2019

21st annual Research Days

April 4th-5th

UNK UNIVERSITY OF NEBRASKA KEARNEY

Schedule of Events

April 4-5, 2019

Nebraskan Student Union Ponderosa Room

Thursday, April 4

Undergraduate Research Day & Graduate Program Fair

7:30 am to 9:00 am	Students set up posters
9:00 am to 11:00 am	Poster Judging
12:00 pm to 1:15 pm	Luncheon with Guest Speaker, Addison Heeren *(Ponderosa A & B)*
1:30 pm to 3:30 pm	Oral Presentations Open Poster Viewing Graduate Program Fair
3:30 pm	Awards Ceremony & Reception *(Ponderosa A & B)*

Friday, April 5

Graduate Research Day

8:00 am to 11:00 am	Graduate Student Oral Presentations, Open Poster Viewing
11:00 am to 12:00 am	Graduate Research Awards and Social

Guest Speaker

Addison Heeren

Addison graduated from UNK with a Bachelor of Music in Musical Theater Performance. Since graduating Addison has become the Resident Prop Master at the Stella Adler Studio of Acting in New York City. To those that do not know, a Prop Master is the person responsible for every "thing" on stage in a theatrical performance. This includes furniture, food, special effects, weapons, and quite often, fake blood. In his last four and a half years in NYC, he has overseen the props to over 170 different productions and has had the pleasure of working with great theater and film personalities such as Joel Grey, Ralph Macchio, Pamela Adlon, Mike Birbiglia, Aundrea Burns, and Donna McKechnie.

Addison has had the great opportunity to work on some very exciting projects in the past few years. He supervised the props for Fidler Afn Dakh, the American premiere of Fiddler on the Roof spoken and sung entirely in Yiddish. He was flown to the Netherlands to install Jersey Boys on the Norwegian Cruise Line - Bliss. He supervised the Off Broadway transfer of A Clockwork Orange direct from London, England. And he also constructed props for Mike Birbiglia's recent Broadway show The New One (a specialized fitted sheet that keeps a sleepwalker in their bed so they do not harm themselves while asleep).

Addison was an Undergraduate Research Fellow at UNK. He studied the hero's journey as it pertains to the Rock Musical. His research culminated in a lecture recital examining the chord structures and key signatures of the musical Next To Normal. He then wrote, casted, directed, and accompanied fellow students performing selections from the musical to accompany his research.

While at UNK, Addison was taught and directed by Dr. Sharon Campbell, Dr. Anne Foradori, Jack Garrison, Janice Fronczak, and Darin Himmerich. It is to these generous and talented professors that Addison owes much of his success today. Even though Addison has somewhat shied away from the spotlight on stage, he still has a passion for singing and playing piano. Quite often, you can still find him sneaking into a piano practice room. Feel free to follow his adventures on Instagram: @propstitutenyc

Table of Contents

Undergraduate Poster Abstracts

Fine Arts & Humanities

Communication

Poster U01 – Matthew Fischer

Mentor: Sonja Bickford

Title: Development and Testing of K-12 Aquaponics Curriculum

Aquaponics is the combining of aquaculture and horticulture that is sustainable and discharges less waste than other methods (Lennard, 2004). Easily portable and sustainable, aquaponics systems have during the past decade been implemented into classrooms, giving more hands-on ways of teaching agricultural methods, biological systems, etc. The literature review conducted has added to this understanding of the usefulness of aquaponics systems and has also shown the importance of increasing the knowledge of why innovating curriculum is important, and how aquaponics curriculum can benefit K-12 classes. This study aims to identify and create curriculum that can be paired with the in-classroom aquaponics system to best utilize the systems in teaching material according to existing educational standards in a K-12 setting. The aim of the study is to write curriculum to be used with the systems to provide examples of curriculum that could be paired with ongoing in classroom instruction. A suggested follow up would be to test the curriculum in order to assess the ones teachers prefer and which the students best respond to.

Based on the curriculum written and developed during this study, it has been found that aquaponics can be used as a model for instruction in the classroom because of its engagement of the students and the plethora of biological systems that can be taught through it as an example. The curriculum wrote was about photosynthesis in the system, and the water cycle though the system. It is able to be easily set up and is adaptable to students' instructional needs as well as classroom and teacher needs. Aquaponics systems are easily adaptable to instructional and curriculum needs due to the variety of variables that can be changed and studied within the system.

Poster U02 – Emma Lee

Mentor: Sonja Bickford

Title: Assessment and Modes of Application of Aquaponic Systems in Classrooms

Aquaponics is the combination of aquaculture and hydroponic technology to grow both fish and plants together in a closed-loop system. While aquaponics can play a role in increasing food security, it may also be a potential educational tool because of its interdisciplinary nature (Heart 2013, pg 7). Systems come in many sizes and styles providing users the choice of system size, colors, sound levels, and food production. In addition, the systems promote and provide health, well being, and educational benefits. The study's main question was to identify the most important types of the benefits of aquaponic systems for elementary aged children.

To identify the benefits of the systems in classrooms anonymous observations were done in second and fourth grade classrooms, looking specifically at the differences in classroom dynamics of classes with verses without systems. In addition, a semi-structured survey was distributed to teachers at 17 different schools around the central Nebraska region with systems. The t-test shed light on the significance of teachers who are newer to teaching and have been in the profession for 10 years or less versus those that have been teaching for over 20 years. The newer teachers believed more strongly in the benefits of the live plants and fish in their classrooms as well as using the systems as a classroom management tool than those who had been teaching longer. For example, a teacher who has been teaching for four years said this about the system's benefits in their classroom, "students are very engaged and interested, love how it influences the classroom atmosphere as a whole".

English

Poster U03 – Theodore Dean Degner

Mentor: Rebecca Umland

Title: Luderature: An Emerging Medium's Ascension to Artform

The interactive medium of video games is still a young art form. It offers experiences that are concurrently narrotological and ludological. For this reason, I coined the term "Luderature", a portmanteau of the word literature

and the latin prefix "ludere," meaning to play. This shows that the properties of luderature are two-fold, serving both to tell a story as well as being interactive in nature; how the player's choice impacts the game experience. This project examined various luderary works, and compared them to literary antecedents. Many works of luderature have remediated narrative structures, typologies, and themes from other works, following a typical pattern that many art-forms go through during their infancy. What this means is that luderature, as a medium, is transitioning from being solely created and viewed as entertainment, to developing into a distinguished art form. It is justifying its merit as an art form through its transposition of traditional story structures, characters, and overarching ideas onto a new medium (electronic games)-remediation providing vitality to traditional narratives and lending legitimacy to the experience of gaming. Luderature, having become more established as an art form, has also started to become self reflective. Games are now also being created due to the inspiration the developer(s) had from another work within the medium. My project approached this by examining a handful of works of luderature, the literature and/or luderature that inspired and influenced them, and how they impacted the medium at large with the ideas they explored or fleshed out with their creation.

History

Poster U04 – Annie Pflaum

Mentor: Christopher Steinke

Title: Memory of the Croatian War of Independence

The learning objective of conducting research on the Croatian War of Independence was to gain a better understanding of the ongoing memory of the war within the country, and its impact on present-day Croatia. Memory of the war has not only had a personal impact on Croatians, but has affected the way in which the economy is run, the places that are advertised for tourism, and how Croatia has chosen to present itself and integrate into the European sense of identity. I sought out primary and secondary resources connected with the war, whether that be archival material, journal articles, and mementos from my own trip to Croatia, which inspired this project in the first place. Throughout this project, I have gained information and knowledge about a source of relatively recent conflict that is not commonly known or understood in the twenty-first century.

Music & Performing Arts

Poster U05 – Tierney Casper

Mentor: Sharon Campbell

Title: Swimming Lessons, Autism, and the Benefits of Music

Throughout the past three years I have been researching the benefits of music when used in swimming lessons with students who have been diagnosed with Autism. In December of 2018 I was able to apply my music techniques in swimming lessons with a student who has been diagnosed with Autism. I found that many of my music techniques were successful and helped the student to learn swimming strokes much more quickly than my non-music techniques. However, I also found that each case of Autism is unique which means the music activities in the swimming lesson need to be tailored to the student. My Student Research Day poster presents my project's findings and my conclusions for future studies.

Poster U06 – Terran Homburg

Mentor: Sharon Campbell

Title: Isis' Role in Egyptian Mythology and her Effect on Society and Music

The purpose of this research is to find and explore the interrelations between Egyptian mythology and early Egyptian society and music. This study traces the path of Isis throughout Egyptian myth, and uncovers the evolution of her character all through the ancient Egyptian period.

This was accomplished through a literature review of the topic, surveying both modern and ancient texts, spells, hymns, and stories devoted to the goddess Isis. An annotated bibliography was then created, synthesizing all relevant information on the rise in importance and influence of Isis in all aspects of ancient Egyptian culture. As this research progresses, it will culminate in an original creative work based on the role portrayed by Isis that permeates ancient Egyptian and modern culture.

Behavioral & Social Sciences

Geography

Poster U07 – Claire Christner

Mentors: Paul Burger & Jason Combs

Title: A Geographical Analysis of Medicaid Expansion Politics in Nebraska

Medicaid covers 74.5 million individuals nationally of which 243,000 participants reside in Nebraska comprising 13 percent of the state's population (NCSL 2018). Under the Affordable Care Act's (ACA) Medicaid Expansion provision states can receive additional matching federal funds by covering those up to 138 percent of the federal poverty level (NAMI 2019). Initiative 427 was approved by voters in November of 2018 following several failed attempts in Nebraska's legislature to pass expansion and is estimated to add an additional 45,000 to the rolls lowering the overall uninsured rate to 9.6 percent from 12.4 percent. (Forbes 2018). Currently, thirty-six states have approved Medicaid Expansion (KFF 2019).

This project examines recent efforts in Nebraska to expand Medicaid. Several bills have been introduced in Nebraska's unicameral to expand Medicaid but failed to garner the needed votes. Initiative 427 placed Medicaid Expansion on the November 2018 ballot where voters approved it 53.6% to 46.4%. GIScience is used as the framework for analysis and comparison of the spatial variations in support by legislative district for Initiative 427 and the failed votes in the legislature to pass it. Keywords: GIScience, Medicaid Expansion, Nebraska

Poster U08 – Tate Combs

Mentor: Jason Combs

Title: Nebraska's Exaggeration Postcards: Giant Grasshoppers and Two-Ton Potatoes Along with Other Facts about the Plains

In the first few decades of the early 1900s, the United States was postcard crazy. Thousands of cards were exchanged daily. Many of the cards were simply a form of "self-congratulation," often demonstrating signs of development and progress—churches, libraries, prominent residential districts, and schools, for instance. For many, postcards boastfully declared "I belong here," "This is my place," and "This is my kind of place." This project examines Nebraska postcards, specifically not just postcards but exaggeration postcards. For Nebraska, exaggeration cards fall into two categories—the natural world (ducks, fish, grasshoppers, and rabbits) and the so-called developed or "cultured" world (carrots, corn, onions, pumpkins, and wheat). Postcards were not only used for communication and entertainment, but in the case of exaggeration cards they also promoted and "sold" Nebraska to a larger audience. This study begins by evaluating trade cards and the history of postcards, then transitions to focus on the importance of Nebraska exaggeration cards.

Poster U09 – Andrew Heine

Co-Author: Brennen Cruise

Mentor: Vijendra Boken

Title: Impact of Irrigation on the Ogallala Aquifer

Sustainability of the Ogallala Aquifer has been a major issue particularly due to increasing irrigated area in Nebraska. This study examines the trend in irrigation in Nebraska and how it has influenced the groundwater table. Data on the groundwater table at different places will be collected from the United States Geological Survey as well as personal sources on farms. Rainfall data within the aquifer zone will be collected from the National Climatic Data Center. The relationships among the irrigated acres, the precipitation, and the groundwater levels within Nebraska will be studied and presented, reflecting the groundwater trend for the future. It will be further analyzed if is needed to limit irrigation in Nebraska in order to keep the aquifer at a sustainable level for future use.

Poster U10 – Rene Ingersoll

Mentor: John Bauer

Title: The Spatial Arrangement of Shinto Shrines

Traveling across Japan, one image stands out on the landscape to a foreigner. From the most rural towns, to the peak of a mountain, to the bustling streets in Tokyo, the torii gate, which leads to a Shinto shrine, can be seen across the Japanese landscape. Shintoism is a form of religion found only in Japan. More than 80,000 Shinto shrines exist in the country. As a foreigner to Japan there is something alluring about the torii gate and a shrine that can be found nowhere else. Upon first visiting a Shinto shrine, is it clear that there are more elements than just the torii that add to the image of Shintoism. Some of the other elements include: the ema to hang a wish, the chøzubachi, where one cleanses themselves, memorial stones, and stores to buy souvenirs or amulets. In 2018, I participated in a study abroad program in Japan, and while I was there, I completed a field study of Shinto shrines. As I traveled to various shrines, I documented the location of the different elements through photography and later drew diagrams to compare the spatial relations of the elements. When comparing the shrines there were some similarities of the location of objects. For example, the shrine usually faced towards the east, the ema and fortunes were closer to the store, and the store was placed near the shrine for easy access. Altogether, the arrangement of Shinto shrines do follow some similar patterns, with the torii gate always marking the entrance.

Poster U11 – Haley Roush

Co-Author: Brock Belgum

Mentor: Vijendra Boken

Title: Declining Water Levels in the Colorado River Due to Crop Irrigation

The Colorado River is vital water source used for a number of activities for seven states within the Western part of the country, but its largest use is crop irrigation. It helps irrigate nearly 90% of the crops in a 256,000 square mile area surrounding the river, producing food for millions of people. But, in recent decades the amount of water drawn out of the Colorado has increased. With the lack of precipitation falling in the Colorado River Basin, plus the increase in population size, the river has found its way on the top of America's most endangered river list. The state that relies on the river most for irrigation is Colorado. Nearly two-third of the crops within the state use the Colorado River for irrigation and the irrigated area has increased over years. This study examines the increase in irrigated acres, the decline in the discharge of the river over the years and suggestions to combat the overuse of the river in order to make it more sustainable for the future.

Poster U12 – Jaden Russell

Co-Authors: Matthew Kostenbauer & Ashley Markham

Mentor: Vjendra Boken

Title: Cost-Benefit Analysis of Irrigation and Dryland Farming

The use of irrigation has proven to produce higher yields for farmers across Nebraska, but it is expensive to start and may not be an option for some lower income farmers. The dryland practice allows farmers to save their money on irrigation systems and maintenance, but with lower yields. The cost-benefit analysis will show whether switching to irrigation from dryland farming is worth the investment. Sprinkler irrigation will be the main point of focus with regards to how much the system costs and for the yields-comparisons with the dryland farming. Such an analysis will help a farmer decide if irrigated farming will be a profitable option for them.

