Fall Student Research Symposium
Schedule of Events
October 2, 2025
Nebraskan Student Union Ponderosa Rooms

1:00 – 2:00 pm	Open poster viewing *Ponderosa A & B*
2:00 – 2:30 pm	Performances *Ponderosa A & B*
2:45 – 5:30 pm	Oral Presentations *Ponderosa C & D*
5:30 – 6:30 pm	Banquet *Speaker: Dr. Ken Nikels,* *Professor Emeritus* *Department of Psychology*

Performance Schedule

Ponderosa A & B

2:00 pm ---- **Rebecca Hoffman:** *Performing Tableaux de Provence for Dr. Ann Bradfield and What I learned from the Experience* (Mentor – David Nabb)

2:15 pm ---- **Alana Posvar:** *Exploring Growth Through Performance: Lessons from Bach Masterclass* (Mentor – David Nabb)

Oral Presentation Schedule

Thursday, October 2, 2025

Session 1 Room: Ponderosa C

2:45 **Chayton Kumpost:** *Investigating Benzyl Isothiocyanate as a Potential Alternative to Toothpaste* (Mentor – Austin Nuxoll)

3:00 **Carter Moss:** *An Investigation of Staphylococcus aureus Persister Cell Activity Within a Macrophage Environment* (Mentor – Austin Nuxoll)

3:15 **Jessica Martinez:** *Investigation of the Staphylococcus aureus Type VII Secretion System in Polymicrobial Biofilms* (Mentor – Austin Nuxoll)

3:30 **Maddie Wocicki:** *Mapping the Nuclear Localization Signal of Nora Virus ORF1* (Mentor – Kim Carlson)

3:45 **Joseph Roeder**: *Examining How Vaping Impacts the Response of B Cells to Peanut (*Mentor – Joseph Dolence)

4:00 BREAK

4:15 **Eri Watanabe:** *Effects of Cancer Therapy on Osteoblasts in the Tumor Microenvironment* (Mentor – Catherine Johnson)

4:30 **Laura Velasco:** *Effects on Environmental Chemicals on Adipogenesis in Mouse Mesenchymal Stem Cells (Mentor –* Yipeng Sui)

4:45 **Megan Wells:** *Parents Attitudes Toward Augmentative and Alternative Communication (ACC) in Children with Speech and Language Disorders (*Mentor – Jane Grothaus)

5:00 **Jimin Chae:** *A Data-Driven Approach to Supply Chain Management: Sentiment Analysis for Supplier Quality Management* (Mentor – Frank Tenkorang)

Session 2 Room: Ponderosa D

2:45 **Samantha Bursaw:** *Elution and Concentration of S. cerevisiae DNA in Large Inserts Using 3D-printed Devices* (Mentor – Kristy Kounovsky-Shafer)

3:00 **Nate Lilla:** *Developing Screening Methods for Pyruvate Dehydrogenase Kinase Inhibitor Discovery*
(Mentor – Michael Moxley)

3:15 **Linus Borer:** *Synthesizing Novel Derivatives of 1,8 - naphthalimide with a Long Emission and Explore Their Biomedical Applications* (Mentor – Haishi Cao)

3:30 **Jade Salgado:** *Elution and Concentration S. cerevisiae DNA in Small Inserts Using 3D-printed Devices* (Mentor – Kristy Kounovsky-Shafer)

3:45 **Magnus Tibor**: *WISEly Hunting For Oe Stars in the Infrared (Mentor* – Brandon Marshall)

4:00 BREAK

4:15 **Elizabeth Morrow:** *Parental Perceptions of Child Social Media Usage* (Mentor – Rachel Turner)

4:30 **Tara Bauman:** *State Wrongful Conviction Policies and the Racial Composition of Exonerees (*Mentor – Christina Sis)

4:45 **Sayuli Contreras:** *Voces silenciadas (*Mentor – Michelle Warren)

5:00 **Kajetan Hubl:** *Spirituality and Poetic Power (*Mentor – Rebecca Umland

5:15 **Rilynn Lutt:** *Interactive Workbook* (Mentor – Derrick Burbul)

Abstracts

Accounting, Finance & Economics

Jimin Chae
Title: *A Data-Driven Approach to Supply Chain Management: Sentiment Analysis for Supplier Quality Management*
Mentor: Frank Tenkorang

