

# Fall Student Research Symposium Schedule of Events

**October 10, 2024**

Nebraskan Student Union Ponderosa Rooms



## Thursday, October 10, 2024

- 2:30 – 3:30 pm .....Open poster viewing, Ponderosa A & B
- 3:30 – 5:15 pm..... Oral Presentations-Ponderosa C & D
- 5:30 – 6:30 pm..... Banquet  
Interim Chancellor Charlie Bicak, Keynote Speaker

# Oral Presentation Schedule



**Thursday, October 10, 2024**

## **Session 1 Room: Ponderosa C**

- 3:45 pm ---- **Jacob Sykes:** *For All of the Children: An Analysis of the Decline in Male Volunteerism at a Christian Nonprofit Organization* (Mentor – Kristen Majocho)
- 4:00 pm ---- **Haley Hernandez-Sandoval:** *Developing a Reaction-Based Fluorescent Sensor to Detect Hydrogen Sulfide (H<sub>2</sub>S) Quantitatively* (Mentor – Haishi Cao)
- 4:15 pm ---- **Emma Dowhower:** *Floristic Survey of the Willa Cather Memorial Prairie* (Mentor – Bryan Drew)
- 4:30 pm ---- **Bryce Sutton:** *Evaluating Asymmetry: Novel Antler Metrics in White-tailed Deer* (Mentor – Brian Peterson)
- 4:45 pm ---- **Ella Buhlke:** *One Hot Paradox: HSP90 Inhibition Reduces Nora Virus Load in Infected Adult Drosophila melanogaster, but the Heat Shock Response is Antiviral* (Mentor – Kim Carlson)
- 5:00 pm ---- **Carter Moss:** *Investigating the Potential Survival Advantage of Staphylococcus aureus Persists within a Macrophage Environment* (Mentor – Austin Nuxoll)

## **Session 2 Room: Ponderosa D**

- 3:30 pm ---- **Lily Engeman:** *"Healthy Hearing" in Aging Farmers and Ranchers (Mentor – Jan Moore)*
- 3:45 pm ---- **Noelle Abels:** *The Effects of Reading on Cognitive Health in Older Adults Aged 60-80 (Mentor - Ladan Ghazi Saidi)*
- 4:00 pm ---- **Melanie Driewer:** *Emotional Expression in Children with Autism Spectrum Disorder During a Play Session (Mentor – Philip Lai)*
- 4:15 pm ---- **Alexis Chavez Monasterio:** *Black Boxes and the Demise of Power Resistance from the Perspective of the American Migrant (Mentor – William Aviles)*
- 4:30 pm ---- **Isaac Hermon:** *American Exceptionalism's Influence on Foreign Coups (Mentor – Chuck Rowling)*
- 4:45 pm ---- **Dylan Seitz:** *The End of the O.A.S. and its Effect on the Oran Massacre and the European Exodus (Mentor – Torsten Homberger)*
- 5:00 pm ---- **Amelia Moore:** *The Landscape of Autism Services in Nebraska (Mentor – Christina Sis)*

# Undergraduate Abstracts



## Biology

### **Ella Buhlke**

Mentor: Kim Carlson

Title: *One Hot Paradox: HSP90 Inhibition Reduces Nora Virus Load in Infected Adult Drosophila melanogaster, but the Heat Shock Response is Antiviral*

The heat shock response (HSR) was discovered and has been extensively studied in *Drosophila melanogaster*. This organism should serve as a good model in which to study the interaction of viral infection and the HSR. Yet, very little research involving this interaction has been conducted in *D. melanogaster*. The purpose of the present investigation was to validate the antiviral effect of pharmacological inhibition of HSP90 in vivo in a *D. melanogaster* model, which has never before been shown. Further, we sought to explore other aspects of the relationship between the HSR, heat shock factor (HSF), and viral infection. Specifically, we explored the affect that pharmacological HSP90 inhibition with 17-allylamino geldanamycin (17-AAG) and 17-desmethoxy-17-N,N-dimethylaminoethylamino-geldanamycin (17-DMAG) on estimates of viral load at 24 and 72 hours after persistently infected stocks of *D. melanogaster* received treatment. We are also examining the ratio of the negative, replicative strand of the virus to the positive strand to understand replicative efficiency. We also tested treatment with Direct Targeted HSF-1 InhiBitor (DTHIB) on persistently infected stocks with heat shock treatment at 36.5°C for one hour to examine the relationship between the two. We also report a trend whereby a line of *D. melanogaster* carrying a mutant HSF tended to have higher estimates of viral load relative to genetic controls with wild type HSF. Finally, we found that DmNV infection leads to significant elevation of HSP83 (HSP90;  $P = 0.029$ ) and DNAJ-1 (HSP40;  $P = 0.001$ ), 24 hours after infection. Our data suggest a prominent role for the HSR and associated inducible HSPs during DmNV infection in vivo.