Poster U13 – Natasha Winfield

Mentors: Jason Combs & Paul Burger

Title: Spatial Examination of Nebraska's Pioneer and Heritage Farms

Land tenure and ownership rates have long been issues under consideration in the United States (Diller 1941; Clawson 1964). More recently, the examination of century farms—a term to note agricultural land held in a single family for more than 100 years—has also become popular. Studies examining century farms in several other states—Ohio and Tennessee, for instance—have evaluated patterns of land tenure and ownership over time (Van West 1986; Verstraten 2007). To our knowledge no studies have spatially analyzed Nebraska's century farms. The Aksarben Foundation in Omaha maintains a database for Pioneer Farms (Century Farms) and Heritage Farms—those held by a single family for 150 years. This project determines what factors impact long-term land ownership rates in Nebraska. This study also incorporates historical geography principles and also employ GIScience to analyze and map findings.

Poster U14 – Natasha Winfield

Mentor: Paul Burger

Title: Using GIScience and Marketing Geography to Define the Market Area and Segment In-Home Health Care Customers in Des Moines, Iowa.

As the United States population continues to age and life expectancies increase, more Americans are looking for alternatives to retirement centers and assisted living facilities. A growing service industry among this demographic group is in-home health care that allows individuals to remain in their primary residence while receiving a basic level of health and personal care. One such business in the Des Moines, IA, metropolitan area is Accessible Home Health Care (AHHC). This study combines the principles of marketing geography and GIScience technology to address-match their customer locations. Using a combination of network and kernel density analysis, the spatial extent of AHHC's market area is defined followed by a block-group level socio-demographic analysis of the customers. Results from the market area delineation and customer segmentation provide AHHC with a basis for understanding their service area and aid in the marketing decision process.

Kinesiology & Sports Sciences

Poster U15 – Katelyn Unvert

Mentor: Matthew R Bice

Title: Aquaponics: Do classroom project only help students?

Approaching overall health within schools commonly focuses on students; however, teachers are equally important in addressing child health. In the 2017-2018 school year, seventeen classrooms were equipped with Aquaponics growing systems and curriculum to guide implementation. These systems were implemented within the classrooms and curricula focused on health and science. The purpose of this study was to determine the impact on teacher health consciousness and perceptions of classroom Aquaponics systems (teaching innovations) during implementation.

METHOD. Rural middle school science teachers from Nebraska participated in this study. Each participating teacher had a minimum of 75 students in their class. Teachers received their own Aquaponics growing system and curriculum including inactive activities focusing on

growing food. Electronic surveys included topics on health consciousness and perception of the aquaponics systems were distributed to teachers at the beginning (August) and end (April) of year.

RESULTS. Teacher's reported significant increases in perceptions of the Aquaponics teaching model. Further, individual scale items were analyzed to assess the measured constructs and reported rating of teacher's Health Consciousness increased; however, the statistical significance was not established at 0.05. Ratings of Innovation Perceptions reported an increase in Teachers being interested in implementing Aquaponics curriculum ($p = 0.077$) and statistically significant increase in Teachers thought this project was highly advantageous ($p = 0.036$).

Discussion. Data suggests the implementation of Aquaponics growing systems had an indirect impact on teachers. Teachers play an integral role in the development of children and being open to new innovations in the classroom can enhance the educational environment. Teachers can influence student health decisions by acting as positive role models. Presumably, teachers who are more conscious of their health will potentially make healthier decisions that can diffuse to students. A larger sample size is needed to draw concrete conclusions.

Poster U16 – Paula Zakrzewski

Co-Author: Jourdan Ringenberg

Mentors: Matthew Bice, Angela Hollman, & Dick Meyer

Title: Growing Activities + Kids = Science Motivation!

Students in middle schools are at a fundamental age where they must begin to assume some responsibilities that their parents and other authorities have previously done for them. This transition can seem difficult as the majority of their time is spent sitting in a classroom. This is common and can often feel monotonous to students, and at this early age, they can lose interest in the STEM fields. This project involved incorporating aquaponics growing systems in classrooms across the state of Nebraska to teach science & health. The purpose of this study was to explore the influence of interactive growing activities, motivation to learn, and social emotional health. METHOD. Middle school students ($n = 523$) in rural Nebraska participated in the Aquaponics growing project, and their classrooms were completely outfitted with full functioning growing systems. Surveys were distributed to each participating school to be completed electronically by middle school students at three different intervals over the course of a school year (Pre, Mid, Post). The measured variables of interest included: students' (a) motivation to learn science and (b) social emotional health. RESULTS. Upon the implementation of the Aquaponics growing system, students' motivation to learn science constructs of self-efficacy ($F = 12.97$, $p = 0.001$) and active learning ($F = 4.09$; $p = 0.01$) significantly increased. We hypothesized an impact on social emotional health, but the current study did not yield significant findings. CONCLUSIONS. Aquaponics systems promote hands-on learning that can spark an interest in scientific and other STEM fields in middle school students. As students take incentive to learn on their own with the system and system's data, they feel more confident in their knowledge of course material. This increase in self-efficacy can translate not only to academic settings but also to interests that promote career choices in science/health fields.

Political Science

Poster U17 – Braydon Conell

Mentor: Satoshi Machida

Title: Media Slant in Immigrant-related News Stories

Immigration into the United States – especially from Mexico – has become a contentious issue both at the state and local level and the federal level. One aspect on the perception of immigration is news media. Past studies looked at media slant in communities located at distances to the U.S.-Mexico border. This study uses some of the same parameters as prior research in this field, but it is measuring media bias in local communities that have large Hispanic or Latino populations instead of proximity to the border. Data is collected from eight communities in the State of Nebraska: four communities that have large Hispanic/Latino populations and four that have small Hispanic/Latino populations. Using content analysis, newspaper articles are scored on a 3-point scale based on the tone of the article toward immigration. These data are then compared to other parameters to control for compounding factors in determining why media bias exists, such as voting patterns and paper ownership. Additionally, similar to past research, this study analyzes the difference between news and opinion in today's media.

Poster U18 – Adrian Gomez-Ramos

Mentor: Peter Longo

Title: Affirming Affirmative Action?

The debate between equity and equality in the United States is an ongoing endeavor that continues to challenge policymakers and citizens. For more than half a century, policies have been put forward to promote diversity and ensure impartiality. The most notable of these actions is affirmative action. Decisions by the U.S. Supreme Court shape the nature of affirmative action policies. The ongoing case, Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al, continues to percolate through the judicial system. This case illustrates the dynamic nature of affirmative action policies. In this paper I will analyze affirmative action landmark cases; evaluate affirmative action policies; address the impact of the Students for Fair Admissions, Inc. v. President and

Fellows of Harvard College et al case; and conclude with possibilities for the future of affirmative action.

Poster U19 – Nicole Kent

Mentor: Peter Longo

Title: An Analysis of the Uninsured Population and Access to Healthcare in Rural Nebraska

In the United States, rural populations face numerous disparities in obtaining healthcare when compared to urban peoples. While about 20% of the population live in rural areas, only about 10% of physicians work in rural settings. Not only are hospitals serving rural residents typically under staffed, they are also under resourced in terms of clinics, finances, and technology. Additionally, national statistics have shown that residents of rural areas have poorer health behaviors, such as consuming fewer fruits and vegetables, exercising less, and using tobacco products more when compared to residents of urban areas. The cost of comparable healthcare procedures and visits is higher in rural facilities compared to urban hospitals. Based on the percentage of the population that is uninsured and the Index of Relative Rurality as a composite measure of rural-urban status, we discover a clear relationship between rurality and rates of uninsured peoples ($p<0.00001$). This issue is only compounded by the shortage of rural healthcare providers, the increased cost of healthcare in rural facilities, and the poorer health behaviors of rural populations. All these issues combined lead to the disparities we see in the health of rural peoples today.

Psychology

Poster U20 – Jake Andreasen

Mentor: Evan Hill

Title: Accessing Cone-based Vision in Rats via Conditioned Suppression/Avoidance

Rats have long been said to have poor color eyesight with physiological studies showing that rat's retinal cones only comprise about 1% of their total retinal cells. Through retinal cell studies, it has been predicted that rat cone eyesight behaves in a dichromic fashion with peak cone sensitivity in around 358nm and 510nm. This study aims to confirm these physiological findings via the use of a behavioral training method called conditioned suppression/avoidance. This will be done with the use of four Long-Evans Rats, two males and two females, of whom will be subjected to LEDs of 5 different wavelengths. These LEDs will have wavelengths 380nm, 405nm, 460nm, 510nm, and 605nm. This behavioral training will begin by depriving the subjects of water and only allowing them to drink during daily training sessions. To obtain water, animals make contact with a touch-sensitive spout, which delivers water upon contact. After the rats are comfortable receiving water through the spout, then they will be moved on to the testing phase. This phase includes the rats undergoing testing involving the use of an avoidable mild shock as an aversive stimulus to motivate the subjects to correctly discriminate between two LEDs of identical wavelengths. One LED acts as the "safe" stimulus to continue drinking awhile the other acts as the "warning" stimulus that a shock will soon begin if contact with the spout is not broken. With trails of repeated avoidance of the "warning" LED, and contact with the drinking spout during the activation of the "safe" LED, we can confidently conclude that the rats being studied can perceive the wavelengths being tested. The results will also give insight on how well the different wavelengths can be seen by the subjects based upon their performances and allow us to either confirm or refute previous research findings.

Poster U21 – Abigail Borgman

Mentor: Krista Fritson

Title: Effects of Lavender Essential Oil on Anxiety and Locus of Control

The use of aroma therapy and essential oils is growing in popularity, and there are claims that lavender essential oil has benefits of reducing anxiety, depression, restlessness, and insomnia (Nordvist, 2018). However, there are limited empirical studies exploring the effects of lavender essential oil on anxiety and stress, with mixed results in research that has been completed. The purpose of my research is to expand on the knowledge of lavender essential oil use and its possible effects on anxiety and locus of control. Although Locus of Control is a fairly stable characteristic, I want explore any possible effects. My research includes college age individuals at a Midwestern university. I hypothesize that individuals who use the lavender essential oil will experience a decrease in anxiety and an increase in locus of control. A Repeated Measures ANOVA is used to analyze the data.

Poster U22 – KC Carrillo

Co-Author: Kendra Hoffert

Mentor: Julie Lanz

Title: The Effects of Mindful Meditation Using a Mobile App

The effects of mindful meditation using a mobile application will be examined in 105 working adults. Participants were recruited from a local school system and city agencies. Using the app, Smiling Mind, we will evaluate the positive effects of mindful meditation. Participants were randomly divided into the control or intervention group. The intervention group will take a pre- and post-survey, use the app five times a week for ten minutes, and will take six weekly mood surveys. The control group will take the pre- and post-survey, along with the six weekly mood surveys. In the pre-survey, we compared the intervention to the control group and discovered that there was no significant difference in burnout or job satisfaction.

Poster U23 – Laura Fisher

Mentor: Julie Lanz

Title: Applicant Reactions to Social Media Screening: Individual Differences and LGBT Views Affecting Organizational Attractiveness

The morals and values expressed by a company, especially regarding LGBT acceptance, can affect how much applicants and customers choose to involve themselves with that particular company (Melissa & Dustina, 2016). Applicant reactions are essential for that reason and because the better fit an employee is for a company the better work they will do for that company (McCarthy Bauer, Truxillo, Anderson, Costa, & Ahmed, 2017). Sixty-four adults (48 females and 16 males) from a Midwestern University in the United States participated in an experimental study about applicant reactions. This study was a 2 (social media background check) x 2 (family condition) between-subjects experimental design. Participants were randomly assigned one out of four conditions. The experiment consisted of a fake job advertisement that included the description of the job a restaurant manager in Kearney, the family condition (heterosexual or homosexual couple eating dinner), and a social media background check (requiring applicants to provide usernames to their personal accounts or not.) There was no significant difference in how attracted the participants were to an organization with a social media background check or without one. Participants who were high in negative affect were no more or less attracted to the organization regardless if they saw a background check or not. Attitudes towards homosexuality, whatever picture presented, did not affect how the participant felt about the organization. In this sample of college students, seeing a fake restaurant demonstrate acceptance of a homosexual couple did not change their opinion of the organization. The implications of this research will be discussed

Poster U24 – Autumn Hallberg

Mentor: Julie Lanz

Title: Exploring Essential Oils in College Students

The pressure to succeed academically is a top concern among college students and is correlated with stress. Essential oils have become increasingly popular and are being used for their restorative effects. For example, lavender has sedative compounds; rosemary has stimulating compounds. Participants were undergraduate students (N=20). Baseline stress was measured, stress was induced through the Sing-A-Song Stress Test. Participants were randomly assigned to lavender or rosemary diffusion while completing a performance task. Participants' post-stress was measured. Essential oils did not reduce stress. The lavender condition performed significantly better than rosemary on task performance. Lavender could improve task performance in college students.

Poster U25 – Kendra Hoffert

Co-Author: KC Carrillo

Mentor: Krista Fritson

Title: The Effects of Mindful Meditation on Anxiety and Life Satisfaction Using a Mobile App

The mindfulness practices have increased in popularity over recent years. The increased flexibility afforded by mobile apps has made practicing mindfulness more available to the average person. This study investigates how a mindfulness app (Smiling Mind) affects life satisfaction and anxiety. Participants are employees of a small city and a local public school system. Participants were randomly assigned to the meditation (N=51) or non-mediation group (N=54). All participants complete a pre-survey, six weekly mood surveys, and a post-survey. The meditation group completes a six-week mindful intervention. Pre-survey results show no significant difference between the mediation and non-meditation group in anxiety or life satisfaction. The data are analyzed using an ANOVA. This study advances current research on mindful apps and the potential for positive outcomes.

Poster U26 – Noah Renken

Mentor: Megan Strain

Title: When It Comes From a Comic vs. a Politician: The Role of Comedy and News Content in Individuals' Responses to Sexual Assault Scenarios

Given the prevalence of stories about rape and sexual assault that have permeated the news in recent months (due in large part to the #MeToo movement), we believe the effects of these media stories warrants investigation. We are interested in examining the differences between news media and comedy in their presentation of content regarding sexual assault.