Supply chains encompass all activities that transform raw materials into finished goods and deliver them to customers. Globalization has expanded supply chains, bringing significant benefits such as efficiency gains, lower costs, and access to wider markets. At the same time, expansion has increased their vulnerability to disruptions. As supply networks grow more complex, they become increasingly sensitive to external shocks. Supply Chain Management (SCM) is the end-to-end coordination of resources, logistics, and processes which has traditionally helped reduce operational costs through data-driven optimization. Nevertheless, supplier issues reported in the media frequently precede failures in key performance indicators (KPIs), suggesting an opportunity to leverage unstructured data as an early warning system. Recent global challenges, including the COVID-19 pandemic, geopolitical conflicts, and shifting trade policies, have further complicated risk detection and emphasized the need for more proactive approaches. This study sought to strengthen decision-making in supply chain management by utilizing Delphi-based sentiment analysis in SCM. We analyzed news articles and press releases to capture the overall sentiment surrounding supply chain issues at both industry and company levels. Sentiment analysis has been applied to unstructured news data from Lexis Uni to detect rising concerns across industries. Using Python (Pandas, NLTK, Matplotlib, and Seaborn), we preprocessed and analyzed 12,501 news headlines to uncover performance patterns. Visualizations of sentiment trends provide predictive insights and actionable understanding. They enable earlier detection of risks, deeper insights into supplier performance, and more informed, proactive decision-making in supply chain management. For example, average sentiment score results by year show 2018-2019 were significant negative, which is linked to US-China trade war and Brexit uncertainty. Even though 2020 sentiment score shows slightly positive, it is still low compared to average. This reflects COVID-19 supply chain disruption.

Art and Design

Rilynn Lutt
Title: *Interactive Workbook*
Mentor: Derrick Burbul

This project investigates how UI/UX design principles can be applied to enhance the effectiveness, accessibility, and creative potential of educational materials in university-level art and photography courses. Traditional textbooks often fail to address the needs of creative learners, especially when evaluated through a grading system that struggles to assess artistic growth. In response, this study explores the development of an interactive, student-centered workbook created using Adobe InDesign both as a learning tool and a design application. The workbook emphasizes experiential learning by allowing students to actively integrate their own photographic work and written reflections directly into a structured layout. A mixed-methods approach was used, beginning with an anonymous student survey analyzing the strengths and limitations of a previous workbook, followed by iterative redesign informed by feedback and UI/UX best practices such as visual hierarchy, modularity, and intuitive navigation. The resulting workbook is hoped to communicate clarity, engagement, and creative ownership, helping students reflect on their personal development rather than conforming to rigid, one-size-fits-all grading metrics. The study also contributes to ongoing discourse around inclusive design, accessibility, and the role of student voice in curriculum materials. This research supports the argument that well-designed educational tools can bridge gaps between academic expectations and artistic exploration, ultimately creating more adaptable and engaging learning environments for visual thinkers.

Biology

Chayton Kumpost
Title: *Investigating Benzyl Isothiocyanate as a Potential Alternative to Toothpaste*
Mentor: Austin Nuxoll

Fluoride has long been a cornerstone in the prevention of dental caries, however, concerns regarding its overuse and potential toxicity have driven the search for alternative antimicrobial agents. Benzyl isothiocyanate (BITC), a naturally occurring compound with known antibacterial properties, presents a promising candidate for oral health applications. This study evaluates the antimicrobial efficacy of BITC by determining its minimum inhibitory concentration (MIC) against key oral and pathogenic bacteria, including Staphylococcus aureus, Streptococcus mutans, Streptococcus sobrinus, and Streptococcus oralis. Additionally, BITC is tested in combination with conventional antimicrobial agents using a checkerboard MIC assay. The

following antimicrobial agents were used, amoxicillin, cephalexin, clindamycin, chlorhexidine, and fluoride, to assess potential synergistic or antagonistic interactions against S. mutans and S. aureus. The MIC value obtained from the MIC assay against S. aureus, S. mutans, S. sobrinus and S. oralis were 125, 125, 250 and 125µg/ml respectively. The Fractional Inhibitory Concentration (FIC) index value obtained from the checkerboard MIC assay against S. mutans and S. aureus were indifferent when BITC was tested with chlorhexidine and clindamycin while being antagonistic when combined with amoxicillin and cephalexin. These results suggest that while BITC is able to inhibit growth of many bacteria, it interferes with amoxicillin and cephalexin mechanisms of action. More testing is needed to see if BITC is a viable replacement for fluoride in dental application.