**Emma Dowhower**

Mentor: Bryan Drew

Title: *Floristic Survey of the Willa Cather Memorial Prairie*

The Willa Cather Memorial Prairie, near Red Cloud, Nebraska, is one of the largest extant tallgrass prairies in the state. The flora of the prairie not been surveyed since a series of surveys ending in 1978. This research aimed to conduct a floristic survey on the Cather Prairie and compare the current findings to the previous surveys. Our goal was to investigate the ecological changes that have occurred in the 48-year span since 1978. Additionally, we looked at the impact of management practices on the species composition of the prairie, with special interest in how invasive species frequency has changed. The initial phase of the project involved collecting specimens in the field throughout the growing season. The second phase, which is ongoing, involves identifying each specimen to species. A total of 220 specimens were collected from the prairie, with the most frequently encountered families being Asteraceae (sunflower family), Poaceae (grass family), and Fabaceae (legume family). Given that less than 1% of the original tallgrass prairie remains in Nebraska, the Willa Cather Memorial Prairie provides a valuable opportunity to study the historical and ecological processes of this endangered ecosystem. By comparing current data to that of 1978, this research contributes to our understanding of biodiversity, management practices, and conservation of native species within prairie landscapes.

**Carter Moss**

Mentor: Austin Nuxoll

Title: *Investigating the Potential Survival Advantage of Staphylococcus aureus Persists within a Macrophage Environment*

*Staphylococcus aureus* is a common human microflora typically residing within the skin and nasal cavities of 30% of the human population at any given time. However, under certain conditions, *S. aureus* acts as an opportunistic pathogen linked to inducing several resulting diseases and nosocomial infections. Consequently, despite modern medicinal efforts, *S. aureus* has evolved various mechanisms to circumvent both antibiotics and aspects of innate immunity. Professional phagocytes, particularly macrophages and neutrophils, are vital cells that interact with *S. aureus* with the aim of bacterial clearance. However, interestingly, in recent studies, *S. aureus* persists, which are a subpopulation of cells with lower metabolic activity, have exhibited a potential survival advantage to antimicrobial peptides, a component of innate immunity playing a similar clearance role to that of phagocytes. Given this apparent advantage found in these studies, we, in turn, reasoned that the same advantage might hold for other players in innate immunity, namely macrophages. To investigate this, we employed a

wild-type strain, HG003, and a high persister-forming strain, fumC::NE (fumC), to determine whether persisters were more fit to survive post-macrophage phagocytosis. Furthermore, we used a persister marker Pcap5A::dsRed to monitor whether *S. aureus* cells with the highest expression of the persister marker displayed a higher relative fitness. With our strains in hand, we infected a cultured sample of RAW 264.7 macrophages and monitored each strain's survival after their internalization within the phagocyte, eventually finding that as time went on, our fumC persister strain possessed a log of difference in survival over its wild-type counterpart. Now searching for a mechanism to explain this, we tested the strains against Reactive Oxygen Species, compound macrophages primarily employed to combat infection. Though hypothesizing a difference in survival to this chemical, we later found no difference in ROS response from either strain, indicative of another mechanism at play. Altogether, upon preliminary data, an advantage is apparent, but further work must be done to isolate a mechanism.

## **Bryce Sutton**

Mentor: Brian Peterson

Title: *In Evaluating Asymmetry: Novel Antler Metrics in White-tailed Deer*

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

protocols can be used in conjunction with standard methods to better evaluate and quantify phenotypic antler growth between antler sides and age groups in white-tailed deer.

## Chemistry

### **Haley Hernandez-Sandoval**

Mentor: Haishi Cao

Title: *Developing a Reaction-Based Fluorescent Sensor to Detect Hydrogen Sulfide (H<sub>2</sub>S) Quantitatively*