The goals of the current study are to examine whether differences exist between these media types, to determine whether they may affect response to sexual assault. More specifically, we are examining how humorous or non-humorous messages that reinforce the status quo, subvert it, (or are neutral) may influence individuals' perceptions of rape, or their anticipated behavior in response to it (e.g., willingness to intervene).

Based on the extant literature, the current study tested competing hypotheses. One, based on the work of Li, Kim, and O'Boyle (2017), suggests that reinforcing news about rape may elicit more traditional views toward rape, and subsequently more "status quo" behaviors (e.g., doubting a woman who reports it). Alternatively, prejudiced norm theory predicts that reinforcing humor would be more likely to elicit discriminatory behavior, as a function of the norm of tolerance created by the jokes (Ford & Ferguson, 2004).

Our results suggest that for the most part, individual differences in perceptions of rape may be more influential

in behavioral responses than media exposure, but additional analysis and research is needed to conclude this is the case. This study adds to the existing literature on media influence and perceptions of/responses to rape, by comparing news media to comedy, and integrating several relevant individual differences. Our findings have the potential to inform future research on the role of such factors in other important areas, such as bystander intervention education, or possibly jury selection in criminal cases.

Poster U27 – Christian A. Vera

Mentor: Krista Forrest

Title: Effects of Police Training and Expert Testimony on Mock Juror's Verdicts and Sentencing

Many factors help juries determine their decision. For example, the expert witness' credentials, their believability, their likeability, their actual testimony, all influence jurors' verdicts and sentencing. Although research has examined the influence of these witness characteristics on jurors' perceptions and decisions, one area of research that has not been examined is the juror's perception of a police officer's techniques and training and the extent to which differences in training influence measures of witness credibility and subsequent verdict and sentencing. A chi-square analysis indicated there was no difference in verdict as a function of type of police training. We found no significant difference between participants who read expert testimony and those who did not on their likelihood of convicting. Whether learned on-the-job or through the police academy, participants saw them both as acceptable.

Poster U28 – Justin Wright

Mentor: Theresa Wadkins

Title: Test Effect and Knowledge Retention

Information learned in college is intended to be retained beyond the test. But how long do college students retain information? The current study investigated the rate of knowledge retention among college students in a psychopathology course six weeks after the course ended. The scores of a final exam and the same exam after a six-week delay were compared. One group of participants was encouraged to prepare for the follow-up exam and the other group was not instructed to prepare. Students answered a demographic questionnaire as well as a study habit and preparedness questionnaire after the initial test (final exam) and they answered a second questionnaire after the follow-up test. The relationship between participant GPA's and test scores was examined. Analysis and results will be discussed.

Social Work

Poster U29 – Guadalupe Chavez

Co-Author: Karina Martinez

Mentor: Benjamin Malczyk

Title: Ayudame! Social Services in Spanish Throughout Nebraska

As the state of Nebraska grows more diverse (Zhang, 2015), the need to serve the Spanish speaking population grows. While services are needed in various areas, medical services and domestic violence services are among the most crucial. There remains a large shortage of Spanish speaking human service professionals (Lanesskog, Piedra, & Maldonado, 2015). This study examined if hospitals and agencies addressing domestic violence are able to assist and communicate with Spanish speakers. This study provides further insight and guidance to agencies to better serve these specific clients. Overall, we examined agencies in 15 Nebraska cities, 5 of which had a large percentage of Latinos. We examined websites and called agencies in these cities to assess their ability to serve Spanish speaking individuals. Data allowed for comparison of provision of services in Spanish based on urban versus rural locations as well as cities with varying percentages of Latinos. Results indicate the overall ability of agencies to provide services in Spanish in a cross-state sample. It is important to educate and bring awareness to agencies and hospitals to better serve the population of Spanish speakers as the services provided are essential to all.

Natural & Physical Sciences

Biology

Poster U30 – Jackson Barnes

Mentors: Marc Albrecht & Nate Bickford

Title: Aquaponic Comprison Study Using Commercial Feed and Homemade Plant-Based Feed

Two experiments were done to find alternatives to commercial fish feeds focused towards developing countries. In the first experiment two mid sized aquaponic systems were set up and allowed to run for 8 weeks. The systems contained tilapia fish and lettuce plants. One system was fed commercial fish food, the other system was fed a homemade food powder consisting of sunflower seed meal, corn meal, ground brown rice, and moringa leaves. Results of both fish growth and plant growth indicated greater growth with the commercial food. Water chemistry shows there were much more nitrates present in the commercial food system which increased the system's productivity. The second experiment was looking at the effect of commercial feed and pelletized homemade plant-based feed from the previous experiment. Two mid sized aquaponic systems were used and were ran for a duration of 8 weeks. Both systems contain equal amounts of tilapia fish and basil plants. One system received commercial feed and the other received the homemade plant-based feed in a pellet form. The results showed no significance difference in fish weights and plant biomass.

Poster U31 – Gabrielle Buttermore

Mentor: Letitia Reichart

Title: Molecular Sexing for Spring Migratory Baltimore Orioles in South Central Nebraska

During May (Spring) each year, migratory Baltimore Orioles (BAOR) stop along the Platte River in south central Nebraska to rest and refuel prior to continuing to migrate north. Individual BAOR were trapped in south central Nebraska during migration in 2016. For some individuals, plumage characteristics did not clearly indicate the sex of the individual trapped. For these individuals, we extracted DNA from blood samples and identified conditions for polymerase chain reaction (PCR) to amplify a specific region of the sex chromosome. To date we have completed DNA extractions for a subset of individuals captured in 2016 and determined the molecular sex for multiple individuals in this sample.

Poster U32 – Caleb Capellen

Co-Author: Jose Ortega

Mentor: Surabhi Chandra, Matthew Dunworth, & Robert A. Casero Jr.

Title: Hyperglycemia Increases Breast Cancer Cell and Normal Breast Epithelial Cell Proliferation Through Polyamine Deregulation

Polyamines (spermine, spermidine, and putrescine) are involved in basic cellular processes such as cell growth, replication, and transcription. Upregulation of polyamines can thus develop tumors due to hyper-proliferation of cells as observed in cancers of the colon, skin, prostate and breast. Inhibitors of polyamine pathway could prevent tumor growth as shown in animal models of colon and skin cancer. Diabetic conditions further accelerate the growth and metastasis of cancers such as pancreas, breast, liver, and colorectal, however the role of polyamines in such states has not been investigated. We hypothesized that polyamine pathway rapidly affects proliferation of breast cancer cells and normal breast epithelial cells in diabetic conditions. Breast cancer cells (MDA-MB-231) and normal breast epithelial cells (MCF-10A) were treated with low glucose (LG, 5mM) or high glucose (HG, 25 mM) in the presence/absence of polyamine pathway inhibitors. There was a time dependent increase in cell proliferation with HG from 48-72 hr compared to LG. This was correlated with an increase in polyamines (putrescine, spermidine) though spermine levels were not changed considerably. In addition, gene expression and activity of catabolic enzymes in the polyamine pathway, spermine-spermidine acetyltransferase (SSAT) and spermine oxidase (SMOX) were decreased with HG treatment, further suggesting a build-up of polyamines. Simultaneous treatment with an ornithine decarboxylase (polyamine synthesis enzyme) inhibitor, difluoromethylornithine (DFMO) could prevent cell proliferation, restore polyamines, and normalize polyamine catabolic enzymes with high glucose exposure. In conclusion, polyamine pathway is responsible for proliferation of breast cancer cells and normal breast epithelial cells in diabetic states, which can be prevented using inhibitors of polyamine synthesis.

Poster U33 – Audrey L. Codina

Co-Author: Derek Kleier

Mentor: Dawn Simon

Title: Evolution of a rRNA group I intron in the lichen Teloschistes chrysophthalmus

The origin of spliceosomal introns is difficult to discern due to high sequence divergence and the absence of direct evidence linking an intron to its source. While spliceosomal introns are found primarily in protein-coding genes of eukaryotes, putative examples in nuclear ribosomal RNA (nrRNA) coding genes of lichen-forming and allied fungi also exist. Due to their unique

genomic location and limited phylogenetic distribution (Pezizomycotina), the nrRNA spliceosomal introns are a potential example of a new type of recently derived intron. We specifically hypothesize that these introns arise from degeneration of group I introns. Here we focus on one lineage of introns found at a single position of nrRNA in Teloschistes chrysophthalmus. We have sequenced introns from 44 samples across the North American range of the species and will focus on 20 of these here. A phylogeny was inferred using ITS sequences and we found that the samples, with one exception, form a well-supported monophyletic group. Within this group, there are four subgroups that each have moderate to strong statistical support. All introns at this site have donor, acceptor and branch point sequences typical of spliceosomal introns. None of the introns are canonical group I introns, but a subset may possess remnant structures. Finally, we were also interested in characterizing the in vivo splicing ability of these introns. We found variability in splicing ability, with some appearing not to splice at all and others splicing though perhaps inefficiently. Sequencing of these products suggest that there may be different subsets of introns within a genome that differ in splicing ability. In general, it appears that the intron at this site is exceptionally variable. This would be expected in cases where there is reduced selection pressure, which is what we predict to be the case for transitional introns.

Poster U34 – Macy Cool

Mentor: Letitia Reichart

Title: Preliminary Examination of Distinguishable Plumage Traits for Spring Migratory Baltimore Orioles in South Central Nebraska

Baltimore Orioles (BAOR), a species of migratory songbird, commonly stopover in south-central Nebraska during spring migration each year. Previous research has shown that plumage traits of young male BAOR resemble plumage traits of older female BAOR and the two are often difficult to distinguish in the hand. In this study, we have organized images of BAOR trapped during Spring of 2016 to identify potential traits useful to distinguish the sex of birds with confusing plumage patterns. To date, I have identified multiple traits on individuals of known sex from birds trapped in 2016. I have also identified images of individuals of confusing plumage patterns and unknown sex to be analyzed further. Here I present a preliminary examination of potential body regions for birds of known sex that will be used to identify the most likely traits useful to distinguish sex for birds with confusing plumage patterns.

Poster U35 – Breana Dobesh

Mentor: Marc Albrecht

Title: Peppermint Essential Oil (Mentha piperita) as a Natural Repellent Against American Cockroaches (Periplaneta americana)

Numerous studies have been conducted over the insecticidal and repelling abilities of plant essential oils. Peppermint essential oil (Mentha piperita) is one of the most popular essential oils purchased by consumers. Nevertheless, investigations into the insecticidal and repelling properties of this oil are lacking. In this study, the objective was to determine if peppermint essential oil can repel American cockroaches (Periplaneta americana) and if so what dilution is needed to do so. Peppermint essential oil was found to repel American cockroaches at 20% and 10% for all animals. To find the minimum percent needed, we ran a number of trials. For each trial, American cockroaches were randomly selected and placed within an aquarium containing a cardboard insert covering the bottom. In one area, the bottom was coated with a specific dilution of peppermint essential oil and vegetable oil. In another area, vegetable oil alone was used to coat the insert. For each trial, we waited 15 minutes after five animals were placed in the aquarium and noted their locations. Results indicate that a 2% solution of peppermint essential oil is the minimum needed to produce a significantly lower repellent effect, an average repellency of 77%, than higher concentrations. The data produced in this study may be useful to insect repellent researchers. The results suggest a product based on peppermint essential oil may be possible against cockroaches.

Poster U36 – Jared Fischer

Mentor: Marc Albrecht

Title: Use of Infra-red Camera for Wildlife Tracking with Drones (UAS)

Through handheld and aerial thermal image data collection, we investigated how air and ground temperatures in different US climate zones (TX vs. NE) affected how well organisms can be detected and monitored using a consumer-grade infra-red (IR) drone (UAS) camera. The investigation observed animals in warmer ground temperatures Texas and Nebraska compared this to cooler winter ground temperatures in Nebraska. The tools we used were a DJI Inspire 1 drone and a FLIR Vue Pro. Most of the images were of chickens, cattle, and horses. Images at different distances were completed. The current resolution on consumer IR cameras is limited meaning that viewing large animals beyond 200 m is difficult and small animals beyond 50 m is difficult. This work showed that increased ground temperature does reduce the visibility of animals on IR images. Areas of ground that are bare of vegetation reflect IR light and create a more challenging situation for animal tracking.

Poster U37 – Sydney Keckler

Co-Author: Rishav Srivastava

Mentors: Surabhi Chandra & Mahesh Pattabiraman

Title: Comparing Cytotoxic Properties of Homo- and Heterodimers of Cinnamic Acid and 6-Methyl Coumarin in Breast Cancer Cells

Background/Aim. Cinnamic acid is an aromatic fatty acid phenylalanine deamination product obtained from oil of cinnamon. Cinnamic acid dimers and their derivatives have been known to possess anti-oxidant, anti-inflammatory, and anti-cancer properties. Eucommicin A, a similar compound extracted from Eucommia ulmoides, has been extensively studied and has been shown to inhibit cancer stem cells. Our aim was that cinnamic acid dimers and their derivatives exhibit potent cytotoxic properties against breast cancer cell lines MCF-7 and MDA-MB-231, and are more effective over the monomer units. Materials and methods. The compounds we used were monomers and homodimers of cinnamic acid and 6-methylcoumarin, and heterodimer of cinnamic acid with 6-methylcoumarin. These dimers were produced by cavitand-mediated photodimerization method. They were tested for cytotoxicity and cell survival using PrestoBlue dye. Results. Both the monomer and dimer of cinnamic acid showed no cytotoxicity in the MCF-7 cell line, but there was cell death measured in the MDA-MB-231 cell line. The 6-methyl coumarin monomers and homodimers were effective in both cell lines, at lower concentrations in the MDA-MB-231 cell line than the MCF-7. The heterodimer of the two compounds did not dissolve well in DMSO and acetone and when the cells were treated with the heterodimer, there was no observed cell death. Conclusion. The homodimers were more effective than their monomer counterparts, however, the heterodimer showed no signs of cytotoxicity.

Poster U38 – Kennedy Kluthe

Co-Authors: Trevor Daubert, Alexis Page & Daniel Nabb

Mentor: Austin Nuxoll

Title: Decreased Tricarboxylic Acid (TCA Cycle Activity in Staphylococcus Aureus Increases Survival to Innate Immunity

Staphylococcus aureus is a bacterial pathogen that is responsible for over one million infections a year. A major concern regarding S. aureus infections stems from failure to respond to antibiotic therapy. One hypothesis for this phenomenon is persister cell formation. Persister cells are a subtype of dormant cells that have a high tolerance to antibiotics making them harder to treat in a medical setting. Recent work demonstrated that persisters form when low intracellular ATP is present. Specifically, when the tricarboxylic acid (TCA) cycle is disrupted an increase in antibiotic tolerance is observed. We hypothesized that persisters not only were problematic for antibiotic treatment but also to components of innate immunity that resemble antibiotics in function (antimicrobial peptides). Previous experiments showed that when the TCA cycle gene, fumC, was disrupted, a higher tolerance to antimicrobial peptides was observed. Preliminary studies also revealed the fumC mutant had higher survival than wild type S. aureus within macrophages. To discern the underlying mechanism for this phenotype, reactive oxygen species, reactive nitrogen species, and pH were examined more closely. Early results suggest the fumC knockout is better able to withstand the reactive oxygen stress at an acidic pH compared to wild type S. aureus.

