spanning long variations within a genome. However, long DNA is fragile, so cells are embedded in an agarose insert to keep DNA intact during cell lysis. The problem is how to get long DNA out of the insert and concentrated. To concentrate DNA from the insert, a roadblock was needed. The roadblock developed was a bis-acrylamide gel. The bis-acrylamide gel was placed within a 3D printed device and cured. YOYO-1 stained lambda concatemer DNA was loaded in front of the bis-acrylamide gel and a dynamic range of voltages were applied for 1 hour to concentrate DNA. Fluorescent images were captured before and after to determine how much DNA was concentrated at the interface of the acrylamide roadblock. The intensity was measured to determine the amount of DNA recovered in the solution between the acrylamide and agarose gel.

# Cyber Systems

## **Poster U68 – Noah Meyer**

Mentor: Sherri Harms

Title: *Creation of a new 3D Action Game - Phase II*

Development of entertainment software is an ever-expanding field of study and commercial engagement, and with the barrier of entry lower than ever, it makes sense that young, passionate entrepreneurs would be able to place their own original content out into the wild, exploring new ideas and iterating on older ones.

Such is the case with Nea Edem, a 3D action game that serves as a creative and academic continuation of the ethos behind the developer's Lloyd the Monkey series. This recently released exploratory action game, having begun development during the COVID-19 pandemic, silently explores the idea of isolation and ruin while concluding on a promise for the future. It also represents its developer's bold first steps into 3D game development. This poster presents an introduction to the play experience, in addition to lessons learned throughout the development process.

## **Poster U69 – Jordan Schnell**

Mentor: Shuva Dass

Title: *Interactive Visualization Tool for Understanding Complex Security Concepts*

The objective of this project is to develop a visualization tool to aid understanding of Cyber Security concepts. Employing the Python programming language, interactive Venn diagrams will be constructed that visually represent fundamental security terms such as Confidentiality, Integrity, and Authentication. Data will be able to be manipulated, likely via an interactive slider, for users to gain a more comprehensive understanding of the concept being demonstrated. Aspiring professionals must understand a wide array of security concepts, and the visualization of such concepts sans complex math grants opportunities for heightened efficiency and effectiveness in the training process of Information Security students.

# Geography

## **Poster U70 – Jalynn Ellenwood**

Mentor: Jason Combs

Title: *Floral Emblems and United States Cultural Identity*

The sense of identity that people form in attachment to where they live or spent their childhood is closely interrelated with their cultural and social ideologies. Natural symbolism enables people to establish ties and gives meaning to a particular environment. Essentially, a symbol conveys a collective perspective of reality in a readily understood manner. From the very beginning of United States history, the promotion of national symbols fostered cultural identity within this newly formed commonwealth that lacked culture, identity, history, and a sense of homeplace. The rise in U.S. nationalism in the 19th century has been associated with the adoption of national and state symbols. This can be seen in the use of natural symbolism in naturalistic literature, postcards and postage stamps, and the adoption of national and state emblems. Flags and seals are more well-known forms of national and state symbols, but less known is the symbolism of state flowers, although they were one of the first state emblems chosen following flags and seals.

## **Poster U71 – Oliver Combs**

Mentor: Jason Combs

Title: *The Official Atlas of Nebraska*

From Ohio westward, counties were often delineated in accordance with the “gridded” land survey system defined by the Land Ordinance of 1785. The result was a checkerboard pattern across the countryside and a well-defined mapping system that did not continue the cartographic problems associated with land division east of the Alleghenies. This systematic process of land division allowed mapmakers to “concentrate instead on embellishing the cultural data on the maps, ranging from precise delineation of the woodland cover to economic and statistical information—and lithographic views.” With this new land division system came county atlases and plat books—which were much more functional than traditional wall maps—that demonstrated spatial information on individual pages. County plat books soon became commonplace throughout the country. Today these works are valuable archival research tools, containing a wealth of material.

### **Poster U72 – Tate Combs**

Mentor: *Jason Combs*

Title: *Main Street, Tornadoes, and Train Wrecks . . . Mining eBay for Data*

Postcards quickly became a social phenomenon in the early 1900s. More than a passing fancy, the first few decades of the twentieth century was the “Golden Age” of picture postcards when they were at their peak as a faddish novelty with nearly a billion cards sold annually which at the time was approximately ten times the population of the United States. Many publishers and customers alike preferred traditional popular views, including bird’s eye views, downtown commercial districts, and local landmarks. Postcards were available at a variety of retail establishments and by 1920 postcard racks were found in a number of retail outlets from “dime stores to department stores.” The popularity of postcards in the early 1900s quickly revolutionized our understanding of places. Today using postcards as a research medium is part of a larger trend by scholars who utilize visual media to represent places. This has occurred at a time when the Internet, eBay in particular, made collecting postcards for research more accessible. DeLyser, Sheehan, and Curtis (2004) along with DeBres and Sowers (2009) both found eBay to be an essential place to locate such items.

### **Poster U73 – Carson King**

Mentor: *Jason Combs*

Title: *How Geography Can Help Inform on Public Health: A Link Between Air Pollution and Cancer*

Air pollution has been a common problem since the start of the industrial revolution and effects our planet in numerous ways. While one of the main focuses of air pollution studies today is to gauge its effect on global warming, other studies have started to look into the effect of pollutants on human health. From heart disease to stroke, air pollution has been linked to many of the first world’s most common causes of death. In this study I am looking to see if there is a correlation between increased air pollution levels and mortality from lung cancer.

### **Poster U74 – Justin Vrooman**

Mentor: *Paul Burger*

Title: *GIScience and Redistricting: A Local Government Case Study in Nebraska*

Following the decennial Census, Congressional redistricting is mandated by the U.S. Constitution. Similarly, Nebraska statutes require local governments with an elected board to redraw the district boundaries of their elected officials with substantially equal population and follow precinct boundaries (Neb. Rev. Stat. § 32-553). GIScience is utilized in redistricting the eight (8) board districts for Educational Service Unit 17

(ESU-17) located in north central Nebraska. U.S. Census Bureau Block level PL 94-171 population data along with TIGER / Line boundaries of precincts, counties, places, major roads, townships, and school districts are the spatial data layers utilized. Boundaries are delineated to produce districts that are substantially equal in population, compact, and preserve precinct and county boundaries where practicable. GIScience has demonstrated its utility in the redistricting process producing numerous iterations of maps that are often superior to hand-drawn alternatives (Burger 1998; Burger and Cornwell 1999; Hulme v. Madison County 2001; Burger et al. 2007; Burger and Combs 2009).

### **Poster U75 –Bhavya Sharma**

Mentor: Vijendra Boken

Title: *Impact of Vaccination on Covid-Mortality Rate in the United States*

Covid began impacting the U.S. population in early 2020 and spread rapidly thereafter during 2020 as well as 2021. It took several months to develop the covid-vaccine and people began taking the vaccine doses. However, mistrust also developed among people about the effectiveness and possible after-effects of the vaccination. This mistrust slowed the vaccination drive and probably enhanced the covid-spread and mortality. Data on Covid cases, vaccination, and mortality was collected for different states in the United States. The percentages of vaccination and mortality was computed for all the states and extreme states were selected for deeper analysis. This poster will present the data analysis and its findings.

## **Math**

### **Poster U76 – Trenton Chramosta**

Mentor: Barton Willis

Title: *EKG Analysis Tool*

The purpose of this research project is to build an open-source electrocardiogram (EKG) analysis tool to flag potential issues for experienced cardiological verification, thus allowing deeper medical research upon all demographics, and facilitating growth in personalized medicine. Our process boils down to Data Collection, Determining a Programming Language, Analysis, and Saving Analysis for future use. Due to the nature of software, this project will continuously evolve and we encourage you to follow our github page at <https://chramostatm.github.io/EKGproject2021code/>

# Physics

## **Poster U77 – Gamaliel Montero Alcaraz**

Mentor: Jeremy Armstrong

Title: *Properties of one dimensional quantum harmonic systems with small variations*

In this work, we produced a Python program that computes properties of a one-dimensional quantum system of an odd number of particles. The one dimensional system is a chain of particles connected by harmonic oscillators. Each particle has a mass and is connected by a quantum mechanical spring with its own interaction frequency. Observables such as energy, size and eigenfrequencies were calculated depending on the interaction frequencies and masses of the particles. Our program produced plots for four different cases in which all particles were identical except for the central particle. The central particle could differ in mass or frequency. There were four types of plots: the system energy versus central particle mass, the size ratio of the central to a terminal particle versus the input frequency of the central particle, the system energy versus the input frequency of the central particle, and the asymmetry in system energy versus the number of particles in the system. In the first plot, we observed a maximum in the energy of the system when all the masses were identical. In the second plot, the energy increased with the frequency but not in a quite linear manner. In the third plot, the size ratio of the central to a terminal particle decreased as the input frequency increased. The fourth plot was studied as a result of observed energy asymmetry in the second plot.