This project focuses on the development of two reaction-based fluorescent sensors, L1 and L2, for the quantitative detection of hydrogen sulfide (H<sub>2</sub>S). Fluorescence sensors, known for their ability to emit light upon interacting with target molecules, were synthesized using 4-bromo-1,8-naphthalic anhydride. The L1 sensor displayed high sensitivity and selectivity to H<sub>2</sub>S in a DMSO/H<sub>2</sub>O (3:7) media, with significant changes in both absorption and fluorescence spectra upon interaction with H<sub>2</sub>S. Optimal fluorescence enhancement occurred in 30% DMSO, with kinetics analysis showing a reaction peak at fifteen minutes. Titration experiments confirmed a linear correlation between fluorescence intensity and H<sub>2</sub>S concentration. L1 exhibited strong selectivity for H<sub>2</sub>S, with minimal interference from other ions, and demonstrated efficient fluorescence enhancement in a neutral pH range, suggesting potential for biological applications. Conversely, the L2 sensor, designed to extend fluorescence emission, showed limited fluorescence response in the same solvent but did display a color shift, indicating reactivity with H<sub>2</sub>S. Further optimization of L2 in different solvent systems may enhance its detection capabilities. These findings highlight the effectiveness of L1 as a reliable sensor for H<sub>2</sub>S detection, with potential use in physiological environments.

## Communication Disorders

### **Noelle Abels**

Mentor: Ladan Ghazi Saidi

Title: *The Effects of Reading on Cognitive Health in Older Adults Aged 60-80*

The goal of this study is to assess how learning a language affects cognitive ability in older adults (age: 60-80) as compared to the cognitive effects of reading newspapers daily for 4 months. This is a longitudinal pre-post-intervention study. Older adults will be recruited via social media, websites, and flyers. A series of cognitive assessments will be administered to

participants before and after the start of the language learning program or newspaper reading. This allows researchers to assess the neurocognitive effect of the language-learning intervention. Participants agreed to complete at least 30 minutes of a language learning curriculum each day through an online language learning program (LLP) or read newspapers of their choice via an app on their tablet for five days a week over the duration of 4 months. Data collected at pre and post-intervention will be compared using spss. The results will be analyzed in the context of the literature on cognitive stimulation and cognitive reserve in older adults and healthy aging.

### **Tatum Cool**

Mentor: Denise Wolfe

Title: *RiteCare UNK: Sharing my Telepractice Experience*

Telepractice has become an essential aspect of service delivery in speech-language pathology that allows clinicians to reach clients remotely while still maintaining high standards of care. This presentation delves into the experiences of a graduate student at the RiteCare University of Nebraska at Kearney Clinic, utilizing telepractice within the clinical setting. It highlights the challenges faced, the innovative approaches utilized, and the creative solutions developed. Through this lens, the presentation offers fresh insights into teletherapy, providing practical strategies for adapting and succeeding.

### **Melanie Driewer**

Mentor: Philip Lai

Title: *Emotional Expression in Children with Autism Spectrum Disorder During a Play Session*

Emotions are an aspect of communication that is very important to succeed in social interaction. Emotional expression and recognition can pose many challenges for those with autism spectrum disorder (ASD). Previous studies have shown that people with ASD generally are able to express basic emotions, but complex emotions can pose challenges, as well as challenges in recognizing both basic and complex emotions in others. There has also been a trend of children with ASD expressing more negative emotions than positive emotions during a specific period of time. This study aims to expand the knowledge base regarding individuals with ASD and emotions, and to explore if similar trends occur in this study during a social interaction as well. A sample of 17 parent-child pairs were asked to “play as you would play at home.” It was concluded that children with ASD did express emotions; however, they expressed more negative emotions than positive emotions. This is interesting due to the fact



that this play session was supposed to be a positive situation, but these results do coincide with results from previous studies. Limitations of the study are discussed.

## **Lily Engeman**

Mentor: Jan Moore

Title: *“Healthy Hearing” in Aging Farmers and Ranchers*

Sensorineural hearing loss (SNHL) due to noise exposure is a persistent health issue among agricultural workers. This condition adversely affects communication, balance, mobility, and cognitive function. Experiencing hearing loss in midlife is a preventable risk factor for cognitive decline and dementia after the age of 70. This project aims to investigate the hearing health, cognitive abilities, and physical activity levels of aging farmers.

Participants were evaluated at the University of Nebraska Kearney (UNK) and a local agricultural cooperative. Eleven participants underwent hearing assessments, completed a background survey regarding noise and chemical exposures, and completed the Montreal Cognitive Assessment (MoCA). A high-frequency pure tone average (HF PTA) was utilized to gauge overall hearing sensitivity. Each participant was equipped with a small remote sensor to track their body movement during daily activities over the course of a week. Activity analysis was conducted using ActiLife and Python software, categorizing physical activity into active periods (walking) and more sedentary behaviors (sitting). An overall “activity score” was calculated for each farmer.