Jessica Martinez
Title: *Investigation of the Staphylococcus aureus type VII secretion system in Polymicrobial Biofilms*
Mentor: Austin Nuxoll

Polymicrobial biofilms formed by Staphylococcus aureus and Pseudomonas aeruginosa present a major clinical challenge due to their heightened tolerance to antibiotics and association with chronic infections. This study investigates the role of the S. aureus type VII secretion system (T7SS) in modulating interspecies interactions within biofilms and its potential contribution to P. aeruginosa antibiotic tolerance. Using minimum inhibitory concentration (MIC) assays and 96-well biofilm models, we compared antibiotic susceptibility of S. aureus wild type, T7SS-deficient (essC) mutants, and P. aeruginosa, both in single- and mixed-species biofilms. Results showed that while S. aureus susceptibility remained consistent across strains, co-culturing with P. aeruginosa altered antibiotic efficacy, suggesting cross-protective interactions. Notably, P. aeruginosa in mixed-species biofilms exhibited different tolerances depending on the antibiotic tested, with ceftazidime showing the most pronounced effects. These findings support the hypothesis that T7SS activity, potentially via secretion of the membrane depolarizing toxin TspA, may shift P. aeruginosa toward more persistent metabolic states, contributing to treatment failure in polymicrobial infections. Future work, including in vivo models and genetic knockouts of T7SS components, will be critical to figuring out the mechanistic basis of these interactions. Understanding how secretion systems drive interspecies tolerance offers promising avenues for developing therapies that disrupt biofilm resilience and enhance antibiotic efficacy.

Carter Moss
Title: *An Investigation of Staphylococcus aureus Persister Cell Activity Within a Macrophage Environment*
Co-Authors: Kim Carlson, Alexis Hobbs, Emma Weis, Austin Nuxoll
Mentor: Austin Nuxoll

Staphylococcus aureus is a common human commensal, residing in the skin and nasal cavities of roughly 30% of the population. However, under certain conditions, it behaves as an opportunistic pathogen responsible for various nosocomial infections. Despite ongoing medical advances, S. aureus has evolved strategies to evade antibiotics and components of innate immunity. Professional phagocytes such as macrophages and neutrophils are key mediators of bacterial clearance. Yet recent studies have shown that S. aureus persisters, a metabolically quiescent subpopulation, possess enhanced survival against antimicrobial peptides, an innate immune defense comparable in function to phagocytes. From this, we hypothesized that persisters might similarly display a fitness advantage against macrophages. To test this, we employed a wild-type strain (HG003) and a high-persister-forming strain (fumC::NΣ, hereafter fumC), alongside a persister marker (Pcap5A::dsRed), to evaluate whether persister-enriched populations exhibit superior survival following macrophage phagocytosis. RAW 264.7 macrophages were infected, and intracellular survival was tracked over time, revealing that the fumC strain achieved nearly a log difference in living population relative to the wild type. To investigate a possible mechanism, we compared strain susceptibility to reactive oxygen species, a primary macrophage antimicrobial, but observed no difference between strains, suggesting an alternative pathway underlies persistence. Our findings indicate that persisters confer a measurable survival advantage within macrophages, though additional work is required to further define the mechanism involved.

Joseph Roeder
Title: *Examining How Vaping Impacts the Response of B cells to Peanut*
Co-Authors: Marissa Hoover, Zane Carlson
Mentor: Joseph Dolence

The health effects of vaping remain unclear, especially how it impacts immune responses that originate in the lung. In this study, we examined whether vaping influences the immune system's ability to mount allergic responses against PN using an inhalation model. First, we showed mice sensitized using PN solution containing vape juice displayed decreased PN-specific IgE responses and milder anaphylaxis. Next, we sensitized mice using electronic conditioned media (ECM) containing 6 mg/mL nicotine to expose mice to vapor. Mice sensitized with PN solution made with ECM displayed severe reductions in PN-specific antibodies when compared to PN alone. We then exposed mice using a 14-day inhalation model to examine whether ECM influences the ability of B cells to respond to PN. Germinal

center B cell reactions to PN were severely inhibited due to exposure to ECM. Overall, our data suggests vaping suppresses PN-specific immune responses by preventing the development of B cell responses. This knowledge is important because failure to mount response against inhaled PN suggests vaping may inhibit immune responses against common respiratory infections. More studies are needed to understand how vaping influences immune responses against PN.