Poster U39 – Emily Laub

Mentors: Letitia Reichart & Nate Bickford

Title: Molecular Identification of Sex for Northern Goshawk (Accipiter gentilis) Feathers Collected Across Multiple Goshawk Populations in Finland.

Understanding the genetic structure of a species is important to identify interactions between and within populations. In many populations of organisms, one sex is the dispersing sex and responsible for gene flow between populations. In this study we extracted DNA from feathers from Northern Goshawks (Accipiter gentilis). Feathers were collected near nests from individuals of unknown sex across multiple populations in Finland. Next, we used the polymerase chain reaction (PCR) to determine the sex of individuals. The results of this analysis of genetic sex for sampled individuals will be incorporated in a future study where we estimate genetic diversity within and between Northern Goshawk populations in Finland. In addition, we will attempt to identify the dispersing sex for this species of accipiter.

Poster U40 – Joshua Lindenberger

Mentor: Brandon Luedtke

Title: Analysis of Coxiella burnetii Proteins that Respond to a Lipid Stimulus During Axenic Growth

As the causative agent of Q fever, Coxiella burnetii has been studied because of this and its relation to Legionella pneumophila. Many studies have been conducted to understand their specific secretion system of Type IVB secretion system (T4BSS). The goal of this study is to build off previous knowledge of growth in ACCM-D with and without lipid environments, respectively. This includes a mass spectrometry of DotA, which is a complex of T4BSS. The results from this were then studied and genes were selected according to their growth difference. These were then amplified and placed into an expression plasmid for recombination. Once the recombinant protein reaches the needed concentration, the product will be inserted into a destination vector. This will then be sent for primary, animal-derived antibody creation at an outside lab. Two samples of C. burnetii will be grown, one in lipids, and one without. These will then be used for Western Blot,

and the animal-derived will act as the primary antibody. These results will then be compared to the DotA screen for confirmation, and continuance of the research.

Poster U41 – Amanda Macke

Mentor: Kimberly Carlson

Title: Expression of Vir-1 and Vago in Nora virus Infected Drosophila melanogaster Hemolymph

The Drosophila melanogaster immune system serves as a valuable model to identify, study, and compare similar components found in humans. Analysis of the D. melanogaster immune response to viral infection can be used to inform future immunity research and applications to human innate immunity. Two D. melanogaster proteins, Vago and Virus-induced RNA 1 (Vir-1), have been identified as candidates for analysis due to their upregulation in response to viral infection. The role of these proteins is uncharacterized in Nora virus-infected D. melanogaster. Nora virus replication is localized within the gut of D. melanogaster, but whether or not it circulates to other organs is unknown. While the complete pathology of Nora virus is not known, a locomotor defect is under investigation in our lab. This led us to hypothesize that Nora virus, Vago, and Vir-1, are circulating in the hemolymph of Nora virus infected D. melanogaster, allowing for virus migration to tissues beyond the gut and a conferred immunity in other tissues. To address this, we performed Western blot analysis on whole body and hemolymph collected from Nora virus infected and uninfected control D. melanogaster. The western blot analysis of Nora virus infected D. melanogaster demonstrates the presence of Vago, Vir-1, and Nora virus capsid protein, VP4b, in the hemolymph. This new finding may provide a link to effects seen in other tissues including the possible locomotor defect. The project described was supported by grants from the National Center for Research Resources (5P20RR016469) and the National Institute for General Medical Science (8P20GM103427), a component of the National Institutes of Health.

Poster U42 – Kelsey Menke

Mentor: Marc Albrecht

Title: Tilapia Feeding Preference Using Commercial Fish Food, Ethanol Distiller's Grain, and Lab-Made Food

Two experiments have examined how Tilapia responds to custom food versus commercial fish food. Tilapia are commonly raised fish worldwide. They are fast-growing and provide high-quality protein for sale or consumption. Tilapia are commonly raised in aquaponics systems. We are interested if custom fish food, which is being made by people in developing economies such as Haiti, will grow fish as well as commercial fish food. Building on preliminary results from our lab that tilapia fry grows as well on commercial food as a custom food, we test if tilapia fingerlings do as well on commercial food as a custom food. We found that tilapia fingerlings, and plants in the aquaponics systems, grew significantly less with custom food than with commercial food (p < 0.0001). We explored the hypothesis that part of the reason for this result may have been the custom food was formulated as powder while the commercial feed is sold as small pellets. The next experiment was to present young adult tilapia with pellets made custom food, commercial food, and commercial food reconstituted with 10% distiller's grain from a corn ethanol production facility. Using previous work, we worked on the process of making the food into pellets and the process of making it palatable. This experiment found that the fish showed no preference for any of the 3 food types ($p = 0.98$). These results indicate the custom food may be a viable alternative food for tilapia when it is formed into pellets of the appropriate size for the age of tilapia being fed. The custom food is made from common ingredients and saves shipping and purchasing costs for people operating aquaponics and aquaculture systems far from retail outlets selling commercial food.

Poster U43 – Rebecca Meusch

Co-Author: Audrey Codina

Mentor: Dawn Simon

Title: Evolution of a nuclear rRNA intron in the lichen Physcia

Introns have been found in all sequenced eukaryotic genomes, yet their origins are unclear. This is likely due to their antiquity and the lack of selective pressure, both of which results in high sequence divergence. This has made the location of convincing intermediate forms difficult. However, some of these issues appear to be mitigated in nuclear ribosomal RNA (nrRNA) in lichen forming fungi and close allies. In this project, species from the genus Physcia are used as a model to understand spliceosomal intron origin at one site within the large subunit (LSU) rRNA gene. We have collected samples from across central and western United States and thus far have done DNA extractions from 25 locations. Often the DNA is degraded and difficult to amplify, so we are focusing on a subset of these. Two regions of the nrRNA are being sequenced, the LSU surrounding the intron of interest and the internal transcribed sequence (ITS). The ITS will be used to understand the evolution of the host organism, which will be compared to the evolutionary history of the introns.

Poster U44 – Makayla Nemecek

Co-Authors: Rebecca Best & Shelby Liesemeyer

Mentor: Kim Carlson

Title: The effect of Nora virus infection on native gut bacterial communities and lifespan of Drosophila melanogaster

Gastrointestinal microflora has been consistently demonstrated as a key component in the maintenance of health and longevity in both vertebrate and invertebrate species. In humans and mice, non-pathogenic viruses have the ability to enhance the effects of the native bacterial flora. Drosophila melanogaster also depend on native gut bacteria to maintain health and longevity. However, it is unclear whether non-pathogenic gastrointestinal viruses lead to similar observations as seen in humans or mice. Nora virus, a picorna-like virus that replicates in the gut of D. melanogaster demonstrates persistent, non-pathogenic viral infection. A longevity study was conducted on Drosophila melanogaster to determine its effects on the organism in relationship to the native gut bacteria. Four different treatment groups were generated with the use of broad spectrum antibiotics and Nora virus infected and uninfected stocks. The results demonstrate that Nora virus may be detrimental to the longevity of the organism, whereas bacterial infection is necessary. This data led us to hypothesize that there may be a difference in the types of bacteria present in Nora virus infected D. melanogaster as compared to uninfected stocks. In the next study, virgin female flies from both Nora virus infected and uninfected groups were collected allowed to age for 4 days. Surface sterilization followed by gut dissections were conducted, dividing the gastrointestinal tract into three main sections: Foregut, midgut, and hindgut, and the fat body was also collected. DNA extraction was performed on the samples along with samples from Nora virus infected/uninfected whole flies. DNA samples were sent to UNMC for 16S sequencing to determine the bacterial communities that comprise the microflora of in the gastrointestinal tract of Nora virus infected and uninfected stocks. This data will help us understand the relationships between bacteria and viruses in the human gastrointestinal tract and health complications that may arise.

Poster U45 – Seth Ostdiek

Co-Authors: Amber Menard & Kaitlyn Pineda

Mentor: Austin Nuxoll

Title: Persister Formation in Staphylococcus Epidermidis Clinical Isolates

Staphylococcus epidermidis is a commensal organism, often found within the exterior microbiota of mammals. Robust S. epidermidis biofilms often form in healthcare settings causing chronic infection mediated through indwelling of medical devices which is further exaggerated due to the target population consisting of immunocompromised individuals. These chronic conditions can be explained by a subpopulation of dormant cells, known as persisters, growing within a biofilm. Recent work has determined that screening S. epidermidis clinical isolates following vancomycin challenge can provide information as to whether an isolate is a relatively high persister former or low persister former. To identify a specific mechanism for persister formation in S. epidermidis, bacterial cells were mutagenized with ethyl methylsulfonate (EMS). Following EMS treatment, enrichment for high persister isolates was performed and candidates were sent for whole genome sequencing.

Poster U46 – Justine Pitzer

Mentor: Austin Nuxoll

Title: Characterization of Staphylococcus lugdunensis biofilms

Staphylococcus lugdunensis, which, not unlike Staphylococcus aureus and Staphylococcus epidermidis, can be found on human skin as normal flora. While S. aureus has been the primary focus of the medical community, there are new concerns that S. lugdunensis has been responsible for biofilm-induced infections, similar to those caused by S. aureus and S. epidermidis. With more accurate testing available, medical professionals are now able to distinguish S. lugdunensis from other coagulase negative bacteria. This has led to a greater appreciation for this organism as a major human pathogen. Contributing to the pathogenic nature of this organism is its ability to form a biofilm, which is the culprit of severe prosthetic joint infections, as well as cases of endocarditis. To characterize further, we tested the antibiotic susceptibility of S. lugdunensis when grown in a biofilm. Various antibiotic treatments revealed low susceptibility to all of the tested antibiotics, similar to S. aureus. To determine whether S. lugdunensis biofilms were protein mediated, we compared the susceptibility of the biofilms to proteinase K. Following proteinase K treatment, S. lugdunensis biofilms were dispersed, indicating they form protein mediated biofilms. We then set out to identify genetic factors essential for biofilm formation in S. lugdunensis. We mutagenized a S. lugdunensis culture by treating with ethyl methanesulfonate (EMS). Following mutagenesis individual cells were separated using a cell sorter and examined for biofilm formation at eight hours and 24 hours. Mutations resulting in high biofilm and low biofilm formers were sequenced to identify genes responsible for the phenotypes. A mutation within the S. lugdunensis surface protein A (slsA) gene was common among all of the low biofilm formers suggesting high expression of this protein is important in biofilm formation. Currently, a genetic knockout is being constructed to confirm these results.

Poster U47 – Alaini Priebe

Co-Author: Olivia Hyde

Mentor: Surabhi Chandra

Title: Analgesic Action of Novel Derivatives of the Active Compound, Incarvillateine, from the Chinese Herb (Incarvillateine sinesis) in Acute Pain

Commonly used pain medications, opioids and non-steroidal anti-inflammatory drugs (NSAIDs) are highly efficacious for treating chronic pain and post-surgical pain, but are associated with neurological and abdominal side effects. This has necessitated research for alternative pain treatment strategies to investigate drugs with potent action but minimal side effects. Incarvillateine (INCA), derived from the Chinese herb Incarvillea sinensis, has been widely used in traditional medicine for treating rheumatism and pain. There are reports that though INCA binds to both opioid and adenosine receptors, its primary analgesic action is through the adenosine receptors, thus having minimal side effects on central nervous system. While INCA is a highly effective natural compound, research on synthetic analogs of this compound has received less attention till date. We hypothesized that INCA analogs show potent antinociceptive action, and their effect is mediated through adenosine receptor action. Compounds were synthesized using novel cavitand-mediated photodimerization (CMP) method, which utilizes a macromolecule (γ—cyclodextrin) to control the excited state reactivity of photoactive compounds to yield target tetra-substituted cyclobutanes (dimers). The dimers generated so far show positive response in suppressing formalin-induced acute pain in mice hind paw while the monomers were ineffective. The antinociceptive effect of these analogs was observed in the inflammatory phase suggesting a primary non-opioid mechanism for pain reduction. Our further characterization and selection of INCA analogs (with predominant A3AR - adenosine receptor action) will help us to generate a new class of antinociceptives with precise chemical modifications using CMP methodology. The broad goal of this project is to provide a targeted low-cost approach towards synthesis of novel analgesics with potent action, high efficiency, and minimal aftereffects.

Poster U48 – Riley Pulver

Mentor: Marc Albrecht

Title: The Use of Small Unmanned Aerial Vehicles to Examine Canada Geese (Branta canadensis) in Central Nebraska

The use of drones (UAS) is becoming more common by hunters, wildlife managers, and hobbyists. One use of drones in Nebraska is to look for game or wildlife. In this study we examined the use of a consumer-level drone to observe Canada Geese on a lake in Central Nebraska. There are concerns about the use of drones, and we wished to see if geese would respond to UAS flying near them. We were able to fly several different drones over a lake in Kearney, Nebraska under different weather conditions. Results suggest that Canada Geese are less disturbed by white UAS than drones that are orange or black. While there was wide variance in some results, flying the drone in at an altitude at 300 feet or lower usually produced some movement by the geese at between 200 and 750 feet. There are several variables other than altitude that may be having some effect on these distances including: drone color, drone sound, cloud cover, temperature, number of birds present on the lake, and acclimation to the drone.

Poster U49 – Emma Raders

Mentor: Bryan Drew

Title: Hybridization of Turkish Salvia

There are about 1,000 species of Salvia distributed around the world, and many of these species have the same number of chromosomes. In Turkey, one of the most species rich areas of Salvia, this has led to hybridization between some species of Salvia. Here, we investigate two specific instances of putative hybridization between species of Salvia in Turkey, neither of which has previously been documented. For this project, we used PCR amplification of selected chloroplast and nuclear DNA markers and resultant phylogenetic trees to assess potential hybridization events. Two putative hybrid taxa were examined, one between Salvia aucheri subsp. canescens and Salvia heldreichiana, and another between Salvia vermifolia and Salvia cyanescens. These putative hybrids do not look like any other described species, but have morphological features in common with their respective hypothesized parental species.