## **Poster U78 – Abigail Osterholt**

Mentor: Joel Berrier

Title: *Pulsar Candidates for NANOgrav*

Gravitational waves are disturbances that act like ripples in space-time caused by the acceleration of massive objects. This phenomenon was a prediction of the theory of general relativity in 1916, but they were not detected until nearly a century later. Since the first detection of gravitational waves by LIGO in 2015, physicists and astronomers have looked for other ways to detect gravitational waves. Due to the small relative size of these disturbances compared to larger vibrations experienced by detectors, Earth based methods for detection of these waves are very complicated. However, pulsar timing arrays provide a potential method to detect the effects of these small gravitational waves. A pulsar is a collapsed remnant of a dead star, or a supernova, that spins rapidly. These dead stars emit pulses which are due to strong magnetic fields funneling jets of particles out along two magnetic poles. This rapid rotation, often hundreds to thousands of rotations per second, combined with a beaming of radio

frequency light from a narrow region on the surface of the pulsar mean that pulsars create a regularly repeating “pulse” of radio waves that can be detected. They can also be used as extremely accurate timing device that can compare to the world’s most accurate clocks. Collections of pulsars of known positions form “Arrays” whose relative positions and known pulse rates can be used to look for the effects of gravitational waves moving through space. There are many resources available to observe and record data obtained from pulsars. We can examine the proposed techniques to detect gravitational waves by the Nanograv project and examine the citizen science project the “Pulsar Search Collaboratory” which is being used to catalog large numbers of pulsars to make those detections.

### **Poster U79 – Brooke Carlson**

Mentor: Kenneth Trantham

Title: *Pockels Effect in Chiral Molecules*

The linear electro-optical effect, or the Pockels effect, occurs when birefringence is produced in an optical medium due to an induced electric field. The relationship between the birefringence and the electric field is linear. The Pockels effect only occurs in non-centrosymmetric crystals meaning they lack inversion symmetry. The crystal acts as a retarder that allows for the control of the phase delay of the slow optical axis. The new proposed experiment tests the Pockels effect in homogeneous material such as fructose and glucose. These materials are composed of chiral atoms and lack a center geometry. In this experiment a typical a transverse Pockels cell will be replaced with a cell designed to hold the new chiral samples while allowing a laser to traverse through them. The holder is designed to melt glucose (146 C) and fructose (105 C). The samples will then be cooled to obtain a transparent solid. The holder will also serve as the housing for the optical experiment. Therefore, from an engineering perspective it is comprised of a high temperature garolite material, stainless steel conducting plates, stainless steel screws, and glass slides. The tests will aim to prove the Pockels effect in materials composed of chiral molecules. The engineering design of the sample holder will be presented.

# Professional & Applied Studies

## Accounting, Finance & Economics

### **Poster U80 – Daniel Vargas Castano**

Mentor: Frank Tenkorang

Title: *Impact of types of Microtransactions on Videogame Revenue*

The U.S. has focused on car-based transportation. After WWII, the U.S. began investing large amounts of money to expand highways and roads and very little in public transportation. The expanded access to roads encouraged driving, which led to cars being the main mode of transportation. The effect of roads and highways were stronger in small developing cities than in older cities which were built before the car was invented. With global warming and growing population, public transportation will need to expand and public transportation in the U.S. can only thrive nationwide if the entire nation is on board with the project. In the literature there has been little to no research on implementing public transportation in small cities. Therefore, the purpose of this paper is to identify the factors that determine the viability of a public transportation system in a small city by developing a viability score. The viability score could help cities identify if they can successfully implement public transportation or what steps could they take to improve the score.

### **Poster U81 – Yijin Li**

Mentor: Steven Hall

Title: *To Study the Current Status and Problem Analysis of Internal Control of Listed Joint-Stock Companies Through the Analysis of Financial Reports of Listed Companies*

The research was conducted to analyze the impact of covid-19 on the insurance industry over the past few years and the judgment for the future. To achieve this goal, ten insurance companies were selected for analysis: AXA SA, Metlife Inc., Aegon NV, Aviva PLC, Prudential Financial Inc, Manulife Financial Corp, Great-West Lifeco Inc, New York Life Insurance, Sun Life Financial Inc. Each of these companies' income statements are presented for the period 2000-2021. The analysis established that Sun Life Financial Inc. was the least affected company by the COVID-19 outbreak. For financial years 2019, 2020 and 2021, the corporation reported respective annual incomes of 2947, 2792, and 4035 million Euros. Conversely, Aegon NV was the most affected by the pandemic. In this case, the net income in 2019 and 2020 was 1289 and -210 million euros, respectively. Accordingly, Sun Life Financial Inc. and Aegon NV are the most and the least affected companies, correspondingly.

# Business & Technology

## **Poster U82 – Matthew Rokusek**

Mentor: John Hastings

Title: *The Preliminary Analysis of the Architecture Behind a Gamified Game Development Based Learning Framework*

The goal of this project was to analyze the architecture of ZORQ, a gamified Game Development Based Learning (GDBL) system. ZORQ is a space-based game framework used as a teaching tool in undergraduate computer science education. Each semester, every student is tasked with implementing code to control a ship that will compete against the other students' ships in a game space filled with supplies and obstacles. The game is the final project in the UNK CYBR 330 Data Structures and Algorithms course.

Maintaining a game for different groups of students to use over the course of several years requires maintenance and modifications to be made to the codebase. As code ages and is repeatedly manipulated, it becomes outdated and messy. Over time, several improvements have been made to the ZORQ system, namely removing memory leaks, adding new game elements, and plugging security holes. In general, the dynamic nature of ZORQ's framework has advantages in its fresh and collaborative implementations, but it leaves the framework open to having overly complex code, security vulnerabilities, and other developmental issues.

To complete a preliminary analysis of the architecture, the following models were created: a full system UML class diagram, a level 0 UML hierarchical class diagram showing relationships, and a data flow diagram (DFD) from ship controller point of view. The various visual representations of the system, as well as a detailed metric analysis of each class and method enabled additional analysis. A systematic review of coupling, cohesion, and code complexity in the framework was conducted. Further, the framework was reviewed manually to find examples of poorly written code. Using these methods, the engine class was found to have very high complexity and coupling. Although not as severe, the Ship class also had high coupling. The flying object classes had issues with cohesion. Surprisingly, the Universe class did not have as many problems as expected.

Methods: Systematically reviewed the system for relationships between the classes and the way data was shared; Color-coded; Used Drawio to represent the diagrams; Eclipse; CodeMR

# Communication Disorders

## **Poster U83 – Holly Rockenbach**

Mentor: Philip Lai

Title: *Measuring Social and Emotional Development and their Growth Trajectories in Two Groups of Children*

In this project, social and emotional development was investigated in two sets of typically developing (TD) children. This study compared two age groups to see if areas of development have reached parity or if these areas are still developing. One set of children are younger children (i.e., ages 2-6) and the other set are older, school-age children (i.e., 7-14). In this study, four different parental questionnaires were examined. First, the Child Behavior Questionnaire-Short Form (CBQ) will be calculated where emotions and sociability will be investigated. This form has parents rank their answer on a scale from 1-7 ((1: extremely untrue; 2: quite untrue; 3: slightly untrue; 4: neither true nor untrue; 5: slightly true; 6: quite true; 7: extremely true; NA: not applicable). Second, the Multidimensional Personality Questionnaire-Parent Version (MPQ) was assessed where personality (i.e, conciliatory, even-tempered, thrill-seeking) was investigated. The MPQ is organized by having parents rank their answer on a scale from 1-4 (1: My child is definitely low on this trait; 2: My child is probably low on this trait; 3: My child is probably high on this trait; 4: My child is definitely high on this trait). The third parental questionnaire was the Salk Institute Sociability Questionnaire (SISQ) where approach behaviors was examined. The SISQ is a ranking system from 1-7 (1: very rarely; 7: very often). The fourth and final questionnaire was the Social Responsiveness Scale (SRS). The SRS examines social interaction behaviors. The SRS is formatted by having parents rank their answer from 1-4 (1: not true; 2: sometimes true; 3: often true; 4: almost always true). First, a literature review and annotated bibliography were conducted focusing on child development and milestones along with background information from these four questionnaires. The questionnaires were extracted into Excel and compared based on mean averages of the scores. Results will indicate which areas constructs are similar within the two groups and which constructs still needs more time/development during early childhood.

## **Poster U84 – Paige Moore**

Mentor: Ladan Ghazi Saidi

Title: *Dyslexia in Children and Working Memory*

Dyslexia is a language disorder that involves difficulty reading due to impairment of speech sounds and cognitive processing such as letter-sound decoding. Working

memory is involved in many cognitive functions including language. Impairment of working memory is associated with impairment of language (Deldar et al., 2020).

In this study, I will present the results of a library research on different psychological tests that are used to measure working memory and phonological awareness. Precisely, I will discuss Phonological Assessment Battery Test, Reading and Understanding Passages (RUP), Neal Analysis, Naming Speed Test, Semantic Fluency Test, Alliteration Fluency Test, Rhyme Fluency Test and Spoonerism Test.

The Phonological Assessment Battery Test (PhAB) measures phonological processing specifically looking at alliteration, rhyme, spoonerism, and non-word reading. The Reading and Understanding Passages (RUP) and Neal Analysis Test both provide reading speed, accuracy, comprehension, and categorization of reading errors. The Naming Speed Test assesses naming speed and reading ability. The Semantic Fluency test measures executive function and accesses to semantic memory. The Alliteration Fluency test measures verbal fluency. The Rhyme Fluency test measures rhyme. The Spoonerism Test measures phonological processing without contamination by reading and writing experience.