All participants exhibited sensorineural hearing loss (SNHL) consistent with noise exposure, with an average high-frequency pure tone average (HF PTA) of 52 dB HL. Four individuals demonstrated clinically significant differences in hearing between their ears, and one participant did not pass the Montreal Cognitive Assessment (MoCA). Analysis of movement data revealed a moderate correlation between the severity of hearing loss and activity scores, indicating that farmers with more severe hearing loss tended to show decreased levels of active movement throughout their daily activities. Additionally, variance analysis of activity levels was conducted over the week; some farmers displayed considerable fluctuations in their daily scores, while others maintained a more consistent activity pattern.

## **Jarod Owen**

Mentor: Whitney Schneider-Cline

Title: *Determining an optimal SSD intervention approach - is AI a reliable resource? A preliminary exploratory study*

Speech-language pathologists (SLPs) have many intervention options when treating children with speech sound disorders (SSD); selecting an optimal approach for each client can be daunting. This poster presentation will introduce artificial intelligence (AI) as a tool for selecting treatment approaches for children with SSD. AI shows great promise in promoting efficient practices in medicine (Khosravi et al, 2024) and physical rehabilitation (Mennella, et al., 2023). The application of AI to speech-language pathology is promising as well, and while many helpful resources exist, to date, the literature in this area is limited. This presentation will explain the steps to determine appropriate treatment approaches, explore different AI platforms as resources for approach selection, and compare AI output to evidence-based decisions regarding SSD treatment approach. In 2021, Storkel provided a tutorial on applying contrastive approaches such as minimal pairs, maximal opposition, and multiple oppositions in speech therapy. Case studies were included in this work to demonstrate application of these often underutilized, yet effective treatment approaches. This study will utilize similar cases and employ AI to determine if similar treatment recommendations are suggested (as compared to Storkel, 2021) to provide a preliminary exploration of how AI may support SLPs in determining effective treatment models. Results of this study are not yet available but will be included in this poster presentation to demonstrate the accuracy of AI as compared to Storkel (2021) recommendations as well as the consistency of results in using AI for this purpose. Storkel, H. L. (2021). Minimal, maximal, or multiple: Which contrastive intervention approach to use with children with speech sound disorders? *Language, Speech, and Hearing Services in Schools* 53(3), 632-645. [https://doi.org/10.1044/2021\\_LSHSS-21-00105](https://doi.org/10.1044/2021_LSHSS-21-00105)

## **Jacob Sykes**

Mentor: Kristen Majocho

Title: *For All of the Children: An Analysis of the Decline in Male Volunteerism at a Christian Nonprofit Organization*

For The Children, locally known as Royal Family KIDS, is a Christian non-profit dedicated to using summer camps and mentoring clubs to create life changing moments for children who have been abused and neglected. A disproportionate lack of male volunteers, however, has led to difficulty in serving the boys that would attend their program, as volunteers and children are paired by gender. As such, an answer

must be sought to the question “How can Royal Family KIDS make public relations choices that result in the increased recruitment of male volunteers?” The answer to this question benefits not only FTC, but also other organizations in the field. By understanding how to more effectively reach male volunteers, other, similar volunteer-based organizations will be able to expand their reach, especially in the world of foster care and mentoring programs. The research question was analyzed through a grounded theory approach, emphasizing pre-existing research based in Functionalist Theory and, secondarily, Personal Contract Theory. By examining research on volunteer recruitment through the lenses of Functionalist Theory, Personal Contract Theory, and gender, several motivational themes were uncovered surrounding the issue, and previous research was used to validate the use of functionalist theory in the volunteering context. Motivational themes such as civic responsibility, local impact, and direct recruiting practices were prominent among those indicated as attractive to male volunteers.

## History

### **Dylan Seitz**

Mentor: Torsten Homberger

Title: *The End of the O.A.S. and its Effect on the Oran Massacre and the European Exodus*

Research on the causes and effects of the Oran Massacre of July 5, 1962, has been growing in recent decades. Sometimes called “the forgotten massacre,” the massacre would play a pivotal role in the exodus of the Europeans, often labeled the Pieds-Noirs, from Oran and the surrounding region. However, research into the effects of the end of the O.A.S. (Organisation armée secrète) and its final attacks before the massacre appears to be minimal. Using a media analysis of articles from Le Monde, The Times, and The New York Times, this essay graphs the major events, emotions, and reactions of the European population in Oran from before and after the end of the O.A.S. on June 17 to the massacre on July 5, and to the exodus of the remaining Europeans. The analysis of the articles has yielded these results: continued terrorism by the Oran O.A.S. after the truce created an atmosphere of terror for the Europeans and created a powder keg of revenge for the Algerians, only needing a spark to blow. The continued terrorism also derailed efforts of reconciliation between the two groups so that when the shots were fired on July 5, the keg exploded and the massacre ensued, which, upon its conclusion, terrified the Europeans into leaving Algeria altogether. This essay

attempts to complete the picture of the Oran Massacre as well as contribute to future research on the event.