Poster U50 – Kaitlyn Schultis

Mentor: Nick Hobbs

Title: Effect of Dietary Protein Content on the Response to Over-Marks and Androgen Receptor Expression in Mice

In both humans and rodents, males outperform females in tasks measuring spatial memory, suggesting a role for gonadal steroids. One example of spatial memory in rodents is the ability to discriminate between the top- and bottom-scent donors of an over-mark. Previous research has indicated that meadow voles fed a low-protein diet or that have been food-deprived spent similar amounts of time investigating the scent donors of an over-mark. Interestingly, these treatments resulted in lower estradiol levels in female voles. However, it is unclear if this lack of preference due to diet is due to cognitive defects associated with the diet or decreased interest in opposite-sex conspecifics due to lower gonadal hormone levels. Therefore, this study tested the hypothesis that the protein content of the diet affects an individual's spatial memory in a mouse model that lacks androgen receptors (AR). Mice

were fed either a high- or low-protein diet for 30 days and then exposed to an over-mark to test spatial memory. Brain activity in response to over-mark exposure was determined by measuring c-Fos expression in brain areas associated with both spatial memory and processing olfactory signals, such as the hippocampus and medial amygdala. We also measured AR expression in these areas to determine if it played a role in spatial memory of mice. We predicted mice fed a high protein content diet will show a top-scent preference and express higher levels of c-Fos and AR in the appropriate brain regions. This would suggest that protein content of the diet affects spatial memory and is facilitated by AR.

Poster U51 – Lesley Towery

Co-Authors: Amanda McCown, Abigail Benz, & Devyn Crisman
Mentor: Kimberly Carlson

Title: Possible Pathogenic Effect Caused By Nora Virus Infection In Drosophila melanogaster

Nora virus is a picorna-like virus that contains a positive-sense, single stranded RNA genome. The virus infects Drosophila melanogaster with no known pathogenic effects. One hypothesized pathogenic effect of Nora virus is a deficit in locomotor ability of the fly. In this study, geotaxis assays and longevity curves were used to determine if Nora virus infection has an effect on D. melanogaster's locomotor ability. Quart sized cages (five Nora virus infected, five Drosophila C virus (DCV) infected, and five uninfected) were established each containing 60 virgin female flies. The cages were marked with a line two thirds from the bottom of the cage. Every third day since cage establishment, the flies were tapped to the bottom, allowed one minute to reach the top, and the number of flies crossing the threshold line were recorded. Also on every third day, the dead flies were removed, the number recorded, longevity curves were created and examined using Kaplan-Meyer survivorship analysis. The data demonstrated a significant decrease in both geotaxis and longevity when the D. melanogaster were infected with either Nora virus or DCV, as compared to uninfected controls. This is the first time that a possible phenotype has been associated with Nora virus infection. Overall, the data demonstrate that geotaxis and locomotor dysfunction may be a pathogenic hallmark of Nora virus infection.
The project described was supported by grants from the National Center for Research Resources (5P20RR016469) and the National Institute for General Medical Science (8P20GM103427), a component of the National Institutes of Health.

Chemistry

Poster U52 – Treyvon Bokoskie

Co-Author: Akshay Kashyap
Mentor: Mahesh Pattabiraman

Title: Cavitand-Mediated Photocyloaddition: Controlling regio-selectivity of photodimeric products via supramolecular forces

A cavitand is a large cyclic molecule that has the ability to encapsulate a smaller, non-polar molecule to increase its solubility. Cavitands, such as cyclodextrin, have been used to increase the solubility of non-polar molecules for applications such as drug delivery. The use of cavitands has also been extended to increase the efficiency and selectivity of different reactions. Photodimerization reactions use UV light to form a cyclobutene between two alkenes. Previous studies have shown that cavitand systems can be used to increase the efficiency of photodimerization reactions between single alkene systems and can be used to direct its stereoselectivity. Supramolecular forces such as pi-pi stacking, hydrogen bonding, electrostatic forces, and steric hinderance all direct the orientation of the monomeric units within the cavitand. By changing the structure of the monomeric units, different supramolecular interactions can be introduced to direct the regio-selectivity of the reaction. Previous studies showed that this was true in directing the final product structure of homodimers. Experiments were then conducted that introduced favorable supramolecular interactions between two different substrates in an attempt to form heterodimers using photocycloaddition. The effects of charge-transfer interactions between 3-methoxycinnamic acid and 2-fluorocinnamic acid in photocycloaddition reactions were examined in this experiment. The use of cavitands in photodimerization was then extended to double alkene systems and larger single alkene systems to see if cavitand-mediated photocyloaddition could be used to form polymers or multi-cyclobutane products. Cyclodextrin was utilized in the photodimerization of several chalcone derivatives and dibenzalacetone derivatives. Preliminary results indicated the formation of several dimeric products using this method. Lastly, NMR analysis of heated guest-host photocycloaddition reactions have indicated the possible formation of oligomers and polymers, instead of the expected dimer.

Poster U53 – Tara Buettner

Co-Author: Kenneth Ernest

Mentor: Annette Moser

Title: Detection of Glyphosate and AMPA Through Derivatization with FMOC-Cl and Analysis by LCMS

Glyphosate is a commonly-used, broad spectrum herbicide and aminomethylphosphonic acid (AMPA) is the primary product of glyphosate's degradation. While both compounds exhibit low acute toxicity in mammals, accumulation in the environment poses many concerns, such as harming benign native plants and insects, and contaminating soil, water and crops. Through collaboration with researchers at UNL, this research project aims to reduce the amount of glyphosate applied by changing the way herbicides are applied to crops. Our portion of the project is to develop a method to analyze glyphosate residue as a combination of glyphosate and AMPA, its primary degradation product to show the reduction of herbicide residue in the environment. Currently, a derivatization reaction between glyphosate and AMPA with FMOC-Cl is being employed alongside liquid-chromatography-mass spectrometry to detect herbicide concentrations; however, further testing is needed to improve the detection limits of this method.

Poster U54 – Bodhi Jelinek

Mentor: Michael Moxley

Title: pH-Dependent Product Inhibition of Mammalian Pyruvate Dehydrogenase Complex

The pyruvate dehydrogenase complex (PDHc) is set of enzymes that connects glycolysis to the tricarboxylic acid cycle in eukaryotes and bacteria by oxidizing pyruvate, in the mitochondria and bacterial cytosol respectively, to form acetyl-CoA, NADH, and CO2. The PDHc is required to aerobically utilize glucose, a preferred metabolic fuel, and is composed of three enzymes: pyruvate dehydrogenase (E1), dihydrolipoyl transacetylase (E2), and dihydrolipoyl dehydrogenase (E3), each essential to catalyze the oxidation of pyruvate.

Using a plate reader, we conducted pH-dependent product inhibition experiments to determine the sensitivity of PDH to pH. We varied the products, NADH and Acetyl-CoA respectively, at pH's 5-8.5 in 0.5 intervals, and found a consistent decrease in activity as pH went below 7 and began to also decrease at 8 and higher. The data showed a peak in activity at pH 7.5 which implies this is the most efficient environmental presence of acidity for metabolic activity to occur for this particular enzyme complex.

Poster U55 – Akshay Kashyap

Co-Author: Treyvon Bokoskie

Mentor: Mahesh Pattabiraman

Title: Photocylocaddition of Dienes in Symmetric Chalcones: A continuation of the cavitand-mediated photodimerization approach

Photocycloaddition is one of the most utilized reactions in chemistry due to its application in fields such as photopolymerization, natural product synthesis, material science, and photolithography. However, the reaction suffers from two disadvantages: (a) inherent inefficiency because of its bimolecular nature, and (b) possibility of formation of several regio- and stereoisomers. Our group has utilized the ability of macrocyclic hosts to confine and pre-orient alkenes to overcome both the disadvantages to achieve successful photodimerization of desired alkenes with specific structures. We have demonstrated in the past, that the cavity of macrocyclic hosts such as cyclodextrin and cucurbituril align reactants in a pro-syn orientation while the relative interaction between the alkenes can be utilized to align them in head-to-tail or head-to-head orientation. In our endeavor to expanding this approach into a reliable methodology, we have demonstrated that the cavitand-mediated photodimerization approach can affect photodimerization of extended reactants: conjugated dienes. Our findings suggest that the cavity in cyclodextrins are capable of aligning symmetric chalcones (1,4- pentadienones) resulting in remarkable product selectivity. Investigation of host-guest chemistry aspect of the complexes provides intriguing insight into nature of supramolecular interactions the reactants engage in when confined to a microenvironment.

Poster U56 – Michael Kratochville

Mentor: Michael Moxley

Title: Mammalian Carnitine Acetyl-Transferase (CrAT) Kinetics and Modeling

Mammalian carnitine acetyltransferase (CrAT) is a mitochondrial enzyme that catalyzes a reversible acetyltransferase reaction. In the forward direction, it converts Acetyl-CoA (AcCoA) to CoA, while transferring an acetyl group to carnitine, forming acetylcarnitine. This reaction is thought to be important for buffering the acetyl-CoA/CoA ratio, an important metabolic regulatory factor. If this ratio increases too much, for example during exercise, it may become inhibitory with regard to increasing metabolic output. We believe this fact may be related to reasons why knocking out CrAT increases susceptibility to insulin resistance, or Type 2 diabetes, and lowered exercise capacity.

In order to improve our quantitative understanding of metabolism, we are trying to better analyze existing and new CrAT kinetic data. In this study, we are trying to determine the kinetic mechanism of CrAT which allows us

to more accurately predict CrAT rates as a function of pH, reactants, and products. We believe our efforts will help support larger scale metabolic computational projects that use, enzyme kinetic models such as this one, to simulate metabolism. These computational efforts are needed to deconvolute large networks of enzymatic reactions that exist in vivo, and test metabolic hypothesis associated with normal and disease states.

Poster U57 – Bryant Menke

Mentor: Kristy Kounovsky-Shafer

Title: Determining Electroosmotic and Electrophoretic Contributions in Microchannels in a Variety of Ionic Strength Conditions

Electroosmotic and electrophoretic flow are two forces that effect the overall mobility of an analyte in a solution under an applied current. Understanding how these forces in microchannels, or other forms of geometric confinement, vary and interact when surface charge and ionic strength of solution in varied, will help develop a better understanding of the forces in nanocoding and enable better-designed devices for genome analysis. Five different ionic strengths (18 mM NaCl, 9 mM NaCl, 2 mM NaCl, 1 mM NaCl, .5 mM NaCl) and three different plasma treatments (18 seconds, 36 seconds, 54 seconds) were tested to determine how these factors influence overall mobility of fluorescently dyed nanoparticles in solution. Additionally, rhodamine B dye was imaged to measure the electroosmotic flow inside the microchannel for each ionic strength solution and each plasma treatment parameter to compare our previous findings to see if the electroosmotic flow is the same or different inside the microchannel compared to inside a gel.

Poster U58 – Sam Novicki

Mentor: Frank Kovacs

Title: Characterization of Amino-Levulinic Acid Dehydratase (ALAD) from E. coli

The purpose of this project has been to develop a microplate version of the ALAD assay that will allow us to characterize the enzyme activity of ALAD that has been made in our lab. To do this we have used a couple of approaches, one indirect and one direct. In the indirect method, we used the reaction of porphobilinogen (PBG) with Ehlich's reagent to generate a colored product. For the direct method we monitored the absorbance at 235 nm where PBG has some absorbance. Here we present the results of this enzyme assay development.

Poster U59 – Samantha Rau

Co-Authors: Cody Masters, Laura Stoner, Jocelyn Dolphin, April Vonderfecht

Mentor: Kristy Kounovsky-Shafer

Title: Using 3D Printed Devices to Elute and Concentrate Lambda DNA

In order to analyze large genomes using systems such as Nanocoding or Optical Mapping, large DNA molecules are needed to span the variation with enough unique information on either end of the variation. Large molecules are inherently fragile and routine molecular biology techniques break large DNA molecules, so a system is required to elute and concentrate large DNA molecules. Using 3D printing, meso-fluidic devices were fabricated and a gel roadblock was polymerized in the device. DNA molecules were eluted from an agarose insert into solution and concentrated at the interface between the roadblock and solution under an electric field. To determine if molecules were sheared during elution and concentration, DNA collected in the concentration region was digested with a restriction enzyme. Compared to a control, DNA collected from the concentration region was full length.

Poster U60 – Hanna Schmitz

Mentor: Haishi Cao

Title: Hydrogen Sulfide Detection Using 1,8-naphthalimide Based Fluorescence Sensors

Four 1,8-naphthalimide based compounds have been created as potential probes for hydrogen sulfide. These compounds were synthesized through two one-step reactions. Initially, 4-bromo-1,8-naphthalic anhydride was refluxed with: 1) cyclopentylamine, 2) 2-morpholinoethan-1-amine, 3) aniline, and 4) butylamine. Each of the four compounds then underwent addition of malononitrile. The resulting compounds are highly soluble in both DMSO and water, and show high fluorescent intensity. Selectivity and sensitivity of these sensors for detection of H2S is in the process of being determined through fluorescent analysis.

Poster U61 – Hannah Wolfe

Co-Authors: Alyssa Wells & Colton Hall

Mentor: Allen Thomas

Title: Triazole analogs of histidine via click chemistry to probe the L-type amino acid transporter (LAT1) binding site

The blood-brain barrier (BBB) is a selectively permeable membrane composed of endothelial cells that are connected by tight junctions which limit the uptake of xenotoxic molecules including many drugs. We seek to exploit the L-type amino acid transporter (LAT1, SLC7A5), a solute carrier protein that transports amino acids (e.g. Phe, His, Trp, L-DOPA) for targeted drug delivery into the brain. In addition to being highly expressed at the BBB, LAT1 is also upregulated in cancer cells due to their increased metabolism. To be useful for drug delivery, a better understanding of the structure-activity relationship

(SAR) of LAT1 substrates is needed. As part of our ongoing effort to understand LAT1-ligand interactions, we have been examining the SAR of histidine analogs. Though most amino acid substrates of LAT1 contain neutral, hydrophobic side chains, histidine is also an excellent substrate despite having a relatively polar side chain (cLogP: histidine = -3.7 vs. phenylalanine = -1.6). We and others have hypothesized that amino acids containing an aromatic side chain may be ideally suited for LAT1 binding, but the effects of ring polarity are complex and need further investigation. To help address these questions, we applied Click Chemistry to synthesize N- and C-linked 1,2,3-triazolyl-alanine analogs with varying polarity. Analogs were tested for LAT1 substrate activity in trans-stimulation and cis-inhibition cell assays. These findings could be applied to optimize drug-amino acid conjugates (prodrugs) to treat brain diseases or cancer.