## Kinesiology and Sports Sciences

### **Poster U85 – Hunter Hiatt**

Mentor: Shannon Mulhearn

Title: *Dual Roles of Coaches: A Proposed Study*

Coaches at recreational facilities have a direct impact on creating positive experiences for children and youth through sports (Solomon, 2021). According to Indeed.com, the average salary of a coach at a YMCA is just over \$13. For this reason, it is necessary for coaches to find additional jobs to supplement their income. The current research on this topic focuses more on coaches coming from the educational field in the K-12 field. The purpose of the proposed study is to examine occupational choices by coaches who work part-time at recreational facilities to learn about their perceptions of coaching and what jobs are preferable to meet their needs. This study will be guided by two research questions: 1. Do athletic coaches at recreational clubs in Nebraska consider coaching their main job or their secondary job? 2. What are the most frequently chosen second jobs of athletic coaches in recreational settings Proposed Methods An electronic questionnaire will be utilized, with an optional follow-up interview with willing participants. The target population will include athletic coaches at recreational workplaces, public schools, and other league sports. The questionnaire has been developed using previous articles about the dual roles of coaching. Analysis Plan

Descriptive statistics will be run on all survey responses. Interview data will be investigated for common themes. Potential Impact Future coaches could benefit from this information through similar interests as other coaches. Recruitment effort by companies and universities could also benefit.

### **Poster U86 – Lexi Schwartz**

Mentor: Joey Eisenmann, Greg Brown

Title: *Evaluation of External Training Load During Practice and Games in Division II Collegiate Football Players*

To minimize the risk for overtraining syndrome, which can result in loss of training adaptations and overuse injuries in athletes, global positioning system (GPS) technology can be used to monitor external training loads during practice and games. These data can then be used to implement individualized training programs to promote optimal adaptations while avoiding overtraining syndrome. Purpose. The purpose of this study was to monitor external training load during practice and games in University of Nebraska at Kearney football players throughout the 2021 fall season. Methods. Thirty players wore Sports Performance Tracking GPS devices between their shoulder blades to quantify external training load during practice and games. Players were categorized into offensive and defensive groups along with positional groups. Data included total distance (yds), hard running (10-14 mph), hard running attempts, sprinting (>14 mph), sprinting attempts, and top speed (mph). Data were viewed individually, in groups, and as a whole team. Comparisons were examined weekly and at the end of the season. Results. Individuals in the wide receiver group produced the highest training load in all forms, followed by defensive backs, linebackers, and running back positions. The day with the overall highest training load from all groups was game day. The practice with the highest training load was three days before game day, followed by four days before, two days before, one day before and five days before. Discussion. These results demonstrate the importance of individualized and periodized training specific to athletes in different positions on the same team.

### **Poster U87 – Blake Heller**

Mentor: Joey Eisenmann, Bryce Abbey

Title: *Velocity Based Training and it's Effect on Athletic Performance*

Velocity based training is a relatively new topic that is becoming more and more popular regarding the effects on strength and power focused training in individuals and athletes alike. A study done by Liao et. al. showed that both velocity based training and percentage based training (1-RM %) can enhance strength, jump, linear sprint and CODs performance effectively without significant group difference. This shows that

velocity based training is as effective as 1-RM percentage based training in regards to these outcomes, offering a different training strategy to possibly include in programming. The studies included in this project review the existing literature on the effects of VBT and the common scheme methods utilized by elite athletes, perform a systematic review of the studies that show effects of velocity-based resistance training on strength and power performance in elite athletes, evaluate the effect of VBT programs on variables related to muscle strength (one-repetition maximum, 1-RM), and high-speed actions (vertical jump, and sprint performance) in trained subjects, and other similar studies.

The purpose of this project is to collect current research articles, meta analyses and other scholarly articles and analyze them for gaps in the data that may lead to future research on velocity based training.

This project will include gathering information from peer reviewed journals regarding velocity based training, programming, equipment, and studies on its effectiveness compared to traditional resistance training programs.

Articles are being reviewed and an evidence table is being created.

### **Poster U88 – Britney Brosius**

Mentor: Kazuma Akehi

Title: *Identifying rodeo related injuries and their corresponding risk factors*

Rodeo is well known physical activity that involves high-velocity and high-impact to rider's bodies against uncooperative livestock. The Justin Sports Medicine Team recorded injuries at 1,939 Professional Rodeo Cowboys Association (PRCA) rodeos from 1981-2005 and reported 49.8% of injuries were from bull riding, 22.8% from bareback riding, 15.6% from saddle bronc riding, 8.0% from steer wrestling, 2.7% from tiedown roping, and 1.1% from team roping. The 3 most prevalent mechanisms of injury are collision with the ground (26.6%), collision with an animal (20.9%), and being stomped on by an animal (15.4%).<sup>3</sup> Head, neck, and facial injuries are commonly seen in bull riding, along with other rough stock events.<sup>1</sup> However, there is limited research of rodeo related injuries in rural Nebraska and central region of the U.S. Purpose: The purpose of this study is to identify and analyze rodeo-related injury frequency, anatomical location, type, mechanism of injury, phase of event, and likelihood in the central region of the United States. Method: A survey study will be conducted to rodeo participants in five rodeo associations; Nebraska High School Rodeo Association, National Intercollegiate Rodeo Association Central Rocky Mountain Region, National Intercollegiate Rodeo Association Great Plains Region, Mid-States Rodeo Association, and Nebraska State Rodeo Association. Data results will be collected and reviewed using Qualtrics, an online survey tool. Clinical Application: The data collected from this

study would be significant due to the lack of previous data available in the US. It could be used in the clinical setting to assist in prevention, awareness, and future research in rodeo sports medicine.

**Poster U89 – Mikael Kuhlmann**

Mentor: Kazuma Akehi

Co-Author: Kazuma Akehi

Title: *Kinetics and Kinematics Analysis during Dynamic Motion on Lower Extremities following Total Knee Replacement*

Total knee replacement, or total knee arthroplasty (TKA), is a procedure that resurfaces and replaces the knee with a prosthetic device for patients that have experienced joint functionality issues and pain due to musculoskeletal issues such as arthritis. In 2017, over 754,000 surgeries took place making it a common joint replacement surgery in the U.S. The study showed patients could achieve a knee flexion range of  $112.6^{\circ} \pm 15.3^{\circ}$  and an extension of  $1.5^{\circ} \pm 3.8^{\circ}$  after TKA. Lateral knee deformities have been shown to improve with ranges of  $3.3^{\circ} \pm 5.0^{\circ}$  for varus deformities and  $6.5^{\circ} \pm 3.7^{\circ}$  for valgus deformities after TKA. In recent years, orthopedic surgeons have been using the computer system to capture and calculate the ideal knee alignment during the procedure instead of the traditional manual procedure. Therefore, there are still limited studies on how the new TKA technique influences the patient outcome. The purpose of the study is to examine the knee and hip dynamic joint angles, alignment, and force production from each limb during dynamic motions following TKA. The Knee Injury and Osteoarthritis Outcome Score (KOOS) survey will be performed to determine their pain and knee functionality before and after TKA. Additionally, 3-D motion analysis will be conducted to evaluate knee and hip dynamic joint angles, alignment, and muscle force produced from each limb during dynamic exercises before and after TKA. The exercises during the testing will include bodyweight squat, lateral lunges, and vertical jump/hop. Following TKA, the same physical therapists will conduct the standardized TKA rehabilitation protocol. Once the physician clears the patient to perform the dynamic motion, follow-up testing will be performed. The current research would allow for a comprehensive analysis of joint and limb functionality. It will also assist in improving the quality of procedures and patient outcomes following TKA.

### **Poster U90 – Derek Elton**

Mentors: Megan Adkins, Matt Bice

Co-Authors: Matt Bice and Thomas Orr

Title: *Athletic Identity: How do you identify?*

Even though partaking in regular physical activity (PA) can result in health benefits, many individuals fail to meet the minimum recommendations to improve health. Still, many gaps exist explaining potential influencing factors of adulthood PA. The term athlete can be confusing and loaded with stereotypes; however, the term has become increasingly popular as adults attempt to rekindle physical fitness. The purpose of this study was to examine athletic identity and perceived need satisfaction (motivation) among a convenience sample of college students at a public university in the Midwest to identify contributing factors to adulthood PA behaviors. Students filled out an online survey that accessed past sport participation and primary physical activities in both high school and during college. A cross-sectional census research design was used examining the variables: (a) the International Physical Activity Questionnaire, (b) The Motives for Physical Activities Measures, and (c) The Athletic Identification Questionnaire. Self-determination theory guided the selection of the research questions and measured variables. Participants who had high ratings in athletic identity competence yielded high rating of motivation competency ( $r = 0.779$ ,  $p = 0.001$ ). Comparing gender differences, males ( $n = 118$ ) rated motivation for competency significantly higher ( $\mu = 28.55$ ) compared to females ( $n = 225$ ;  $\mu = 27.18$ ) suggesting differences in perceived need satisfaction (motivation) and further potential implications to adult PA behaviors. Athletic identification can be used as a crucial tool in understanding how young adults identify. Leveraging identity to impact health behaviors could have a direct impact in predicting future health behaviors. College campuses accommodate young adults through the offerings of intramurals, but more needs to be done as the terminology of athlete has broadened (i.e. types of activity opportunities).