Tanner Theis
Title: *Androgen Deprivation Therapy-Induced Osteoblast Changes*
Co-Authors: Joelle Gilmore, Eri Watanabe
Mentor: Catherine Johnson

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

Laura Velasco
Title: *Effects of Environmental Chemicals on Adipogenesis in Mouse Mesenchymal Stem Cells*
Mentor & Co-Author: Yipeng Sui

Obesity and obesity-associated metabolic disorders, such as insulin resistance and type 2 diabetes, are rapidly growing public health epidemics, and there is an urgent need to understand the molecular mechanisms underlying these chronic diseases. Increasing evidence has linked exposure to environmental chemicals as contributing to the development of obesity

by interfering with lipid metabolism. This study investigated the effects of two plasticizers, 2-ethylhexyl diphenyl phosphate and alkyl sulphonic phenyl Ester (ASE), and two organophosphate pesticides, malathion and dichlorvos, on adipogenesis in murine mesenchymal stem cell line C3H/10T1/2 cells. Lipid droplet formation was visualized with Oil Red O Staining to evaluate lipid accumulation. Our results demonstrated that ASE and EHDPP did not alter adipogenesis. In contrast, malathion and dichlorvos inhibited adipogenesis in C3H/10T1/2 cells. These findings contribute to our understanding of how plasticizers and pesticides may influence obesity and will be valuable for future assessments.

Eri Watanabe
Title: *Effects of Cancer Therapy on Osteoblasts in the Tumor Microenvironment*
Co-Authors: Tanner Theis, Joelle Gilmore
Mentor: Catherine Johnson

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

Maddie Wocicki
Title: *Mapping the Nuclear Localization Signal of Nora Virus ORF1*
Co-Authors: Belle Turk, Amanda Mackie, Darby Carlson, Alexis Hobbs
Mentor: Kim Carlson

This project works to understand how the nuclear localization signals (NLS) of the open reading frame (ORF) 1 lead to translocation of the virus to the host nucleus in Drosophila melanogaster cells. Nora virus is a Drosophila virus that infects cells in a similar fashion to human viruses, such as poliovirus or norovirus. The virus consists of 4 open reading frames (ORFs), but it is hypothesized that ORF 1 is responsible for the virus translocating to the

nucleus. The ORF 1 DNA sequence contains 3 potential nuclear localization signal sequences (NLSs), but which of these is responsible for the localization to the nucleus is unknown. This project aims to understand which of the NLS sequences of ORF1 is responsible for translocation of the virus to the host nucleus in Drosophila melanogaster cells. To address this NLS knockouts were created for NLS 1, 2, 3, 1&2, 1&3, 2&3, and 1,2&3 via PCR and stitching. The PCR products were cloned into pCR2,1-TOPO and subcloned into pEGFP-N3. The products were sent for sequencing to confirm that the NLS was knocked out. To date, full-length ORF1, knockout 1, and knockout 2 have been successfully cloned. Next steps are to transfect Drosophila S2 cells with the knockouts to determine which of the NLS sequences is responsible for nuclear translocation. Determining this will allow insight into how viruses can transfect to the host nucleus and give information to specific molecular mechanisms of viruses and cells.

Chemistry

Linus Borer
Title: *Synthesizing Novel Derivatives of 1,8-naphthalimide with a Long Emission and Explore Their Biomedical Applications*
Mentor and Co-Author: Haishi Cao

Hydrogen sulfide (H2S) is a gaseous molecule important in numerous processes in the human body, whether physiological or pathological. The function of H2S, whether beneficial, or harmful, primarily depends on its concentration. Accurate detection of concentrations of H2S are valuable in helping determine the causes and potential treatments of certain disorders. 1,8-naphthalimide-derived fluorophores have been found to have an affinity for H2S. An important quality for an effective fluorosensor is its ability to be “quenched” due to photoinduced electron transfer (PET) by preventing the emission of light when the sensor has not reacted with the target molecule. Three sensors were developed in this project with the intent of maximizing the “quenching effect”: Q1, Q2, and Q13. Q1, consisting of a trifluoromethanesulfonyl ester group at the 3-position of the naphthalene ring, was capable of exhibiting the “quenching effect” and turned out to be the most fluorescent sensor of the three upon reaction with NaHS. Q2, consisting of an ethanesulfonyl ester at the 3-position on the naphthalene ring, was also capable of being quenched; however, it did not display much fluorescence, even when combined with high concentrations of NaHS. Q13, which contained a 2-naphthalylethanesulfonyl ester on the 3-position of the naphthalene ring, was also capable of displaying the “quenching effect” when unreacted; however, when combined with NaHS, no fluorescence was detected. The observed “quenching effect” is likely due to the sulfonyl ester group present in all sensors, regardless of whether they contained electron-withdrawing groups or electron-donating groups.