Cyber Systems

Poster U62 – Andrew Fritson

Mentors: Matt Miller & Krista Forrest

This is a continuation study of a study we did last year which was focused on phishing emails but ended up being more focused on personalities and their effects on online consumerism. Taking the downfalls and mistakes we made last year, we decided to try it again and see if we get better results on the phishing side. While we still looked at the different personality traits and their effect on online consumerism as well as their likelihood to fall for a phishing email, we also wanted to see if a more personal phishing email was more effective than the generic one that we used last year.

To do this, we collected their data from an online survey which had their email address and personal preferences when it came to online shopping (as we used coupons from those sites to lure them in). Once all the data was collected, we sent an email to every participant that was personalized to their shopping preference and their name. Through a program made by Dr. Miller, we were able to see which participants opened the email and clicked the links which would be considered a successful phishing attempt.

Poster U63 – Bricyn Jameson

Mentors: Sherri Harms & Shahram Alavi

Title: Data Storage Architectures

Data is one of the most valuable objects people and businesses can possess. Whether it be customer information, proprietary software, or personal photos they all require storage. There are three performance traits by which data storage is commonly measured: integrity, speed, and capacity. The goal of this project is to design and implement experiments to compare two main data storage architectures, Redundant Array of Independent Disk (RAID) configurations and erasure coding. RAID is a well established technology in the industry. Erasure coding has been a known storage concept, but only recently been gaining a larger usage. While similar to RAID, it appears to be more flexible, but require more processing in general.

The initial phase of this research explored the properties of different RAID levels using benchmarking software in Linux. Benchmark testing included initializing the array, and then performing read/write tests. Three tests types were used: a single test of 50 samples of 1000 MB of data, three tests of 50 samples of 200 MB data, and 5 tests of 50 samples of 20MB data. The average read/write performance was recorded for each test as well as the total average. To test data integrity, random binary data files were occasionally written to certain arrays as test data. Then hard drives were removed to simulate drive failure. If the test data was still intact after the drive failure, then the array had a fault tolerance equal to the number of drives that had failed. After establishing benchmarks using RAID technologies, the next phase will be to test the capabilities of erasure coding methods using the same hardware and testing procedures for consistency. The results of these baseline benchmarks for RAID conducted in the initial phase will be reported.

Geography

Poster U64 – Theodore Dean Degner

Co-Authors: Zachary Albrecht, Claire Christner, & Brian Guerra

Mentor: Jeremy S. Dillon

Title: The Contact between the Peoria Loess and the Gilman Canyon Formation in the Kearney Area

The contact between the late Pleistocene Peoria loess and the underlying Gilman Canyon Formation (GCF) can be abrupt or gradual. Some studies have reported a “mixing zone” between the two stratigraphic units. In the Kearney area, the boundary between Peoria loess and GCF is subtle. Visually, there is a ~ 1 meter transition zone between what is clear Peoria loess and clear GCF. The zone is only slightly darker than the overlying Peoria loess (pale brown - 10YR6/3, compared to very pale brown - 10YR7/4.) The base of the transition zone is marked by another gradual change to darker brown (10YR 5/4, 4/3) colors that are more typical of the GCF.

As a class project, we investigated this “transition” zone. We collected samples at 20-cm intervals from a continuous core that was drilled through the Peoria loess, GCF, and into the underlying Loveland loess. Our field observations, and total organic carbon and particle size data suggest that there is an observable boundary between the transition zone and the overlying Peoria loess. We submitted two sediment samples from the transition zone for bulk carbon

14C analyses. The samples from the upper and lower portions of the transition zone yielded 14C ages of 25,891 + 197 cal BP and 29,898 + 470 cal BP, respectively. The upper age corresponds to other published ages of approximately 25 ka for the top of the GCF. Based upon the evidence for a contact and the 14C ages, we propose that the "transition" zone is actually the upper portion of the GCF.

Mathematics & Statistics

Poster U65 – Anna Porter

Mentor: Ted Rupnow

Title: Investigating Technology Usage and Integration in High School Math classrooms

Teachers say that they are doing more and more to integrate technology into their students' classroom experiences, but this is not evident in comprehensive classroom observations made across all parts of the school day. Technology is becoming increasingly important in today's society, and is becoming more prevalent in schools. It is important that teachers are not only using technology, but that they are using it in ways that enhance students learning. The purpose of this research was to investigate the usage of technology in High School mathematics classrooms in Nebraska. We investigated what factors could be limiting the integration of technology in high school classrooms. More specifically, we were interested in factors that may limit the potential benefits for student. Through a review of the literature we identified possible factors limiting successful technology integration in mathematics classrooms. We then developed a survey for high school mathematics teachers that measures the impact of these factors. This survey will give us insight about the extent to which the factors are truly impeding technology integration in Nebraska classrooms. We hope to have preliminary results available to share in this poster. The results of our study will inform efforts to alleviate the limiting factors and allow teachers to utilize technology more successfully in the classroom.

Physics & Physical Science

Poster U66 – Lena Janssen

Mentor: Kenneth W. Trantham

Title: Multiple Source Interference with Sound

In the classroom, most of the time interference of waves is demonstrated by using light but the interference of sound is only treated in the context of standing waves. In this paper, an experimental setup for diffraction and interference of sound with N=9 speakers at different frequencies is described, as well as the calculations to find the maxima and minima of the interference picture. Both an automated and manual approach are shown. It is important that the radial distance from the speakers is in the far-field (Fraunhofer limit). The experiment takes place outside which is why wind and background noise need to be taken into consideration, as well as the directionality of the sound level meter. Ways to improve the data quality are discussed and applied to the example measurements. Calculations and graphs at different frequencies show the interference picture. For further calculations and interpretations of the result, the speed of sound can be found and compared to the expected value. All results are consistent with the expected value, which makes this experimental setup very useful for demonstrating the interference of sound in the Fraunhofer limit. Further research will show more of the differences between the far-field (Fraunhofer limit) and near-field (Fresnel limit).

Professional & Applied Studies

Business Administration

Poster U67 – Nathan Lemmer

Mentor: Angela Hollman

Title: Bring Your Own Device (BYOD) Policy in Healthcare

Cyber threats are on the rise creating over fifteen different categories of external threats1 to organizations. Many organizations have experienced a loss of confidential information because of cyber attacks, which creates a need for organizations to become proactive in regards to cybersecurity3. In the healthcare industry, patient data must be protected from cyber threats. However, healthcare employees are actively encouraged to use their mobile devices for ease of accessibility and increased productivity. This creates a need for healthcare organizations to adopt a bring your own device (BYOD) policy before implementing the use of mobile technology2,4,5. Managers must understand the cyber risks and balance this with a manageable BYOD policy. Thus, the question: Are we effectively managing bring your own device (BYOD) security and policy in the healthcare system?

To gain a larger understanding of the BYOD security and policy in the United States healthcare systems, a survey instrument has been created. This instrument was generated from the qualitative data collected from the interviews above. Results from the survey have been collected. It appears that organizational size and other factors contribute to the frequency of training.

Communication Disorders

Poster U68 – Shelby Hinrichs

Mentor: Whitney Schneider-Cline

Title: The Speech & Language Skills, Needs, & Services for Children Who Homeschool: A National Survey

Little is known about the communication abilities, needs, and services provided for children who are homeschooled. The current study utilizes a national survey to explore and direct this topic towards informing future research to determine if families who homeschool have the necessary resources for information, support, and services regarding children's speech, language, and literacy abilities. The participants of this study came from the homeschool education population and were contacted through a variety of different homeschool associations via social media. The survey was developed through Qualtrics and guided by resources from two existing surveys directed towards homeschool education (Lewis, Robertson, Parsons, 2005 ; United States of Commerce, 2008).

The survey was distributed and opened from July to October. 139 participants answered questions about if they were aware and had received any previous speech and hearing services, their child(ren)'s development , and if they would be interested in receiving extra information about communication skills and/or speech language pathology services. The results revealed that parents were not aware of what public resources were available to them and their family. The 31 children that were reported to not be typically developing in two or more areas was another discovery found throughout the research. As well as only 20 parent participants wanting extra information/education about different communication subjects. Throughout the last two months, the researchers have compiled packages educating parents in regards to children's communication milestones as well as services located in their geographic location, that will be sent out. It is vital that the public explores this area more in order to inform home educators about the developmental expectations in the areas of speech, language, and literacy and to educate this population about the public resources available to them.

Poster U69 – Kacy Leuck

Mentor: Philip Lai

Title: Investigating the Co-Occurrences of Gestures and Eye Contact in Two Sets of Children of Autism Spectrum Disorders

Deficits in social interaction, communication, and restricted, repetitive, and stereotyped patterns of behavior, interests, and activities are areas of concern in individuals with Autism Spectrum Disorders (ASD). The estimated prevalence rate of ASD is 1 in 68 children. In the United States, males are four to five times more likely to be diagnosed with ASD than females. This neurodevelopmental disorder is a growing public health concern. Investigating both verbal and nonverbal channels of communication and their co-occurrences can provide evidence of language development in toddlers with ASD. Two sets of children with an average age of 31 months were investigated. The first group of children were verbal (n=15) and the second group of children were minimally verbal (n=15; produce < 10 words total). A 15-minute mother-child play session captured the social interaction. The mothers were instructed to play with their child as they normally would at home, using a standard set of toys which were provided by the experimenters. Sessions were audio/videotaped for later coding using Eudico Linguistic Annotator (ELAN) software. Using the ELAN software permits real-time integration of behaviors while gathering information regarding duration, frequency, and latency. When investigating the co-occurrences of gestures and eye contact, a behavioral difference was detected. In the verbal group, 12 of the 15 children produced instances of gestures and eye contact together, while only 6 of the 15 in

the nonverbal group expressed this behavior. This result suggests a more global communication delay in nonverbal children with ASD. In the verbal children, when speaking, we detected a preference in behavioral co-occurrences which indicated that verbal children prefer to talk and gesture over talking and making eye contact during social interaction. When considering future directions, these participants should continue to be observed in order to keep data on their progress with their communication skills.

Poster U70 – Bobbie Moseman

Mentors: Ladan Ghazi Saidi & Laura Moody

Title: Description of Assessment and Intervention Approaches for an Infant with Dysphagic Symptomology: A Case Study

This research reports the case of an infant who suffered dysphagia symptoms including inability to latch, poor sucking ability and slow feeding with lethargy. Identification and assessment of dysphagia in infants is important to avoid more serious problems, such as failure to thrive, pneumonia and the inability to establish and maintain adequate nutrition and hydration. In this case, a referral for assessment was delayed despite parental concerns and earlier reports of gagging and gasping. An assessment ordered at the age of 15 months resulted in recommending interventions for the child, including oral-motor therapies aimed at restoring mastication and deglutition functions, jaw grading, muscle strength and oral/facial sensitivity. Parent follow-through with treatment recommendations in the home resulted in resolving the dysphagia. Early intervention and referral for feeding support would have been beneficial. Pediatric dysphasia is a neurological disorder related to different causes including texture preferences or traumatic birth incidences. In this case, prenatal case history documents traumatic birth, however, there is no evidence suggesting a direct link between the two. Further research is warranted to determine the relationship between a traumatic birth experience and manifestation of dysphagia symptoms in children.

Poster U71 – Kaitlyn Pawloski

Co-Author: Kacy Leuck

Mentor: Philip Lai

Title: Capturing Four Nonverbal Channels of Communication in Preverbal and Verbal Todlers with Autism Spectrum Disorders

Individuals with Autism Spectrum Disorders (ASD) are characterized by deficits in three core areas: social interaction, communication, and restricted repetitive and stereotyped patterns of behavior, interests, and activities. This disorder affects an estimated 1 in 68 children in the United States. In 2015, based on questionnaire data collected in 2014 from the National Health Statistics Reports, the Centers for Disease Control estimated the prevalence rate of ASD to be 1 in 45. Because children with ASD have significant impairments in social communication and interaction, the purpose of this project is to investigate communicative behaviors focusing on both verbal and nonverbal channels of communication. Two sets of children with ASD (n=30) were investigated, a group of children who are verbal and a group of children who are minimally verbal. Children were defined as minimally verbal if they used fewer than 10 words based on parent report on the Communicative Development Inventory (CDI) Words and Sentences: Number of Words Produced. The task consisted of a 15-minute mother-child play session with toys provided by the experimenters. Sessions were audio/videotaped for later coding using Eudico Linguistic Annotator (ELAN) software. Using ELAN, annotations can be created based on behaviors observed in the video and audio data. This program can capture information regarding duration, frequency, and latency. The child's gestures, eye contact, negative affect, positive affect was compared. A series of t-test found statistical differences in two of these 4 domains. Gestures ($p=.02$) and eye contact ($p=.03$) were significantly different, where the verbal children were producing more of these two behaviors. These results highlight the delays in communication in both verbal and nonverbal channels of communication. Because a majority of research is done on younger children with ASD, future directions would be to conduct research on school-aged children with ASD, and their communicative style/abilities.

Poster U72 – Maci Wingard

Mentor: Ladan Ghazi Saidi

Title: The Effect of Bilingualism on Cognitive Abilities in a Person with Parkinson's Disease

The brain's ability to maintain cognitive processes or to overcome or find alternative ways to complete a task after suffering from damage is known as its cognitive reserve (Stern, 2002; Stern, et. al., 2018). This means that people who have a greater cognitive reserve are able to resist degenerative symptoms. There have been studies which provide evidence that speaking a second language increases cognitive reserve (Kavé, et. al., 2008). Thus, we hypothesize that patients with cognitive impairment related to neurodegenerative diseases should show the symptoms of their disorders later than monolinguals.

We used publicly available data to look at demographics, and cognitive symptoms of monolingual and bilingual patients with Parkinson's. The data encompassed background information regarding their cognitive abilities and their language. Patients who speak one language were compared to multilingual patients on their age of on-set of their cognitive decline. A descriptive analysis was completed to analyze the mean, median, maximum, and

minimum of the age of on-set and their life-style measures. Using SPSS, a t-test was then conducted to compare the groups.

The results of this study showed that cognitive impairment in PD patients who speak more than one language manifest three years later than their monolingual peers. These results bring evidence that life-long bilingualism contributes to a stronger cognitive reserve and better compensation in case of a neurodegenerative disorder.