### **Poster U122 – Derek Elton**

Mentors: Greg Brown, Thomas Orr

Title: *Comparison of Running Performance between Division and Sex in NCAA Outdoor Track Running Championships 2010-2019*

Although it is expected that there is a stratification of running performance between NCAA Division 1, 2, and 3 athletes, the performance difference has not been evaluated. Similarly, the differences in running performance between men and women in NCAA Division 1, 2, and 3 has not been evaluated. Purpose. The purpose of this project was to evaluate the differences within and between men and women in the top 8 places in individual running events in the 2010-2019 NCAA outdoor track

championships. Methods. Track running performance times for individual race distances of 100m – 10,000m for the NCAA Division 1 (D1), 2 (D2), and 3 (D3) outdoor championship finals for the years 2010-2019 for men and women were obtained from the NCAA website, and then were analyzed for performance differences. Results. For men and women, respectively, the overall average D1 1st place time was 3.01% and 4.42% faster than D2, and the D2 1st place time was 1.46% and 1.73% faster than D3. Men's performance times were faster than women's times in all events. Overall, the 1st place man was 14.1% faster than the 1st place woman, with a range of 10.04% (in the D1 100m) to 17.2% (in the D2 10,000m). Conclusion. The present data confirm that there is a stratification of athletic performance between NCAA divisions with D1 being faster than D2, and D2 being faster than D3 for most individual running event. Furthermore, the fastest D1 woman in each event was typically slower than the slowest D3 man.

### **Poster U91 – Bella Whiston**

Mentor: Matt Bice, Kazuma Akehi

Co-Authors: Matthew Bice and Kazuma Akehi

Title: *The Intrinsic and Extrinsic Factors That Affect Patients' Motivation to Participate in the Rehabilitation Process Post-Injury*

The Self-Determination Theory (SDT) describes extrinsic and intrinsic factors as the 3 basic psychological needs of human beings (autonomy, competence, and relatedness). This continuous concept exhibits the levels of both extrinsic and intrinsic types of motivation, as well as the degree of internalization. Previous studies reported extrinsic and intrinsic factors play a major role in how patients who have been receiving rehabilitation/therapeutic intervention stay motivated throughout the recovery process. The purpose of this study is to identify those extrinsic and intrinsic motives and understand how patients undergoing rehabilitation use them as motivation throughout the rehabilitation process in local Physical Therapy clinics. In this study, patients who have experienced some form of musculoskeletal injury and are currently undergoing rehabilitation at a local PT clinic will be recruited. A cross-sectional survey method will be used to understand extrinsic and intrinsic motivation types. Within the first round of surveys at the beginning of the rehabilitation process, intrinsic and/or extrinsic factors will be identified by the patients to understand how they motivate themselves to seek out PT. The follow-up survey will be conducted at the halfway point and at the end of the rehabilitation process to determine how their motives have been changed or stayed the same throughout the PT process. By understanding how patients are motivated to rehabilitate after injury and identifying their motives at different points during rehabilitation, health care providers such as physical therapists and athletic trainers

could see their psychosocial and emotional changes and how extrinsic and intrinsic factors play a role during the rehabilitation process.

**Poster U92 – Jessica Klingelhofer**

Mentor: Megan Adkins

Co-Author: Shannon Mulhearn

Title: *A Hop, Skip, and a Jump: What's Happening in Elementary School Hallways?*

Movement, and/or sensory hallways are being added in schools beyond the special education classroom to serve as an intervention to assist in decreasing off-task behavior, mindful transitions between classrooms, increase time on task, and improve academic performance of students. Schools have become aware of the need for additional opportunities to be physical activity and influence of the various senses for different learning abilities of elementary students. Currently limited research exists about movement hallways. The purpose of the research project was to investigate the number of Nebraska elementary schools who have implemented the hallways, and gain an educator's perspective about the need, and effectiveness they have seen in their own classrooms.

**Poster U93 – Paige Steinman**

Mentor: Greg Brown

Co-Author: Piper Steinman

Title: *Knowledge of the Female Athlete Triad in Nebraska High School Students*

Before the passage of Title IX in 1972, less than 4% of school aged girls played sports; now almost 40% of school-aged girls play sports. While increased access to and participation in sports by girls and women over the past 50 years is laudable, the dramatic increase in female participating in athletics has been coupled with a dangerous, yet widely underdiagnosed condition known as the Female Athlete Triad. The Female Athlete Triad consists of three interrelated components: low energy availability with or without an eating disorder, menstrual dysfunction, and impaired bone mineral density. While the prevalence of the female athlete triad is unknown, reports indicate that disordered eating occurs in 15 to 62 percent of female athletes, menstrual dysfunction occurs in 3 to 66 percent of female athletes, and low bone mineral density occurs in 10-20% of female athletes. However, most research has been conducted in college-aged or elite female athletes. Purpose. The purpose of this literature review is to evaluate peer reviewed primary research on the prevalence of the Female Athlete Triad in high school athletes, and to evaluate how knowledgeable high school girls are about the Triad. Methods. A literature review of published peer reviewed primary research articles evaluating the prevalence of the Female Athlete

Triad in high school girls will be conducted. A literature review of published peer reviewed primary research articles evaluating high school girls' knowledge of the Female Athlete Triad will also be conducted.

### **Poster U94 – Alex Korte**

Mentor: Greg Brown

Co-Authors: Carson Walker and Kennedy Jones

Title: *The Efficacy of Pre-workout Drinks in College-Aged Males/Females*

Pre-workout supplements are popular performance enhancing products that are readily available in stores that sell nutritional products such as vitamins. Pre-workout supplements usually contain a proprietary blend of vitamins, minerals, herbal extracts, and other ingredients that are purported to enhance exercise performance by increasing energy and/or preventing the accumulation of fatigue causing waste products (e.g. as lactic acid), and are typically consumed 30-60 minutes before an exercise session. However, there is considerable controversy regarding the efficacy of pre-workout supplements and whether one proprietary blend of ingredients is superior to another. Purpose. The purpose of this literature review is to evaluate the acute effects of pre-workout supplement use on resistance exercise performance. Methods. Searching PubMed, a free search engine accessing primarily the MEDLINE database of references on life sciences and biomedical topics, peer reviewed research articles evaluating the acute effects of pre-workout supplement use on resistance exercise performance will be identified. The search will be limited to clinical trials that evaluate the acute effects of only pre-workout supplements (i.e. not solely caffeine, energy drinks, or caffeinated beverages such as coffee or cola) before resistance exercise performance. Full text copies of the articles will be obtained either on-line or using resources of the Calvin T. Ryan Library. A table will be developed listing the research procedures for a) pre-workout drink contents, b) type of resistance exercise, and c) outcome, which will then be used to help form a narrative review on the acute effects of caffeine intake on resistance exercise performance.

### **Poster U95 – Kennedy Jones**

Mentor: Greg Brown

Co-Authors: Carson Walker and Alex Korte

Title: *The Effect of Caffeine Intake on Resistance Exercise Performance: A Literature Review*

Caffeine is considered to be the most popular and widely used stimulant in the world. Whether it's a cup of coffee in the morning, drinking an energy drink during a long study session, or taking a caffeine pill to stay awake during a long road trip, caffeine is

widely used to help people feel alert and awake. Caffeine is also the primary active ingredient in most pre-workout nutritional supplements, where the stimulatory effects of caffeine are purported to delay the onset of fatigue and enhance exercise performance. Purpose. The purpose of this literature review is to evaluate the acute effects of caffeine intake on resistance exercise performance. Methods. Searching PubMed, a free search engine accessing primarily the MEDLINE database of references on life sciences and biomedical topics, peer reviewed research articles evaluating the effects of caffeine intake on resistance exercise performance will be identified. The search will be limited to clinical trials that evaluate the acute effects of only caffeine intake (i.e. not including caffeine as part of a multi ingredient supplement or other product) before resistance exercise performance. Full text copies of the articles will be obtained either on-line or using resources of the Calvin T. Ryan Library. A table will be developed listing the research procedures for a) caffeine dose, b) type of resistance exercise, and c) outcome, which will then be used to help form a narrative review on the acute effects of caffeine intake on resistance exercise performance.

### **Poster U96 – Carson Walker**

Mentor: Greg Brown

Co-Authors: Alex Korte, Kennedy Jones

Title: *The Effects of Acute Caffeine Intake on Blood lactate, Heart Rate, and Burpee Repetitions Completed in Recreationally Trained College Age Adults*

Caffeine is the primary active ingredient in most pre-workout supplements, which are taken 30-60 minutes before exercise and are advertised to increase energy during exercise. The use of caffeine before exercise has shown some conflicting results with enhanced performance in upper body but not lower body resistance exercise. A “burpee” is a callisthenic exercise that involves near simultaneous upper and lower body exercise. Purpose. The purpose of this project is to evaluate the effects 200 mg caffeine intake on burpee performance. Methods. Ten male and ten female UNK students who regularly exercise will be recruited. In order to assess physical fitness, participants will first be measured for body composition via dual-energy X-ray absorptiometry, aerobic fitness via the YMCA bike test, lower body power via a vertical jump test, and upper body strength via a 1 minute push-up test. Then, separated by 3-7 days, participants will consume either 200 mg caffeine or a placebo in a double blind, placebo controlled, randomized, cross-over manner, wait 1 hour, and then complete the burpee challenge. The burpee challenge involves completing a set of 10 burpees, wait 5 minutes, complete a second set of 10 burpees, wait 5 minutes, and then complete a third set of as many burpees as possible. Participants will be assessed for time to complete the burpee challenge, number of burpees completed during the third

set, heart rate during the burpee challenge, and blood lactate concentrations before and after the burpee challenge. Data collection will begin in fall 2022.