Samantha Bursaw
Title: *Elution and Concentration S. cerevisiae DNA in Large Inserts Using 3D-printed Devices*
Co-Authors: Esmeralda Mendez Ortiz, Jade Salgado, Kristy Kounovsky-Shafer
Mentor: Kristy Kounovsky-Shafer

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

Nate Lilla
Title: *Developing Screening Methods for Pyruvate Dehydrogenase Kinase Inhibitor Discovery*
Mentor: Michael Moxley

Pyruvate dehydrogenase kinase (PDK) is an enzyme that regulates the activity of the pyruvate dehydrogenase complex (PDC) by phosphorylating its E1 subunit. This phosphorylation inactivates PDC, halting the conversion of pyruvate from glycolysis into acetyl-CoA, which limits entry into the TCA cycle and reduces ATP production. Due to PDK's role in metabolic reprogramming—particularly its activity in cancer and type 2 diabetes—it has become a therapeutic target. Although potent inhibitors have been discovered, there remains a need to identify compounds that are more effective. Our research focuses on discovering improved PDK inhibitors through virtual screening of compound libraries from ChemBridge and the ZINC database. We aim to validate several hits identified using an in vitro luminescent assay that measures ATP and ADP activity. Initially, we created a standard curve by measuring luminescence at various integration times and comparing it to the ATP–ADP conversion percentage in the kinase reaction mixture. However, this approach produced inconsistent and non-reproducible data. To improve the assay, we shifted our focus to measuring luminescence associated with ADP production to see how time and temperature influenced signal output. Under these refined conditions, we observed consistent results, especially when reaction components were omitted from the PDC E1 mixture. Upon adding known inhibitors AZD7545 (AZD) and VER-246608 (VER), PDK activity decreased by approximately 40–60%, confirming the expected inhibitory effects. We then began testing additional hits from molecular screening that we had previously tested in vitro to compare inhibitory effects with the AZD and VER inhibitors using this new assay to further validate them as new potential PDK inhibitors.

Jade Salgado
Title: *Elution and Concentration S. cerevisiae DNA in Small Inserts Using 3D-printed Devices*
Co-Authors: Esmeralda Mendez Ortiz, Samantha Bursaw, Kristy Kounovsky-Shafer
Mentor: Kristy Kounovsky-Shafer

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

Communication Disorders

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

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

English

Kajetan Hubl
Title: *Spirituality and Poetic Power*
Mentor: Rebecca Umland

Spiritual Poetry and spirituality are often intermingled, which is why a poet's spiritual journey can be most readily observed through their verse. Two English Romantic poets, William Wordsworth and Percy Bysshe Shelley, communicate their spirituality through poems about direct personal experiences. Although the two poets held different spiritual beliefs, they attempted to communicate these powerful spiritual experiences. Centuries earlier, poet Dante Alighieri composed two works that are crucial to the conversation: The Divine Comedy (1314-1321) and its precursor La Vita Nuova (1294). These two works convey the development of and connection between Dante's spiritual and poetic journeys. Following what Charles Williams deems Dante's "Beatrician experience," Dante dedicated himself to reinventing how to write about love and its transformative effect; his maturation as a poet resulted from his need to express powerful personal experience. Dante– one of the first poets to write spiritual poetry from direct experiences–opens the door to examining this same impulse or longing in the lyric poetry of Wordsworth and Shelley, showing this connection between poetic growth and spiritual growth is found in multiple generations of poets, most especially in the Medieval and Romantic generations. In order to examine this claim fully, I've observed the spiritual and poetic growth expressed between two key works from each poet, comparing their earlier work with their later work, and considered the poet's personal statements about the relationship between the spiritual and the poetic. Works studied include Wordsworth's 'Tintern Abbey,' 'The Prelude,' and 'Intimations Ode,' and Shelley's 'Ode to the West Wind,' 'Hymn to Intellectual Beauty,' and 'A Defense of Poetry.' Looking at these poems' content, context, and form, with Dante as a model, I've observed that a maturation of poetic powers is needed to express what is often an authentic, singular, and even ineffable spiritual experience