Poster U73 – Sky Zalman

Mentor: Philip Lai

Title: Social and Linguistic Profile of School-Age Children with High Functioning Autism

Autism is one of five disorders on the autistic spectrum disorder (ASD). Individuals with Autism, including children with High Functioning Autism (HFA), are characterized by deficits in these core areas: social interaction; social communication; and restricted repetitive and stereotyped patterns of behavior, interests, and activities. This disorder affects an estimated 1 in 68 children in the United States. To be included in the HFA group, child participants had to score a 70 or higher on the non-verbal section of the WASI IQ test. Children with a potential diagnosis of HFA were identified by a licensed neurologist from the pediatric neurology clinic, and through referrals from other clinicians/health care professionals. Previous research found effects of parental behaviors on their children. A positive relationship was found in parental emotional behaviors and their child's production of affect. For this project, our main question of interest is observing how variable the HFA group is with respect to their emotional expression compared to their typically developing (TD) peers. Our other main question of interest is whether the behaviors observed by the children are comparable to parental reports. This study used archival data and included 40 children in total between 7-14 years of age; 20 children with HFA (13M, 7F) and 20 TD (9M, 11F) children. The computer software, ELAN, was used to code facial expressions. Three parental questionnaires provided a unique point of view. Their answers helped us put together a more accurate profile of how these children are preforming on a daily basis. The Children's Behavior Questionnaire (CBQ) measures temperament; the Multidimensional Personality Questionnaire – Parent Version (MPQ) assesses mood and personality; the Salk Institute Sociability Questionnaire (SISQ) evaluates approach and social-emotional characteristics. These sources of data will be combined to create profiles, helping answer multiple questions relating to autistic severity and emotional responses.

Educational Administration

Poster U74 – Courtney Harwager

Mentor: Jane Ziebarth-Bovill

Title: Middle School Teachers' Perceptions of Math: As it relates to themselves and their students

This research study focused on middle school math teachers' perceptions towards math as it pertains to themselves and their students. Four middle school math teachers in Kearney completed a pre- survey and a post-survey. The researcher also conducted a face-to-face interview with the teachers. The researcher has gained deeper knowledge about the perceptions that teachers have towards math in general. In addition, the researcher gained knowledge about what, when, and where middle level students begin to struggle in math. The findings showed evidence of what the four middle school math teachers believed about their math proficiency as well as their beliefs about why some middle school students struggle in math. One key finding from the study was the belief by some of the middle school teachers surveyed that students who struggle in their math class, struggle because of past experiences in previous math classes.

Family Studies & Interior Design

Poster U75– Justine Bauer

Mentor: Sharon Obasi

Title: Volunteering: A Catalyst for Change

Increasingly, there is greater emphasis being placed on encouraging college students to become more civically engaged. Civic engagement or service learning projects are being listed as specific course requirements and even graduation requirements (Nash, 2015, Turner, 2014). Yet there has been little research on what college students would want to see in a new program or policy relating to civic engagement. Before any polices or programs are implemented it is important to identify what level of civic engagement college students would be interested in getting involved with. This presentation focuses on the results of an exploratory study that used an online survey to examine civic engagement among college students with specific emphasis on students' opinions about civic engagement and the precise types of activities students would prefer to do. For comparison purposes college faculty, staff and administrators were also asked to provide their opinions about civic engagement and the precise activities that students should engage in. This presentation will also highlight gennder differences in opinions about civic engagement and preferred activities. Collectively, these observations may be used to inform the practice and policy of requiring civic engagement for course completion and graduation.

Poster U76 – Courtney Gould

Mentor: Mickey Langlais

Title: "Til Sex Do Us Part": Examining Purity in the Context of Dating Relationships

Sanctity and purity is the notion that someone should remain sexually abstinent prior to marriage. Research has shown that remaining "pure" until marriage is positively associated with interpersonal well-being (Mahoney, Pargament, & Hernandez, 2013) and moderately related to marital satisfaction (Pomerleau, Wong, & Mahoney, 2018), but little research has examined the role of purity for dating relationships. Purity is likely to have a significant impact on young adults self-esteem and quality of their relationships, given that purity is associated with identity and intimacy development. The transition to college is likely to also impact individuals' perspectives of purity, and in some ways promote the participation in risky sexual behaviors. Therefore, the goal of this study is to increase understanding of purity, particularly its associations with romantic relationship quality and self-esteem. Quantitative and qualitative data will be collected concerning views on purity, which will be used to examine its association with romantic relationship quality for dating couples.

Poster U77 – Taylor Kizer

Mentor: Mickey Langlais

Title: Social Media Use and Interpersonal Health: Examining Generational Differences

Logging in and checking social media has become a ubiquitous behavior in American culture and has ramifications for mental well-being. The goal of this study is to compare how social media use (i.e., Facebook, SnapChat, Instagram, and Twitter) is associated with mental well-being (depression, anxiety, and stress) between young (ages 18 to 23) and middle-aged adults (ages 24 to 40). I use Erikson's Psychosocial Theory of Development as a framework for this study. Participants were recruited from two areas in the United States, a small city in the Midwest and an urban city in the Southwest (N = 261). Eligible participants completed an online survey that took approximately 40 minutes and then nine consecutive daily online surveys that took approximately 15 minutes to complete. Data was analyzed using linear regression analyses. For participants younger than 23, only posting on Twitter was associated with increased anxiety and stress. However, multiple social media behaviors were associated with the well-being for participants older than 23. First, posting photos on Facebook was negatively associated with each measure of well-being, and private messaging on SnapChat was negatively associated with anxiety. On the other hand, monitoring on Facebook and SnapChat was positively associated with anxiety. Additionally, posting comments on Facebook was positively associated with stress. Generally, older participants reported more effects of social media for interpersonal well-being than younger participants. Based on the results of this study, middle-aged adults' mental health appears to be negatively associated with social media use. Additional implications will be discussed.

Poster U78 – Molly Moeller

Mentor: Mickey Langlais

Title: Attached to Swiping: Examining Adult Attachment Styles with Online Dating Applications

Online dating has increased 20% over the past five years (Pew Research Center, 2016). However, individuals are likely to vary in their use and motivation for using online dating applications. A variable that is likely to explain these differences are the four adult attachment styles proffered by Bartholomew and Horowitz (1991). The goal of this research is to examine similarities and differences between the four attachment styles (secure, fearful, preoccupied, and avoidant) concerning online dating application behavior. Participants (N = 281; 78.6% female, 91.8% heterosexual) completed an online survey regarding behaviors on and motivations for using dating applications. Results indicate that individuals with a fearful attachment style are more likely to have ever used or be currently on an online dating application compared to other attachment styles, as well as motivated to use online dating applications to form romantic relationships. Comparisons concerning time on dating applications, frequency of checking applications, number of matches, and perceived effectiveness of applications across attachment styles are examined. Implications for relationship formation will be discussed.

Poster U79 – Callie Opbroek

Mentor: Mickey Langlais

Title: Social Media Experiences and Coping Strategies

The use of social media, particularly excessive use, is linked to low self-esteem, increased anxiety, increased depressive symptoms, and lower levels of sleep quality (Berryman, Ferguson, & Negy, 2017; Twenge, Joiner, Rogers, & Martin, 2018; Vannucci, Flannery, & Ohannessian, 2016). However, there is a deficit in the literature concerning how to assist with these emotions, besides simply recommending avoiding social media altogether. With the use of social media, advocating for completely avoiding social media may not be realistic. Therefore, the goal of this research project is to understand how to assist individuals who may be experiencing negative emotions as a result of social media use. Data for this study comes from a community sample of 160 participants (88.1% female, 89.4% white) who completed an online survey. Both qualitative and quantitative data were collected. Participants were presented with two case studies. The first dealing with low self-esteem due to social

media experiences and the second dealing with trust with romantic partners on social media. Correlation analyses revealed a positive association between age and seeking professional help and a positive association with education level and seeking professional help, but only for the first case study. Qualitative analyses revealed that viewing political and negative posts prompted participants to feel upset. The first case study found that most participants felt envious, inadequate, or indifferent. Participants stated they would cope with these feelings by staying productive, boosting self-love, or talking to a friend. Participants thought the best way to cope was to talk to someone or find ways to be productive. The second case study revealed that participants felt curious or frustrated and most reported that they would cope by talking to someone. Subsequently, participants thought the best way to cope with case study two was to also talk to someone.

Kinesiology & Sports Sciences

Poster U80 – Darienne S. Blair

Mentor: Richard Mocarski

Title: Assessing the current occupational therapy readiness to serve post-gender-affirming surgery

The purpose of this research is to understand the training and experiences that occupational therapist (OTs) have had with transgender and gender diverse (TGD) individuals and to assess their desires and needs relating to TGD care. Occupational therapists work with clients to help them achieve a fulfilled and satisfied state of life by looking at their goals and working alongside them to achieve those goals. This can be in several different settings: e.g. work, home, personal life. OTs can work with several different populations, but one area that has not been studied is the relationship between occupational therapist and trans and gender diverse care. The data will be obtained through a survey that is sent out to randomly selected OTs from across the state of Nebraska. This survey is a general needs assessment with questions regarding their practice, comfort level and training with TGD clients, and what skills OTs currently have that can be adapted to provide the best care for TGD individuals. The results of this research will be used to bridge the gaps in training for future and current occupational therapist and help improve the care of TGD individuals.

Poster U81 – Jerromy Cissel

Mentor: Kazuma Akehi

Title: The Effects of Tart Cherry Juice on Recovery from Delayed-onset Muscle Soreness in the Biceps Brachii Muscle Following Eccentric Exercise

Introduction: Strenuous exercise causes an inflammatory response in the muscles being used, which causes delayed-onset muscle soreness (DOMS). Tart cherry juice consumption may decrease this inflammatory response, because it has anti-inflammatory effects. Purpose: The purpose of the study was to examine the anti-inflammatory effects of the tart cherry juice on muscle thickness and echo intensity after inducing the muscle soreness on the biceps brachii muscle. Participants: Eight male, college-aged (19 to 25 years) recreationally active individuals were voluntarily participated. Methods: The forearm (FC) and upper arm circumference (UC) and biceps brachii muscle thickness (MT), subcutaneous tissue thickness (ST), and echo intensity (EI) were measured using a tape measure and ultrasound imaging system as the baseline measurement. Following the baseline measurement, participants were instructed to consume 8 oz of tart cherry juice or placebo twice a day for 6 consecutive days. Upon their return on the 6th day, the participants performed 3 sets of 10 reps of the biceps curl at 125% of their 1-RM. After the immediate and 24 hours post-exercise, the circumference, tissue thickness, and echo intensity were remeasured. Results: FC, UC, MT, and EI significantly increased from the baseline to immediate post-measurements in both treatments ($P<0.01$). Both treatments also significantly decreased the EI from the immediate to 24-hour post-measurement ($P<0.01$). ST significantly increased from the immediate to 24-hour post-measurement, regardless treatments. ($P=0.03$). Conclusion: There was no acute treatment effects on the recovery from the DOMS consuming the tart cherry juice or placebo for 6 days. Further research needs to be conducted to examine the long-term effects of those treatments and longer recovery periods from the DOMS.

Poster U82 – Andrew Fields

Co-Author: Taylor Wilson

Mentor: Gregory A. Brown

Title: Establishing normative data for VO2max for students in PE 461

Maximal oxygen consumption (VO2max) is considered the best measurement of cardiorespiratory fitness. Based on considerable evidence that lower levels of cardiorespiratory fitness are correlated with an increased risk of cardiovascular disease and all-cause mortality, the American Heart Association published a scientific statement in 2016 recommending that VO2max be used as a clinical vital sign. Students in Exercise Physiology (PE 461) undergo a measurement of VO2max, performed by the students in the next class in sequence (Fitness Testing; PE 467). While there are well established normative data for stratifying VO2max into categories of fitness or risk for disease, it is often recommended that laboratories also establish normative values for the population most frequently tested within their laboratory. By establishing normative data for VO2max for students in PE 461, the students will be able to not only rate their VO2max relative

to categories of fitness or risk for disease but will also be able to see how their fitness compares to other students in PE 461. This project will use archival data of VO2max measurements in PE 461 from 2010-2018 to establish normative percentile data for VO2max for students in PE 461. These data will then be included in future instructional materials used in PE 461.

Poster U83 – Kimberly Higgins

Mentor: Scott Unruh

Title: Effects of the anterior cruciate ligament reconstruction surgery/rehabilitation on post-surgery knee functionality

After completing this project, I will have a greater depth of understanding of the differences between an allograft and an autograft ACL reconstruction. I also will gain great insight into how these two different reconstructions affect patients' lives long after their initial surgery is complete. I hope to work closely with the professionals at UNK along with the staff at New West Hospital, and gain any knowledge or insight they pass along to me. I will be sending out a survey to patients that have had an ACL reconstructive surgery at New West Sports Medicine facility 5 or more years in the past. I will then collect the data from these surveys and analyze the results, with special note being taken on the effects that an allograft versus and autograft repair has on their lives 5+ years post-surgery. I will be asking daily living knee functionality questions in the survey, along with emotional and mental health questions.

Poster U84 – Allison Hirschman

Mentor: Scott Unruh

Title: Extrinsic Factors of Anterior Cruciate Ligament Tears in Female College Soccer Players

The purpose of this study is to further investigate the extrinsic factors of anterior cruciate ligament tears in female collegiate soccer players. By using an online questionnaire, we will be able to reach schools across the Mid-America Intercollegiate Athletics Association to collect adequate data. The questionnaires will be sent to the athletic training rooms at the participating schools. The survey will contain questions about numerous extrinsic factors such as leg dominance, weather condition and field surface, at the time of injury to their ACL. The survey will not include athlete's names or any other identifying information. Once the data has been successfully collected, we will then be able to draw correlations between injuries to get a better idea of factors that may increase the chances of an ACL tear. This may also lead into prevention mechanisms that the athletes may take into consideration.