### **Poster U97 – Piper Steinman**

Mentor: Greg Brown

Co-Author: Paige Steinman

Title: *Incidence and Knowledge of the Female Athlete Triad in High School Athletes*

The Female Athlete Triad (Triad), consists of three interrelated components, beginning with low energy availability with or without an eating disorder, leading to menstrual irregularity, and resulting in impaired bone mineral density. The Triad can be particularly concerning for young female athletes as peak bone mineral density is often attained by age 19, thus causing those who experience the Triad in their teenage years to be predisposed to osteoporosis and other bone health disorders at a much higher rate than the non-athletic population. Although the Triad was first identified in 1992, knowledge about the Triad is low, particularly in high school-age females. While studies regarding knowledge of the Triad have been conducted in some states, knowledge about the female athlete triad in Nebraska high school athletes has not been evaluated. Purpose. The purpose of this project is to determine knowledge about the female athlete triad in female high school athletes in Nebraska . Methods. Female athletes in Pender Public Schools will first be targeted for this research project, with plans to include more schools in the future. After completing documents of parental consent and child assent, participants will complete an on-line version of the Nutrition, Health and Athletic Performance Questionnaire developed by Brown et al. (2014). This survey asks participants questions regarding their knowledge and experience with topics related to the menstrual cycle, exercise, and eating habits. This project has been approved by the UNK IRB (IRB # 111721-1) and is in the initial stages of obtaining parental consent.

### **Poster U98 – Baylor Hellmuth**

Mentor: Thomas Orr

Title: *Definitions of Success Varies Based on Athletes' Schedules, Perceptions, and Psychological State*

Student-athletes have always been held to a higher standard by themselves, coaches, and parents compared to many of their peers. Sport has become a way of life for many across the world. Whether you consume, participate, or produce sport in some way, it is undoubtedly one of the most influential and popular markets in the world. According to Blackstone of Zacks Finance, "College sports bring in well over \$1 Billion per year" (Blackstone, V.L.). When any niche is involved with this much revenue, it is important

to consider how and why it is so successful. The main reason the NCAA has enjoyed continued success over generations, comes back to one key factor: the Student-athletes. Just as the most important capital for any business is the people, they have working for it, the most important recipe for success in the NCAA is the athletes. But what toll does this type of responsibility take on the athletes mentally and physically? Does the athlete have support from peers? Ultimately, does the student-athlete believe that he or she achieved success during their time as a student-athlete?

The aforementioned questions cannot be unequivocally answered from one group, team, or university to be set in stone longitudinally across different groups, teams, etc. Albeit the data from these questions can give better insight on a certain groups disposition which may help us better understand how to help student athletes with their physical and mental states across the country. With the onset of Covid-19, mental health has taken a toll in athletes due to things such as lockdowns and school closures. The sudden impact of withdraw from daily fitness training and competition has provided challenges to athletes of all ages. The Public Health Emergency Collection, a subsidiary of the U.S. National Library of Medicine, published an article that contained: “the abrupt change in their daily routine, the adopted home confinement measures, and uncertainty about the date for the return to activities can lead athletes to experience conditions that affect their mental health; such as external sources of distress, including financial problems, bad daily news, and internal sources of distress, such as worry about their performance when they return, and tension due to the routine change”(Andreato, Coimbra, and Andrade, 2020, p.3).

Adjoining such a pandemic with the other obvious stresses of collegiate sports life such as coursework, relationships, practice, competition, etc., there is a serious issue to be examined and that is why I wanted to take a deep dive into this area of study. The contribution from my study may help show the correlation between time obligation and the stress an athlete experiences from such obligations. Being able to pinpoint certain issues in athletes’ lives, we might be able to help provide guidelines for student-athletes and how to better their quality of life.

**Poster U99 – Nathan Slusarski**

Mentor: Bryce Abbey

Co-Author: Bryce Abbey

Title: *Oral and Maxillofacial Sports-Related Injuries: A Case Study*

In the world of sports, it is a common that injuries happen given the amount of playing time by athletes. The type of injury is unknown as there is a large variety of injuries that could occur in any part of the body. Of those, oral and maxillofacial injuries are not nearly as common and tend to account for a small percentage of all sports-related

injuries (Gould et al, 2016). On the other hand, the number of participants in athletics is increasing which coincides with the likelihood of possible oral and maxillofacial injuries during competition (Gould et al, 2016). Oral and maxillofacial injuries can be defined in a few different ways, but in this study, they will be defined as teeth injuries such as fractures, avulsions, and luxations, alveolar injuries, soft tissue injuries (ranging from bruising to severe lacerations), and facial skeleton and dental hard tissue injuries (Beachy, 2004).

The purpose of this project is to analyze different cases involving oral or maxillofacial injury and understanding the details of each case as well as comparing the details of the cases and what treatment options were used on the patients.

The project included the gathering and analyzation of archival information of oral or maxillofacial injuries in individuals participating in athletic events. Each case will be studied to determine possible treatment options and future complications.

Seven cases have been collected from two practicing doctors, a general dentist and an oral surgeon. Of the seven cases, 43% of them involve a baseball/softball accident. Then the other four cases include a soccer, swimming, bicycle, and trap shooting incident. These cases are being analyzed to determine treatments of each and if any complications have arisen from the maxillofacial injury that occurred in the patient.

It is uncommon for the two doctors used in this study to see sports-related injuries in their office. These injuries that require professional treatment are always possible, but not always predictable. Uncertainty remains on what preventative measures could have been taken to avoid the injuries talked about in this study. However, prior research has proven that the usage of mouthguards in sports helps reduce chances of injury.

### **Poster U100 – Reid Beilby**

Mentor: Bryce Abbey

Title: *Testing the Validity of DXA to BIA Scale to Measure Body Composition in College-Aged Students*

The Dual-Energy X-Ray Absorptiometry (DXA) is recognized as the ‘Gold Standard’ when it comes to measuring an individual's BMI, fat mass, lean body mass, etc... However, the DXA has many barriers to access, including the necessity of a licensed technician to run the machine and the need for a prescription due to the use of radiation. The total amount of time it takes to complete the measure may also need to be considered before scheduling a DXA scan. The Bioelectrical Impedance Analysis (BIA), allows for an individual to quickly and efficiently get a very similar measurement without as many barriers as the DXA. “Establishing the validity of this body composition

method could potentially designate a non-invasive, affordable, and portable modality to be efficient in determining body composition. Therefore, the purpose of this study is to validate body fat percentage determined by InBody versus DXA in recreationally active individuals” (Miller et al.)

**Purpose:** The purpose of this project is to collect and research current information and human subjects comparing the validity of the results of a BIA to a DXA scan. **Methods:** This project will include gathering information from peer reviewed journals regarding DXA validity, BIA validity, and comparisons between the two’s results. As well as analyzing archival data from data collected in a University Research Methods course. **Results:** Articles and data are currently being analyzed.

### **Poster U101 – Jarin Potts**

**Mentor:** Bryce Abbey

**Title:** *Myofascial Release Therapys Effect on Athletic Performance*

The skeletal and muscular systems of the human body work interdependently to provide movement on the appendicular and axial axis of the body. Fascial and myofascial attachments throughout the body may inhibit efficient movement patterns and range of motion. The study of efficacy and effectiveness of myofascial release therapy is a relatively new area of study according to its effects on athletic performance. The Journal of Strength and Conditioning Research states that self-myofascial release (SMR) can enhance joint range of motion and restore movement function, but the effects of different SMR duration on athletic performance has yet to be examined. This leaves gaps in the literature that may lead to future research. There are many methods being used as it relates to SMR. Current research published in the Journal of Bodywork and Movement Therapies includes tools used to study the effects of SMR on myofascial pain, muscle flexibility, and strength. These included a foam roller, roller massager, Thera cane, massage balls, and even common sports equipment like tennis, lacrosse, and golf balls.

The purpose of this project is to identify the relationship between myofascial and active release therapy’s ability to enhance an athletes’ flexibility, muscular strength, and joint mobility as it relates to athletic performance in terms of power output, agility, and endurance. **Methods:** This project will include gathering information from scholarly, peer reviewed articles on myofascial and active release therapies as is relates to athletic performance. Analysis of each article will allow for gaps and limitations to be found within prior studies. This will allow for future research and projects to be conducted.

Articles are being reviewed and evidence table is being created to identify gaps in the current literature for a future research project.

### **Poster U102 – Colton Roberts**

Mentor: Bryce Abbey

Title: *Reliability and Validity of Sports Performance Tracking GPS Technology*

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.

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.

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.

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

### **Poster U103 – Kyler Watts**

Mentor: Kate Heelan

Co-Author: Kaiti George

Title: *Differences in Perception of Nutritional Needs and Desires Among College Athletes vs. College Coaches*

Nutrition plays a key role in supporting athletic performance; however, many times athletes don't consume a diet adequate to support their sport demands (Tam et al., 2021).

The purpose of the current project is to evaluate general nutrition knowledge and sports nutrition knowledge among UNK student-athletes.

UNK student-athletes (n=41; 32 female, 9 male) participated in the Platform to Evaluate Athlete Knowledge of Sports Nutrition Questionnaire (PEAKS-NQ) (Tam et al., 2021) assessing two categories: general nutrition and sports nutrition. The PEAKS-

NQ is a valid, reliable survey developed by researchers at the University of Sydney, Australia in collaboration with Massey University, New Zealand. The general nutrition section examined food groups and nutrients and the sports nutrition section examined recovery, nutrition during training, body composition, and supplements.

The overall score on the PEAKS-NQ was  $69.0 \pm 8.9\%$ . The general nutrition score was  $74.0 \pm 9.7\%$ , while the sports nutrition score was  $66.0 \pm 11.0\%$ . Top scores were found in the categories of food groups (93%) and identifying micronutrients (90%) and they did poorly on understanding the role of fats (66%), identifying types of fat sources (59%), and identifying macronutrients (49%). In the sports nutrition section, they excelled in the category of consequences of low carbohydrate availability (85%), and did poorly in safe usage of supplementation (63%).