Management

Tranessa Hasbrouck
Title: *Charting the Road Ahead: A Scoping Review of Healthcare Accessibility and Outcomes During the Covid-19 Context in Rural Nebraska*
Mentor: Xiao (Lilac) Li

Background
Residents of rural communities often face barriers to healthcare. Nebraska, one of the most rural states in the U.S., illustrates these challenges. Widely dispersed communities limit

access to doctors, dentists, specialists, and hospitals. Lower household incomes and reduced health insurance coverage further exacerbatesthese issues. While primary care access in rural areas may approximate that of urban areas, specialized services such as cancer treatment, mental health, and maternity care are far less available in rural Nebraska.

Objectives

This study examines key barriers to healthcare access in rural Nebraska before and after COVID-19, highlights resulting health disparities, and explores evidence-based strategies to improve access and outcomes for rural populations in Nebraska.

Methods

This study employs a scoping review approach to synthesize evidence on healthcare access in rural Nebraska. The review incorporates peer-reviewed literature, government reports, and publicly available healthcare databases published between 2019 and 2024. Key resources include the Rural Health Information Hub for state-specific data on healthcare infrastructure and health indicators, the University of Nebraska Medical Center for publications addressing rural health disparities and workforce distribution, and the Nebraska Department of Health and Human Services for reports on provider shortages and health outcomes. Records were screened for relevance to rural healthcare access, disparities across medical disciplines, and evidence-based strategies. Data were charted and synthesized thematically to identify barriers, disparities, health outcomes, and potential policy and practice interventions.

Predicted Results & Potential Policy Implications

The study is expected to systematically identify barriers to healthcare access, associated disparities, and resulting outcomes in rural Nebraska pre-post COVID-19 pandemic, with the aim of informing state and local policies to mitigate rural health inequities, especially in the public health crisis context.

References are available upon request

Modern Languages and International Studies

Sayuli Contreras

Title: *Voces silenciadas (Silenced voices)*

Mentor: Michelle Warren

This project aims to amplify the voices of Latin American immigrants in Nebraska whose stories have often been unheard. Through oral interviews, the study documents the lived experiences of immigrants and the challenges they face during their journey. The research focuses on building knowledge and a better understanding within our community. My goal is to bring forth the true stories that have been shared through personal narratives of resilience, hope, and fear. Despite facing obstacles during my research, such as Institutional Review Board (IRB) approval and participant recruitment, the project continues to move forward to

ethically represent immigrant stories through interviews that will be made into a documentary, an exhibition, a presentation, etc. The study provides an opportunity for participants to share their stories through oral interviews. By centering on immigrant voices, this work contributes to a more inclusive and humanized understanding of the Latinx experience in Nebraska.

Music, Theatre, and Dance

Rebecca Hoffman
Title: *Performing Tableaux de Provence for Dr. Ann Bradfield and What I Learned from the Experience*
Mentor: David Nabb

My project centered on study of the 4th movement from Paule Maurice's suite for saxophone and orchestra titled: Tableaux de Provence, "Dis alyscamps l'amo souspire / Des alyscamps l'âme soupier" or in English, "A Sigh of the soul" The project culminated on March 8th, 2025, when I attended the North America Saxophone Alliance (NASA) Region 3 meeting at SDSU in Brookings and performed in a masterclass with saxophone professor Dr. Ann Bradfield. In the class I played the fourth movement of Paule Maurice's Tableaux de Provence. Dr. Ann Bradfield gave me some constructive criticism, which helped me with my expression of the piece as well as helping to provide me with the correct fundamentals to achieve this. The project started in January 2024, when I ordered the sheet music for Tableaux de Provence to work on during my private lessons with Dr. David Nabb. During the spring semester we worked on movements I and II. In August 2024, we started working on movement IV. During this semester, NASA was hosting auditions for masterclass performers and I submitted a recording of my performance of movement IV. On November 12, 2024, I received an email stating I was chosen to play in a masterclass at the Conference for Dr. Ann Bradfield. Over the course of the fall and start of spring semester we continued to work on that piece in my private lessons. The Conference started on March 7th, 2025, and ended on March 9th, 2025. The masterclass I was a part of took place at 5:00 PM on March 8th. I had a short rehearsal with the Conference accompanist, Dr. Casey Dierlam Tse, before the masterclass took place. I played the music for Dr. Ann Bradfield and she gave me notes about my posture and breathing techniques. Please provide some specific details of these as best you can. These notes gave the foundation for the unique and grand sound the piece called for. I have been using what she said to influence my playing up until this very day. At the student Research Symposium I will discussing Dr. Bradfield's breathing techniques and demonstrate what I learned by playing Fantasy Piece No.3 Op. 73 by Robert Schumann.