## Psychology

### **Mason Morhain**

Mentor: Julie Lanz

Title: *Support for those who serve: Evaluating levels of military cultural competence among Nebraska health providers*

The purpose of this study was to identify the current level of military cultural competence (MCC) among Nebraska mental health providers. MCC is defined as the “language, system of rank, norms and values, identity, ethics, and rapport that are distinct from U.S. civilian culture” (Collins et al., 2023, p. 1). A frequent complaint of veterans and military-connected families (MCFs) is that mental health providers do not understand their experiences. Veterans are more likely than civilians to live in rural areas which suffer from a shortage of mental health providers. There has been very little research done on MCC of mental health providers. Given that only 34% of U.S. providers report having any training in military culture (Tanelian et al., 2014), understanding the level of MCC among Nebraska providers is critical if the state wishes to best serve its veterans and MCFs. The current study is Phase 2 in a two-year URF project. In last year’s URF project (Phase 1), I conducted a pilot study recruiting participants from Buffalo and Hall counties in Nebraska and found no respondents had high levels of military cultural competency. With around 94% of counties in Nebraska having a shortage of providers (Ostrowicki, 2023), there is a strain on MCFs to obtain services in the first place. In this year’s URF project (Phase 2), I will be recruiting licensed mental health providers across the state of Nebraska to participate. Using Nebraska’s DHHS list of licensed mental health providers, I will email 5,806 participants to respond to an online survey about military cultural competency to better understand how our state can better serve the needs of military-connected families. Keywords: military cultural competence, Nebraska, mental health, rural, military-connected families

# Political Science

## **Isaac Herman**

Mentor: Chuck Rowling

Title: *American Exceptionalism's Influence on Foreign Coups*

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

## **Alexis Chavez Monasterio**

Mentor: William Aviles

Title: *Black Boxes and the Demise of Power Resistance from the Perspective of the American Migrant*

In past decades, the American migrant, and the conditions of their arrival at the southern border have changed drastically. Along with these changes has come a restructuring of the economy of power that has developed surrounding these migrants. Michel Foucault saw the notion of power as a relational force that is exerted onto a body to influence their behavior. The power holders achieve overall stability of power or "domination" when their ability to resist the methods through which power is exerted diminishes. In recent years, it appears that

the domination of migrants has drastically changed with new technological advancements. Technological advancements in the mechanisms of migration have allowed these mechanisms to become incredibly powerful, omnipresent, and ever-changing. In this paper, I explore how CBP One has developed into a powerful actor in the domination of migrants attempting to seek refuge via the US southern border. Through the exploration of this developing technology, I seek to draw attention to the growing degree of agency that non-human actors are gaining in the migration process. I then plan on exploring existing what Michel Foucault calls “Counter-Conduct” strategies to display how migrants continue to resist domination in the increasingly difficult and deadly migration process.

## Social Work

**Amelia Moore**

Mentor: Christina Sis

Title: *The Landscape of Autism Services in Nebraska*

The project aimed to enhance understanding and advocacy for autism needs and services, focusing on increasing knowledge and improving access to essential resources and support for individuals with autism. First, researchers identified providers of ASD services in Nebraska, with emphasis on providers in rural areas. Secondly, through surveying providers, researchers developed a comprehensive list of interventions most frequently utilized in ASD therapy. Finally, researchers identified and analyzed common barriers that exist in service access and delivery. Data analysis was conducted through Qualtrics’ data and analysis function and researchers focused on frequency rates and frequency tables. Responses to open-ended questions were assessed to identify common themes and ideas. Respondents reported a diverse array of services provided both in-house and out-of-house. The most common services provided in-house were found to be social skills, ABA, vocational services, and residential services. The most common services respondents’ agencies refer out included occupational therapy, speech therapy, and autism diagnosis. Many respondents noted a lack of service providers and service provider turnover to be huge barriers when it comes to providing services to clients with ASD. Respondents also reported that engaging families and loved ones in services was a significant barrier, while simultaneously acknowledging families’ difficulties with transportation to services and stigma with ASD. Future research must focus on commonalities between agencies experiencing similar barriers, geographic-specific barriers (i.e. urban versus rural barriers), relationships between barriers faced by service providers and barriers faced by individuals and families with ASD, and ways in which to alleviate these barriers.