Although UNK Athletes did not score as high as expected (69%), results were equivalent to Australian athletes (70%) who took the same questionnaire.

### **Poster U104 – Conner Brown**

Mentor: Gregory Brown

Title: *Boys and Girls Differ in Track & Field Performance Before Puberty*

A 2012 report from the CDC indicated no differences between 6–11-year-old boys and girls in performance on physical fitness tests. Many sports leagues for pre-pubertal children are not separated by sex since the focus is developing basic sports skills rather than competition. Scholarly evaluations of differences in athletic performance between boys and girls have primarily focused on ages 11-18 years. Some have interpreted this to mean that boys and girls do not differ in athletic performance before the onset of puberty.

The purpose of this project was to determine if there are pre-pubertal sex-based differences in athletic performance. Top 10 data for national performance in 100m, 200m, 400m, 800m, 1600m and 3000m running events, and in high jump and long jump, for children in the 7-8, and 9–10 year-old age groups for the years 2019-2021 from Athletic.net were analyzed to determine if there were differences in performance between boys and girls. In both the 7-8 and 9-10 year-old age groups, boys consistently were 1.2-14.5% faster than girls in 100m, 200m, 400m, 800m, 1600m and 3000m running events. In both the 7-8 and 9-10 year-old age groups, boys consistently outperformed girls in the high jump and long jump by 1.3-24.1%. Discussion. It is often said or assumed that boys enjoy no significant athletic advantage over girls before puberty. However, the present data indicate that in competition boys aged 7-10 years old run faster, and jump higher and farther, than girls of the same age.

# Marketing and Agribusiness

## **Poster U105 – Manuela Rubatscher**

Mentor: Ngan Chau

Title: *The New Phenomenon of TikTok for Individuals and Marketing Communication*

The coronavirus (COVID-19) outbreak has enabled a surge of online connectivity to avoid potential exposure to the virus. TikTok, a social network based on user-generated content, witnessed a remarkable expansion in its user base during COVID-19 in the United States, with a growth of 180 percent among 15–25-year-old users. TikTok has become the ninth most used social network; more importantly, its substantial growth among young users has made it a potential and important tool for marketing purposes. Despite its increasing popularity, marketers lack a clear strategy for leveraging the opportunities and engaging users for marketing purposes. The purpose of this study is therefore to explore and understand user motivation and usage behavior on social media in general and TikTok in particular. This knowledge could be used to enhance the effectiveness of marketing communication.

To address the research problem, this project has conducted an empirical study on user attitude and behavior using a survey instrument. A survey has been developed and distributed to participants in the U.S. and Italy. Results from this survey will facilitate evidence-based recommendations that can be used by businesses targeting the young user base of TikTok.

# Teacher Education

## **Poster U106 – Laurel Schmidt**

Mentor: Marisa Macy

Title: *Bowlby's Theory of Attachment*

All early childhood professionals have learned about the early childhood theorists; Vygotsky, Piaget, Erickson, Freud, and many more. These theorists have built teachers' understanding of how children in their classroom work. They have informed teachers on how to help children that struggle in the classroom and help the children that excel. One theorist that does not get enough attention from early childhood professionals is John Bowlby. Bowlby develop his Theory of Attachment while working with emotionally disturbed children. While working with these children, he developed the idea that all infants have the innate need to develop strong and meaningful

connections to a caregiver. He believed that these connections will have long-lasting effects on every child.

**Poster U107 – Kelcie Burke**

Mentor: Marisa Macy

Title: *The Loss of Play in Early Childhood Curriculum*

My research project “The loss of play in early childhood curriculum” examined how curriculum in early childhood education is changing. These changes being towards more academic focus areas and away from play based curriculum. It also addressed how this change affects children’s learning, development, and social skills. I have conducted literature reviews that address curriculum and policy that are widely adopted and how these may not be best practice in early childhood. I also reviewed the importance of play in early childhood and how the loss of it in favor of more academic heavy curriculum is affecting children 's mental, social, and developmental well-being. The long-term implications a strict academic curriculum in the early years of education is still being evaluated on the long term effects it will have for children. The loss of play in early childhood curriculum remains a problem with no clear resolution. However, there are recommendations for helping to negate this issue by spreading awareness and continuing to engage in research to better understand how these policies are impacting young children long-term, so there is a greater basis to change the widely adopted practices we see today.

**Poster U108 – Kelsey Borowski**

Mentor: Dena Harshbarger

Title: *Are academically gifted students being encouraged to pursue the field of education?*

The focus of this research project is to pursue the idea of whether the education community is finding the most qualified and effective teachers. The question driving this research is “How can we encourage high-ability learners to pursue a career path in education?” This research is important because students deserve to receive instruction from teachers who are knowledgeable in subject matter. This research is being conducted using purposeful sampling (Creswell 2012, p. 100) Three individuals, including high school counselors and university career service advisors, will participate in the study. Through interviews, the research will determine what careers are being promoted to students who are recognized as being high-ability learners. The overall goal of the research is to gain the knowledge of how to encourage gifted learners to pursue the field of education and why it is important to promote the field of education to high-ability learners.

# Fine Arts & Humanities

## Art & Design

### **Poster U109 – Karina Boatright**

Mentor: Derrick Burbul

*Title: Giving Shape to my Thoughts*

I created a lamp shade constructed from photographs printed traditionally in the platinum process on Japanese Tosa paper, from which I learned how to further control platinum printing and combine photography and sculpture.

Two things were the focus of my project. One was researching the process of the platinum print and learning the technique. The platinum print has a wide range of grayscale to express the depth of density, therefore, it is a photograph, but it seems real. I used this technique in my photographs of the landscape of Kearney, Nebraska. Japanese papers are great for the platinum print: one I used is called Tosa paper. I combined the photographs and papers to create a visual collaboration between American and Japanese cultures. The other focus was giving the three-dimensional form to Photography. Photography is two-dimensional and thought to only be hung on a wall. My goal is to tear down that stereotype to cause audiences to think about what photography is, and what it could be. In particular, I created a kimono framework lamp covered with Japanese papers. It gives photographs three-dimensional depth and an unusual appearance. This project creates the link between two cultures and allows me to think creatively about art.

### **Poster U110 – Gabrielle Onate**

Mentor: Derrick Burbul

*Title: Those Who Stay & Those Who Go, the Emigration of Nebraska's Youth*

I have called Nebraska home my entire life and the concept of Nebraska's brain drain, in which college graduates leave the state, is one that I am very familiar with. While growing up, my peers and I said "I can't wait to leave Nebraska" countless times. My family has been here for generations, yet it still took me most of my life to see that Nebraska is much more than I thought. I want to use photography to capture both those who feel the call to stay and those who feel the push to leave. In my heart, what makes Nebraska the Nebraska I have grown to love, is the people.

For the past 10 months, I have been traveling Nebraska with a mobile camera obscura, photographing, and interviewing young adults who have a connection to this land. Young adults are Nebraska's future, and they decide whether the brain drain continues. I've been learning their stories to see if Nebraska will hold onto them or if they feel a push to leave. Rather than photographing the individual in the landscape, I merge the individual and the landscape using a van transformed into a giant pinhole camera. The subjects would be inside the van while a Nebraska landscape is projected onto them using the simple phenomenon of physics referred to as the camera obscura effect. Whether or not they want to stay, the landscape is a part of who they are. The photographs I capture combined with their stories shine light on why some feel a connection to this land and why others feel the call to leave.

Physics plays a large part in the camera obscura. Along with the science behind it, making contacts and establishing a trusting relationship is important to get honest results. When going into this project, I knew I wanted to create a traveling pinhole camera but had many options to consider. While a trailer seemed like a great idea due to the size and openness, the size also was a concern. Trying to fit into different locations would be tricky. I would also have needed to find a vehicle that could pull said trailer. Another option I considered was renting a U-Haul. This option was considered because of the size and openness as well, and it wouldn't need to be pulled by a separate vehicle. But, U-Hauls must be rented and I would need it on many separate dates due to scheduling. Because of this, I chose to use my grandparents' van.

As a photographer and artist, portraits are my favorite type of photograph to capture. I love interacting one-on-one with subjects, getting to know them, and capturing images that express who they are. Along with that, I have been fascinated by pinhole cameras since I learned about them in class. They turn the idea of a camera into a space that individuals can be a part of. The idea of making a mobile one sounded challenging, but limitless; anywhere I can drive is a possible location. When discussing his work, Abe Morell stated, "One of the satisfactions I get from making this imagery comes from my seeing the weird and yet natural marriage of the inside and outside." (Morell) This quote is extremely fitting for this project, connecting the individual with the outside world in a different way. Thirdly, I am intrigued by the emotional significance that a location can have to an individual. What looks like a normal, almost mundane place to someone, may hold great or horrible memories for another. Learning about one's sense of place and what pushes or pulls individuals will be very interesting. Finally, as a woman nearing the end of her time in college, the question "what comes next?" is often on many of our minds. Deciding whether to stay or go is something that I must face, and I feel both pushed and pulled. I wanted to create art that shines a light on that decision making process all of us go through.