Alana Posvar
Title: *Exploring Growth Through Performance: Lessons from Bach Masterclass*
Mentor: David Nabb

Since beginning my study of the saxophone at age eleven, I have sought opportunities to expand both my technical skills and artistic understanding of music. Currently, I study under Dr. David Nabb at the University of Nebraska at Kearney, where I have further developed my performance practice. In Fall 2024, I was selected through a competitive application process to perform in a masterclass at the North American Saxophone Alliance regional conference in March 2025 at South Dakota State University. There, I performed a solo work by Johann Sebastian Bach in the format of a master class led by Dr. Kenneth Tse, a distinguished pedagogue and performer. This experience provided an outstanding opportunity to receive direct feedback and apply advanced techniques in a professional setting. My performance at this research fair reflects both the pedagogical insights gained from the master class and my continued growth as a musician. This presentation has the opportunity to highlight the importance of pursuing unique educational opportunities to foster technical, artistic, and personal development.

Physics, Astronomy, and Engineering

Magnus Tibor
Title: *WISEly Hunting for Oe Stars in the Infrared*
Mentor: Brandon Marshall

O-type stars are rare, short-lived and highly influential stars, but they tend to form in dense, dust-filled regions that makes identifying them difficult. A subtype of these stars, Oe stars, are far rarer, and represent a very small fraction of O-type stars. To address this, we used the WISE catalog of HII regions and combine photometry from 2MASS, GLIMPSE2, and the NEOWISE infrared sky surveys to hunt for these stars. Spectral Energy Distribution (SED) fitting is used to classify potential O-star candidates, while light curves from NEOWISE observations were examined for variability indicative of emission activity. From 200 HII regions, we analyzed over 15,000 stars, identified more than 2,300 as O-star candidates, 47 of which were flagged as emission candidates. These results demonstrate the current catalog of massive stars, though distance uncertainties and blended light curves remain to be challenges. Overall, this work highlights how multi-survey infrared analysis can uncover rare O-stars and even rarer Oe stars and provide new insight into the role of high-mass stars in galactic evolution.

Political Science

Olivia Beauchamp
Title: *Women's Movements in Latin America*
Mentor: William Aviles

This past summer, I took a class that focused on Argentina. This class led me to take an interest in Latin American movements, as Argentina is very active in this category. After talking with the professor, who is now my URF advisor, we decided to focus on women's movements in Latin America. While this topic is very new in the research stage, we have an idea of the route I am going to take. As of right now, I am researching abortion rights in Argentina and Chile. The reasoning behind this specific topic has to do with Argentina and Chile's governments. They both align politically on a lot of topics and are quite comparable in many ways. Despite this, Argentina has legalized abortion, while it is still a touchy subject in Chile. I took an interest in this because I want to find out why, despite the similar governments, Argentina has more active movements and has passed policies such as legalizing abortion, while Chile is still debating these policies. Throughout my research, I hope to get the chance to analyze these differences and theorize why these differences have come about. I also hope to find backing to prove my hypotheses.

Brayan Cazares-Enrique
Title: *Comparison of the Organizations of Mothers for the Disappeared in Argentina and Mexico*
Mentor: William Aviles

The focus of my project will be to compare the organizations of mothers looking for their disappeared loved ones in Argentina and Mexico. Both these countries have had instances in which hundreds of people have disappeared due to violence. In Argentina, the military regime was responsible for the disappearances of thousands of Argentinians during the 1970s and late 1980s. In Mexico, many people have disappeared in large numbers due to cartel activities and other criminal organizations. The connection between these two events is the outcry from mothers and grandmothers who protest in hopes of finding out what has happened to their loved ones. I plan to analyze these situations and analyze similarities and differences. I intend to carry out my research project through extensive research by reading books, articles, and other forms of media examining these organizations. I can also use my experience from a study abroad I did in July. I hope to accomplish gaining an understanding on the formation of these organizations as well as what their missions are and what they have completed. I hope to build upon the proper skills and strategies for writing a structured and well-thought-out research paper within the field of political science.