## Communication

### **Poster U111 – Megan King**

Mentor: Tiffani Luethke

Title: *Phenomenological Research of Hair Discrimination and the CROWN Act*

Hair discrimination has gained widespread interest in the workplace and educational settings. The CROWN Act, which stands for Creating a Respectful and Open World for Natural hair, allows men and women of different races to express themselves with their natural hair in a professional setting. In response, several states have begun the development of antidiscrimination legislation to protect one's right to wear their natural hair in the workplace. In addition, the CROWN Act is providing new legislation to creating such policies as it helps hold companies accountable for unreasonable grooming policies that are generalized to minority populations, including Black women.

Using a phenomenological approach, the storytelling of defining beauty standards and how "one size fits all" no longer applies. This exploration will contribute to qualitative research and help promote inclusivity and non-discriminatory attitudes toward natural hair by sharing individual stories. Furthermore, by contributing to this research, improvements to understanding what it means for Black and Brown people in corporate America to be accepted in the workplace. This research will create a platform to discover new insights, help inform future scholarship, and, hopefully, lead more organizations to adopt and enforce non-hair discrimination practices.

Finally, the implication of this research may help corporate America improve alignment between their inclusivity and non-discrimination philosophies by manifestation of practical policies (e.g., the right to wear one's natural hair).

## Music, Theatre, & Dance

### **Poster U112 – Rochelle Hazelton**

Mentor: Anne Foradori

Title: *Trouser Roles in Nineteenth Century French Opera*

The focus of this research is an examination of the literature of nineteenth century French opera "trouser" (travesti) roles for soprano and mezzo-soprano voices. After a literature review, I created categories of roles by type within the broader scope of "trouser roles". The creation and inclusion of travesti in opera, afforded composers a

greater palette of vocal ranges and colors from which to work. The new character types provided a different gaze for the librettist and composer, performer, and audience. In the case of French repertoire, a more expansive portrayal of the male character emerged. Nineteenth century French travesti roles included youthful pages, mischief makers, sufferers of unrequited love, and colorful romantic interests. They often acted as catalysts for the greater plot development and served as invaluable friends for protagonists. Within these specialized supporting roles, composers and librettists had opportunities to challenge, shape, and reflect upon societal views of gender and sexuality.

The nineteenth century opera “trouser roles” for women often included the roles of pages: Siebel (*Faust*), Stefano (*Roméo et Juliette*), Amoroso (*Le pont des soupirs*) and Urbain (*Les Huguenots*). Mezzo-sopranos also depict roles of adult men: *Le Prince Charmant* (*Cendrillon*), and Nicklausse (*The Tales of Hoffmann*). Composers opened the door for male and female performers to express a broad depiction of gender onstage. A more inclusive representation could take flight within these roles as gentle love interests excited audiences, without scandal. Composers both appreciated and promoted the broad definition of gender identity espoused by their worldly Parisian audiences. French composers wrote twenty-some “trouser roles” for women during the 19th century. My research examines the history, general dramatic characteristics, and musical considerations of specific operas and roles in this repertoire.

Roles of pages, messengers, and youth were part of almost every nineteenth century French opera. In addition, “trouser roles” included young men who were the love interests of women. The French audiences not only accepted this convention, but they also thought themselves bold and progressive to attend the opera to watch two women involved in a dramatic presentation of a love affair. French composers and audiences had grown in sophistication and breadth so that practice of creating en travesti roles became a hallmark of nineteenth century French opera. Growing and flourishing in the nineteenth century, these roles can be divide into three categories: youth, youthful but mature men, character for whom gender is unimportant. Roles in these categories not only gave female performers a greater opportunity to perform on the stage but presented an image of women that was freer and less incumbered – something appreciated by female audiences. Women who had been confined to narrowly acceptable roles in society found more access to all aspects of culture in progressive 19th century France.

The most prolific composer of trouser roles in nineteenth century French opera was Jacques Offenbach, who wrote a diverse collection of thirteen different trouser roles during his career. Creating approachable works for both cast and audience alike, Offenbach stands out from other composers of trouser roles, and led the way for

composers in the early part of the twentieth century to continue the practice of creating en travesti roles.

The French uniquely treated “trouser roles” in a fashion that captivated audiences and had challenged ideas of what was possible for women, gender, and sexuality in the nineteenth century and beyond, creating a wealth of role types that are indispensable to opera literature today.

## English

### **Poster U113 – Coleman Riggins**

Mentor: Amanda Sladek

Title: *Gender Bias in English Academic Writing*

The purpose of this research project is to investigate the use of gendered bias in English academic writing and how it has evolved over the past half-century. Then, with the information gathered, I will question why changes were made at various points of time. Are there any consistencies in when different styles of writing (APA and MLA) started to shift away from gender bias in their language, and if so, are there any historical events that might correspond with these changes?

Ultimately, in order to get answers for this research, I will conduct a corpus scan of documents and articles from journals dating back to the 1600s and observing the various uses of gender binary language as opposed to gender neutral language, all-encompassing uses of words containing the all-encompassing use of the word “man” and other masculine-leaning words as compared to neutral words like “person” or “human”. I have currently pieced together a corpus of articles from College Composition and Communications. In order to maintain some consistency in the articles I have chosen, I included the articles from every fifth year of the journal dating back to 1970. Then, I searched the corpus for uses of gendered language and also gender neutral terms being used by looking them up using the corpus analysis program “AntConc.exe.” I hope to replicate this research method with a couple other academic journals by March 2022. Preferably, I would like to observe journals in the MLA and Chicago style guides to get some variety. By doing this, I should then have some points of comparison to compare what I currently have completed. IRB approval isn’t necessary for this research, so I have not applied for it nor do I plan to in the future.

This research would be beneficial to present at the Conference on College Composition and Communication, not only because it is utilizing the CCC journal over the past half-century, but also because it is viewing this shifting aspect of the modern

English language. It will ultimately view the evolution gendered language in a few select modern academic journals through the past half-century. With it, we will be able to view how some academic writing has handled the recent changes in the way gender bias in writing has changed over a set time period.

### **Poster U114 – Theresa Ascherl**

Mentor: Rebecca Umland

Title: *Science, Magic, and Religion in Diana Gabaldons Outlander Novels*

When it was published in 1991, *Outlander* became one of the best-selling novels of all time. This novel by Diana Gabaldon was followed by eight others (the last of which will be released in November 2021), an ongoing successful television series, and other literary spin-offs. My research question turns to the issue of why this work is so popular. *Outlander* is a time-travel work in which the heroine, a British nurse, accidentally travels back in time to mid-18th century Scotland, combining the element of fantasy with historical fiction. While there are nine books in the series, I focus on the first novel to explore my thesis that the literary device of time travel, Gabaldon's own background in the hard sciences, and the historical period she chose for her setting, contributes to the success of this work, because it shows the convergence of earlier beliefs in magic with emerging science, while also considering older religious beliefs with Christian faith—both Catholic and Protestant. This semester, I have been reading *Outlander* to pinpoint the exact moments that integrate this thesis. I have also researched into the period of the story to build groundwork for a better understanding of the novel. These two tasks are preparing me to ask literary questions as well as critically analyze and eventually write a critical essay about literature.

## History

### **Poster U115 – Jake Ellis**

Mentor: Thomas Orr

Title: *History and Benefits of Golf in Nebraska*

Golf is one of the oldest, continuously played sports in the world. From its inception in Scotland during the Middle-Ages, to the growth across America in recent decades it has been a favorite pastime for generations upon generations. As golf sprawled across the American West, Nebraska became a hotspot for golfers. First appearing in the 1880s, the Great Plains/Sandhills proved to be destination land for golf courses. Some of the nation's top golf courses have sprouted up on the untouched land of the Nebraska Sand Hills. These courses include Prairie Club outside of Valentine,

Wildhorse in Gotheburg, and Sand Hills outside of Mullen. Though many of these courses have been constructed in recent decades, they would not be here if it was not for the illustrious history of Nebraska Golf.

Golf and economics are two things that go hand in hand. According to Erik Matuszewski of Forbes “The game is big business, directly driving \$84.1 billion in economic activity across the U.S. in 2016.” (Matuszewski) Being seen as an upper-class sport, it is obvious why golf has an incredible amount of economic stimulus. The cities in Nebraska such as Gothenburg, Norfolk, and Valentine see this immense economic value and take advantage of it. Whether it be drawing in tourism for having a top affordable public course such as Gothenburg, or hosting State Championships like Norfolk, it all drives economic stimulus into these cities.

People play golf for a variety of different reasons. Some play for the health benefits of walking 18 holes daily. Others play golf to maintain their competitive nature after their youth. One thing is certain though, golf allows people from many different motivations, ages, genders etc... to compete/socialize in a fair way. With Nebraska having illustrious golf courses for a state its size, it has one of the highest amounts of golf participation of the 50 states. According to the National Golf Federation, Nebraska ranks 2nd in terms of golfer’s per capita in the United States.

Through this project, I will examine the history of Nebraska golf. When it arrived, the and the actors that played a vital role in it’s expansion. Additionally the more recent history of Sandhills golf will be examined and how the Nebraska sandhills was discovered as a golf paradise. Next, the benefits of golf will be examined. Starting off economically, three examples around the state of Nebraska will be examined. Prairie Club near Valentine, Wild Horse near Gothenburg, and Norfolk Country Club in Norfolk. These sites bring in golfers for different reasons but an economic surge is the result. Lastly, the reasons people play golf will be examined. Overall in this project I hope to find what makes golf, specifically in Nebraska, special.

**Poster U116 – Douglas McCue**

Mentor: David Vail

Title: *Escaping the Lab*

The Great Plains History of Science and Medicine project is a UNK-based online collection of primary sources and research materials made by students for other students. From the beginning, an important milestone for me in this project was identifying and securing a modest collection of literary oddities with a range of published dates as early as the Victorian period to as late as the 1950s, with careful attention to medicine being infused with other fields of study. The collection we obtained has a working title of the Cauldwell Collection and covers a comprehensive

range of subjects from alcoholism to sexually transmitted diseases. Humanities projects like these are essential for furthering STEM education as they bridge the gap in knowledge between the significant characteristics of science, technology, engineering, and mathematics. My efforts in creating this repository also underscore the importance of blending humanities with STEM to help solve problems with out-of-the-box thinking. For me, this project is invaluable because it is an opportunity to give back and aid others now and in the future with their careers and goals. Professionally, it is a unique adventure that illustrates multitudes of unrealized opportunities and career possibilities available for my Psychology and Multimedia double major. Finally, this project would have never been realized without my humble advisor, Professor David Vail, and his insights and direction; and from the University Special Collections and Archives, Professor Laurinda Weisse's assistance with the archival collections and Dublin Core metadata process.

**Poster U117 – Austin Truex**

Mentor: William Stoutamire

Title: *A Narrative Analysis of Norfolk's Namesake*

Throughout history, people have interacted with the Elkhorn River in northeastern Nebraska. Primary and secondary texts from the region produce an insightful case study of life near, the development of, and battles with a natural river in the Midwest. The context and history of such a site allows for an exploration of history in the Norfolk area. While those who settled in the area influenced the path, flooding patterns, and ecology of the Elkhorn River, the waterway has shaped the surrounding city of Norfolk in equally impactful ways, ranging from economic opportunities to recreational resources. An assessment of the connections between the tributary and the community reveals a tumultuous yet necessary relationship that may be used as a foundation and guide through the region's history. Although the community has redirected and restrained the river, the river has in turn helped to shape and define the community's identity. These insights, made publicly accessible by this project through wayside panels on a trail system and an exhibition at a local museum, will encourage citizens to take a more thoughtful approach when thinking about the river and its interactions with the city. A stronger understanding of the formation of the community in relationship to the Elkhorn River will influence the ongoing efforts to revitalize the riverbank in the heart of Norfolk.

# Undergraduate Performances



## **Emma Newman**

Mentor: Noelle Bohaty

Title: *Essence of Light*

The basis of this research poses the question of “On the spectrum of light, where are we as humans affected the most from a literal and metaphorical stance?” Working to further evaluate the scale of light from natural to artificial, where fire becomes the fulcrum, it focuses on the creation of physical movement as it relates to the different facets of light. This research takes the scientific properties of light including how the light is produced and what elements influence its essence. From there, three of the points on the spectrum of light which include sunlight, fire, and electrically produced light were assigned a corresponding metaphorical meaning that worked to influence the movement of the piece.

This research required assessment and casting of dancers in an open audition. Then, in collaboration with the dancers, a piece was created that embodied the literal and metaphorical essence of light. Evolving into a collaborative effort with a creative team to ensure the theatrical elements further enhance the purpose of the piece. Looking at how theatrical lighting can be utilized to evoke a sense of natural light or be dramatized to further emphasize the many different forms of artificial light we encounter in our everyday lives. Or, how the element of sound plays a role in the portrayal of the metaphorical depiction of the spectrum of light. Working from natural to artificial in the same way of creating the physical movement.

The presentation of this research will take place in the form of a live dance production. Seeking to understand how the knowledge of that scale can be translated into physical movement, which offers the audience a relaxed yet thought provoking environment to assess their own relationship with the spectrum of light.

# Additions



## **Poster U118 - Jason Gonzalez**

Mentor: Thomas Orr

Title: *Factors that influence International NCAA Division II Student-Athletes*

The goal of this research is to examine the factors influencing the college choice decisions of NCAA Division II International Student Athletes. The importance of this research would be to find what attracts international students towards a NCAA College. The data and conclusions reached will assist university and athletic administrators' better position themselves to attract international student athletes. The research will also help identifying other factors such as, career opportunities post-graduation, program availability, and the reputation of the University.

## **Undergraduate Oral Presentation – Will Babbitt**

Mentor: Jeff Wells

Title: *"We know about Okinawa now:" Paxton, Nebraska, and Mourning During World War II*

Casualties during World War II were high for all of the countries involved and the peoples of these countries dealt with the death and destruction in different ways. In the United States the people memorialized the deaths in several ways: the first was living memorials or memorials that people could use and also remember the fallen. The second way was through the traditional methods of memorialization. The town of Paxton, Nebraska was no different in this regard as it created a more traditional style of memorial for the soldiers it lost on Okinawa. Okinawa was a devastating battle for the people of Paxton as it lost 3 of its young men on the island. What was surprising for the people was the high number of Paxton men that were on the island. Of 5 men on the island 3 were killed and 2 were wounded. The men that were killed were Rodney "Buddy" Babbitt, Joseph Klupal, and Robert "Bob" Boyle. The deaths of the men were very devastating to the town. The town resolved to remember their sacrifices and would memorialize them and the other soldiers who would inevitably fall in war.

## **Online Graduate Poster - Carol Wieck**

Mentor: Shannon Mulhearn

Title: *Bringing Quality Physical Education to the Homeschool Community: A Proposed Study*

The homeschool community is a growing community. There are currently 3.7 million K-12 students who are homeschooled in the United States, and the National Home Education Research Institute reported that the percentage of households with homeschooled children has increased from 5.4% to 11.1% from March 2020 to March 2021. These students need access to quality physical education just like other students in the United States, which includes a standards-based curriculum. In the past 10 years, although 1,372 publications mention “Homeschool”, “Physical Education”, and “Curriculum”, only 9 articles were found that also noted “National Standards”.

Additionally, none of the articles is directly related to a physical education curriculum designed for Homeschool families. Therefore, the purpose of the proposed multi-phase community-based participatory research study is to determine the needs of homeschool parents for a standards-based, quality physical education curriculum. This proposal focuses solely on Phase I. Methods: Phase I of this study will use both quantitative and qualitative methodology. Phase 1 will be guided by the following questions: (1) What is currently available to homeschool parents for physical education? (2) What are the criteria for homeschool physical education from the state of Nebraska? (3) What are parent perceptions about the need for physical education curriculum? Implications: Findings from Phase I will be used to inform future phases including curricula designed to address homeschool community needs while also ensuring a connection to national standards.

## **Poster U119 – David Zelnio**

Mentor: Tiffani Luethke

Title: *Vocational Branding*

Organizations are facing big challenges with recruiting and employee shortages. Employers recruit to fill open positions. They engage in employer branding to tout their reputation as a good place to work with a desirable employee value proposition. Vocational career paths, such as healthcare and trucking, are industries at a higher risk of facing these challenges and require solutions.

Using grounded theory methodology, I will define a new term called, “Vocational Branding,” which is a set of actions that seek to persuade people to pursue a particular career path. During the data collection phase, I will interview people who are likely to engage in vocational branding activities, like high school career fairs, in order to learn

about individual and organizational strategies that already exist to promote vocational branding. To analyze the interview transcripts, I will use axial coding and an inductive process to define vocational branding as a series of actions. The implications of this research suggest that vocational branding may increase the number of people in a community pursuing a particular career and therefore decrease a company's cost-per-hire for related jobs.

**Poster U120 – Ahmed, Ahmed**

Mentor: Hector Palencia

Title: *Synthesis of phenanthrones, catalized by N-heterocyclic carbenes*

Incarvilline is an alkaloid isolated from the plant *Incarvillea sinensis*. It has been used in traditional Chinese medicine for its strong analgesic properties. Incarvilline forms part of a dimeric ester, from a bicyclic piperidine backbone, in the structure of incarvillateine, which is also isolated from the same plant than incarvilline.

Incarvillateine shows analgesic properties similar to opioid derivatives, such as morphine, but with the advantage of addiction. For such reason several groups are developing efforts to prepare incarvilline by different synthetic routes. However, the synthesis of such molecule presents several challenges, from the synthetic point of view. We are interested in preparing analogs of incarvilline to evaluate their analgesic properties. The first part of this project is directed to obtain the incarvilline and use it as a standard for comparison.

**Poster U121 Courtney Ostrander**

Mentor: Ladan Ghazi Saidi

Co-Authors: Heng Wu and Gina Blackman

Title: *Acceptability of GrandPad in Older Adults: Preliminary Results of a Case-Study*

Social isolation and loneliness affect both physical and psychological factors in one's life (Boru, 2017). A lack of social isolation can increase the chance of depression and anxiety in older and younger adults (Budzynski-Seymour, et al., 2019). Aging in general has negative effects such as causing a decline in cognition and increasing the chances of acquiring dementia (Lara et al., 2019).

Many of the psychological, cognitive, and communicative effects of isolation and loneliness were brought to the forefront with COVID-19 when everyone was forced to isolate. This isolation raises concerns about cognitive and psychological function in aging adults.

Technology has made virtual communications possible. However, most older adults find it difficult to use digital devices and technology. GrandPad is designed to be user

friendly for older adults, and among other features, it enables simple video chatting for seniors in a safe and secure setting. In this study, we use a survey and interview an older adult and their caregiver about their experience using GrandPad, and their acceptability of the device.

Participant for this study is an older adult and her son who has used GrandPad for four months. We will use an adapted Acceptability tool embedded in Qualtrics. The participants will receive the survey via email and will be interviewed via zoom. The results of the survey and interview will be discussed.

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