Robin Jones
Title: *Comparative Study of Environmental Policy*
Mentor: William Aviles

This paper compares the environmental histories and development of renewable energy of Costa Rica and Argentina, primarily through the lens of the institutions that shaped how each of these matters were addressed within each country. This paper will be addressing how Costa Rica managed to implement such strong renewable energy measures despite the many challenges that would make it an unlikely candidate for such levels of development in this field. As well as exploring the question of why these policies and other renewable energy measures have not been implemented across Latin America – specifically within Argentina. Costa Rica's renewable energy projects and organizations promoting renewable energy had large amounts of public support consistently over the past couple decades, allowing for people and government officials to push for the development of the renewable energy system they have today. Many other countries do not have as much public support for the development of renewable energy, meaning that their politicians have little to no incentive to push for these measures, especially when they can be costly endeavors. This has been the case in Argentina, which has lacked the public support to generate a push for further development of renewable energy sources within the country.

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

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

region and the nation. The Interest Group Model emphasizes key pillars, such as the Kinship order and the Economic order, which are highly relevant to Nebraska's prohibitionist paradigm. Navigating through political rhetoric, the introduction of legislation, and various political models is crucial in deciphering this ongoing puzzle within Nebraskan borders. Furthermore, my research project will illuminate the plight of this deep red state locked in an endless struggle against the current era.

Paxton Robertson
Title: *Environmental Constitutionalism in Argentina*
Co-Author: Juliana Merrihew
Mentor: William Aviles

In recent years, there has been a wave of judicialization and constitutional change throughout Latin America. This is often caused by a crisis of accountability, as citizens turn to the judiciary to enshrine new rights and enact environmental protections when the legislature or executive have not done so. Environmental constitutionalism provides a lens through which to understand the dynamics of environmental protections amidst a background of extreme activism in Latin America. It uses theoretical frameworks to classify constitutions based on their structure, including what rights they include and what systems they outline to protect them. Constitutions may also differ in their historical evolution and the different factors that influenced their change. This research includes a comparison of cases in Ecuador, Chile, and Argentina, which each have markedly different constitutional structures. For the most recent stage of our research, the analysis of Argentina, we are incorporating information gained from a field study in Argentina. While some academics claim that there has been considerable success through the new constitutions in several Latin American countries, others claim that these constitutional changes have yielded rights that have not been carried out in practice. The literature suggests that environmental protections can be prompted by social movements that create bottom-up change and ensure that rights, such as prior consultation, are properly carried out. This relates to the transformative strand, which also calls for societal as well as legal changes. My focus is on the implementation stage of environmental protection, while my co-author explores the theoretical frameworks of environmental constitutionalism.

Psychology

Elizabeth Morrow
Title: *Parent Perceptions of Child Social Media Usage*
Mentor: Rachael Turner

In today's world, technology is always evolving, and media usage is increasing. Media is built into almost every aspect of life: work, academics, and social interactions. This study had two

main aims. The first to look at how media usage and well-being were related. The second was to examine how age and well-being were related. We collected data from 124 parent participants who reported on 183 children in an online survey. Parents reported on their own demographics and media usage before reporting on their child's demographics, media usage, depressive symptoms, sleep, and cooperation. We found that parents who reported that their child spent more time on media and social media also reported their child had more depressive symptoms. Sleep was negatively correlated with social media usage, indicating that children with greater time spent on social media also had fewer hours of sleep as reported by parents. In addressing aim 2, age of mobile phone adoption was not significantly correlated with well-being. This study helps to draw attention to the relationship between media usage and children's well-being, showing the importance of awareness among caregivers and professionals.

Social Work

Tara Bauman
Title: *State Wrongful Conviction Policies and the Racial Composition of Exonerees*
Mentor: Christina Sis

Wrongful convictions remain a critical social justice issue, disproportionately affecting people of color and raising questions about equity in the U.S. criminal justice system. This study examined the relationship between state wrongful conviction compensation policies and the racial composition of exonerees using quantitative secondary data analysis of the National Registry of Exonerations (1989–2024) and policy data compiled by Duke Law's Wilson Center. Findings indicated that although state compensation statutes expanded over time, racial disparities in exonerations persisted. Black exonerees remained overrepresented even in states with compensation policies. While policies provided financial redress, their uneven design and accessibility limited their potential to reduce racial disparities. These findings highlighted the importance of advocacy for equitable policy reform and the role of social workers in supporting exonerees' reentry and recovery.