Poster U85 – Emily Kaiser

Mentor: Kazuma Akehi

Title: Effects of the Plant Protein Based Diet on the Muscle Strength Properties Comparing to the Animal Protein Based Diet

A plant-based diet is not particularly popular among athletes because of the preconceived notion that it is difficult to eat enough protein. A study was reported that participants eating a vegan diet could exercise more with less muscle fatigue compared to the meat-based diet, due to lower fat and increased nutrients. Plant proteins, when combined to provide all of the essential amino acids, provide an excellent source for protein considering they are much lower in saturated fat and cholesterol. Plant protein-based diets also provide numerous other nutrients and fiber that are part of a healthy diet. The purpose of this study is to examine how a vegan diet could benefit athletes by making it easier to improve muscle volume and muscle strength properties. The study will consist of twelve recreationally active male college-aged who have been eating the western diet (animal-based protein diet). The study will be a twelve-week long intervention of the special diet plan and exercises. Six participants will follow a vegan diet (plant protein-based diet) and the others will follow the normal western diet. At the baseline, 4th, 8th, and 12th week of the intervention, their body composition, thigh muscle size and volumes, and the thigh muscle strength properties will be measured. Each participant will also have a standardized muscle strength exercise program. The hypothesis was determined to see better improvement of the quadricep from the plant protein-based diet group because of the plant protein that is utilized instead of animal protein. This study could help develop a better idea of how not only athletes should be eating and fueling their bodies, but also their health in general. Based on this information, scientists would have a better idea of how muscles are directly affected by nutrition.

Poster U86 – Kevin Line

Mentor: Kazuma Akehi

Title: Effects of Vision Training on the Static Balance for Collegiate Recreationally Active Individuals

Vision training has become the growing practice to improve visual perception, cognition, and oculomotor tasks to consolidate athletic performance in addition to traditional strength training. Saccadic eye movement (SEM), smooth pursuit eye movement (SPEM) and vestibulo-ocular reflex (VOR) are ocular movements and reflex, which are influential to an athlete's balance. SEM is described as quick eye movement incorporated with a swift change in focused target. SPEM is slower and more fluid tracking of the moving stimuli. VOR implements the external feedback to the fixation and stabilization of the eye in correlation to the head movement. It is,

however, still unclear how visual training influences athletic performance. The purpose of this study is to determine a correlation of a four-week SEM, SPEM, and VOR training on static balance. Twelve males and twelve females, recreationally active college-aged subjects will be recruited. Subjects will go through a four-week visual training program, consisting of a 30-min training, four times per week. Sway balance scores using a Humac Balance system will be recorded pre- and post-visual training. Visual training consists of SEM, SPEM, and VOR included in the visual training video program. The investigator hypothesized static balance would increase significantly after 4 weeks of visual training. Incorporating visual training into the athlete's training program may increase in balance and it would be vital in sports due to consistent performance of eye movement, balance, hand-eye coordination, and tracking. The visual training would also be beneficial for the sports-related head trauma patients by convalescing their balance and ocular movement that has been compromised in preparation to return to play and possible quick recovery.

Poster U87 – Jenn Nolda

Mentor: Bryce Abbey

Title: Collegiate Supplement Use, Knowledge & Motivation

The purpose of this study was to investigate the prevalence of dietary supplement use among division II collegiate athletes at a midwestern university. Sixty-seven collegiate athletes (33 males; 34 females; mean age = 22.2 ± 1.03 years) volunteered to participate in this study. A 26-question anonymous survey instrument examined type of sport participation, use of dietary supplements, reasons for use, and sources of information for sport supplements. Of the participants, 44.78.3% (N = 30) reported currently taking dietary supplements. There were a significantly higher number of males (male N=21, female N=9) reporting current dietary supplement use. Of those who reported to be currently taking dietary supplements, improved sports performance, 51.85% (N = 14) was the most reported reason for use. Only 5.63% reported using the NCAA Sports Science Institute as a source of information for sport supplement usage. 51.02% (N=49) reported that they believe their coach gives adequate information about sports nutrition. There were no significant differences found in reported sports supplement use between any of the sports. 68.09% of student athletes surveyed requested more sports nutrition related resources from the athletic department. The results of this study offer additional insight into trends in supplement use among division II collegiate athletes. Practical implications suggest that it may be necessary to ensure coaches have sufficient knowledge about sports supplements so that athletes are receiving accurate information. New methods of providing sports nutrition supplement information per the NCAA Sports Science Institute guidelines may include: social media campaigns, informational posters hung in locker rooms, and a dedicated food station for student-athletes.

Poster U88 – Mallory Stoner

Mentor: Kate Heelan

Title: Female Athletes: Healthy Options on the Road

Female collegiate athletes face the challenges of eating out and consuming nutritious meals during in-season travel (Anderson 2010). PURPOSE: The purpose of this study is to determine if female collegiate athletes will choose healthier food options while traveling with the team if provided recommended meal options (RMO). METHODS: Seven restaurants were identified, and menus were analyzed based on total calories, carbohydrate, fat and protein content. RMO were between 500-700 calories, contained high carbohydrate, low fat and moderate protein content. Menus and meal content breakdown were evaluated by a registered dietitian and meal options were distributed to coaches and Women's soccer players via email. Surveys were sent to players via Qualtrics at the end of the season to determine if they ordered a RMO from the provided menu, whether or not they felt like it impacted their performance, and if they liked the healthier options. RESULTS: Data indicated that 52% of the women's soccer team ordered healthier options when healthy menu options were provided. Players were more likely to order a healthy option when eating at a sandwich shop style restaurant. 56% of the players who ordered a healthy option at Jimmy Johns or Planet Sub felt like their performance was positively impacted by their meal. 62% of the Women's soccer players generally liked having the healthy options provided. Conclusion: Division II athletes typically are not provided with a sports nutritionist to help make healthy choices. It has been suggested that providing athletes with specific menu suggestions when traveling may assist them in making better choices (Anderson, 2010). Our data supports this notion and suggests that the majority of female athletes will use healthy menu suggestions, like the choices and believe healthier options impact their performance.

Poster U89 – Zach Sutton

Mentor: Kazuma Akehi

Title: Finger Tendon Adaptations Following a Hangboard Training Protocol in Recreational Rock Climbers

Rock climbing as a recreational sport has grown in popularity over the last few years. Although the risk for physical injury is less in climbing than many other sports, overuse injuries still occasionally occur, especially in finger tendons. A possible explanation for these injuries is muscle strength would be exceeding the rate at which the tendons can adapt to the stress. It has been shown that the Achilles and the patellar tendon increase in cross sectional

area (CSA) with resistance training, however, this has not been applied to finger flexor tendons. Therefore, the purpose was to measure the CSA and tendon thickness of the flexor digitorum profundus (FDP) and flexor digitorum superficialis (FDS) muscles before and after an eight-week hangboard strengthening protocol. Nine male college aged students (age=21.6yrs, height=177cm, weight=19.47kg) participated in a baseline session to measure their finger maximum voluntary isometric contraction (MVIC) strength through the figure strength machine. FDP and FDS CSA (cm2) and thickness (cm) were also measured with ultrasonography. Participants performed a hangboard training protocol that consisted of a 7-second dead hang followed immediately by a 3- second rest. This interval was repeated 6 times to complete one set. Participants then rested 2 minutes between sets and completed a total of three sets. If the subject could comfortably complete the hang boarding session without reaching failure, 2.5 pounds was added the following training session. Finger strength and CSA (cm2) and thickness (cm) of FDP and FDS were reassessed after 4 and 8 weeks of training. We expect to not see a correlation between the finger strength and CSA and thickness adaptation. If this is true, this may explain the high proportion of finger tendon injuries present in rock climbers because the finger tendon cannot tolerate the certain level of physical stress.

Poster U90 – Dakota Waddell

Mentor: Gregory Brown

Title: Establishing normative data for the 30-second Wingate bicycle test for students in PE 461

The 30-second Wingate bicycle test is one of the most widely used tests for measuring anaerobic fitness. During the 30-second Wingate bicycle test, the participant pedals against a constant high resistance as hard as possible for 30 seconds. Due to the high resistance, fatigue causes a rapid reduction in power output over the 30 second test with reductions in power output of 50% or more being common. During the 30-second Wingate bicycle test anaerobic glycolysis is a primary source of ATP formation resulting in large increases in blood lactate concentrations. Normative data for changes in blood lactate due to a 30-second Wingate test are not available, and normative data for power output can vary greatly due to the ergometer used. In 2016 the Physical Activity & Wellness Lab obtained an electronically braked bicycle ergometer for use in Wingate testing. This project will use archival Wingate test data of blood lactate measurements in PE 461 students from 2010-2018 to establish normative data for change in blood lactate and archival data from 2016-2018 to establish normative data for peak, mean, and minimum power output and fatigue rate. These data will then be included in future instructional materials used in PE 461.

Management

Poster U91 – Kylie Johnson

Mentor: Michelle Fleig-Palmer

Title: An In-Depth Analysis of Adult Vaccination Rates in the Two Rivers Public Health District

Due to the irregular scheduling of adult vaccinations, many adults are unaware of their vaccination status. Vaccines protect whole communities through herd immunity, so populations are at risk when people are unaware of their vaccination status. The purpose of this study was to identify adults' awareness of their vaccination status regarding select vaccines, as well as identifying factors that influence their decision to vaccinate. To conduct this study, I investigated patient activation and provider trustworthiness. Provider trustworthiness was studied because rural communities face a shortage of provider options, so if patients in rural areas do not trust their provider they may not vaccinate. Participants (n=51) were asked to complete a 15-minute survey administered at local county fairs in Nebraska in July 2018. The survey included sections on self-reported vaccination adherence, the Patient Activation Measure, a trustworthiness measure, and general demographics. The analyses revealed positive relationships between patient activation and the following variables: self-reported vaccination adherence (r=.25, p< .05) and perceived provider trustworthiness (r=.35, p< .01). This study identifies the importance of the role of patient activation and provider trustworthiness in adult patients' decisions to vaccinate. The significant correlations above suggest that increasing provider trustworthiness leads to an increase in patient activation. The data also suggests patient activation could positively impact vaccination rates and thus herd immunity. Recommendations include shifting provider focus to educating adult patients to aid in building stronger patient-provider relationships. The strengthened relationship could empower patients to be self-advocating and increase adult vaccination rates.

Teacher Education

Poster U92 – Guadalupe Perez

Mentor: Martonia Gaskill

Title: Minority Teachers in the Public School System: A Qualitative Study of Perceptions and Attitudes

Education is constantly changing and innovating with the goal to provide the best learning experiences to all student. A current interest found in the research literature is understanding the challenges and opportunities associated with becoming minority teachers and how minority educators impact of influence students' potential. This study is significant because it supports claims that

children need to develop the ability to build relationships with diverse people and relate to others from different backgrounds from a young age. Nieto & Bode (2008) claim that US schools are becoming more and more diverse while the teacher body is going in the opposite direction and becoming more homogeneous. Research has shown that when it comes to the distribution of the best teachers in the school systems, poor and minority student population are less likely to get their fair share (Peske & Haycock, 2006). Additionally, there is a growing need to encourage minority populations to pursue higher education degrees leading to education careers to reverse current trends that discourage the general population and the potential minority from entering the teaching profession. The purpose of this qualitative study is to explore how minority teachers in Midwestern schools describe their professional experiences as classroom teachers. Interviews were conducted with minority teachers employed in small, large, urban and rural schools in the state of Nebraska. Results, implications and recommendations for future research are discussed.

Undergraduate Performance Schedule

Sandhills Room

1:30 pm ..... Minori Yamauchi
Fusion: Multi-Media Dance
Mentor – Sharon Campbell

Undergraduate Performance Abstracts

Music & Performing Arts

Minori Yamauchi

Mentor: Sharon Campbell
Title: Fusion: Multi-Media Dance

My research is finding and experimenting with a fusion of dance and music. Jazz music with Jazz dance is what people think it is a "typical" combination. However, a dance audience may become more curious and interested to watch oppositions presented together as one art. The goal of my research, culminating in the dance concert, "Fusion," is to find an art form that people don't usually expect - such as classical music with hip-hop dance, nature sounds and tap dance, Japanese cultural music and other countries' dance, and the opposite meanings of movements and words in sung music. Preserving the idea of history behind each story, I want to surprise people when unexpected fusions happen.

In the process of creating my dance concert, I first conducted interviews with people from various ethnicities (from native Nebraskans to international students), because what an audience wants is the most important point for creating the art to share with them. Based on the feedback from interviews, and research on the history of music, and dance, I found the starting place for my performance. To find actual movements for each piece, I discussed how the topic was a part of creating art with the dancers. I asked dancers for their reactions to aspects of the pictures, poems, words, and music which had inspired me. Then, the dancers were asked to improvise based on their aspects of the subjects. The final step to choreograph was to puzzle together the movements which I have created and inspired by dancers' improvisation. As a result, the feedback from the audience was that sharing the cultural exchange made the biggest impact on audience member's memories. Things that people don't know get them interested to watch a dance concert.

Undergraduate Oral Presentation Schedule

Ponderosa C

2:00 pm ..... Mia Grant
Socialist Feminism in Theory and Practice
Mentor – William Aviles

2:15 pm ..... Makenzie Petersen
Improving Teaching by Improving Teachers: What Nebraska is Doing in Regard to Professional Development of Educators
Mentor – Diane Duffin

2:30 pm .....Jesus Ramirez
A Survey Experiment in Attitudes about Gun Control
Mentor – Joan Blauwkamp

2:45 pm ..... Jasmine Beringer
Race to the bottom?: Consequences of Globalization on Labor
Mentor – Charles Rowling

3:00 pm .....Erin Green
Combining Feminist Theory with Republican Virtue to Combat Workplace Sexual Harassment
Mentor – Diane Duffin

Ponderosa D

1:45 pm ..... Chase Harrison
The Enduring Critic: Richard Brinsley Sheridan and the Theatre of War
Mentor – Denys Van Renen

2:00 pm ..... Parker Witthuhn
World War I: The Soldiers of Kearney State Normal School
Mentor – Jeff Wells

2:15 pm .....Megan Steinhauer
Perkins' Past: The Life of Edwin Perkins Before Kool-Aid
Mentor – Jeff Wells

2:30 pm .....Cannon Marchand
Students in Service
Mentor – Mark Ellis

2:45 pm ..... Macey Stall
The Diaries of Verna Holmes
Mentor – James Rohrer

3:00 pm ..... Megan Gifford
Dante's Trek into a Far-Off Galaxy
Mentor – Rebecca Umland

3:15 pm ..... Erica Wood
The Evolution of Modern Marriage in 19th-Century Literature
Mentor – Rebecca Umland

Undergraduate Oral Presentation Schedule

NSU 310

1:30 pm ..... Jose Ortega
High Glucose Conditions Affect Physical Characteristics of Breast Cancer Cells and Increases Proliferation Through Polyamine Pathway
Mentors – Surabhi Chandra & Diganta Dutta

1:45 pm ..... Alaini Pribe
Antinociceptive Action of 3-methoxy Cinnamic Acid Dimmers on Adenosine Receptors
Mentors – Surabhi Chandra, Vasundhara Balraj, & Mahesh Pattabiraman

2:00 pm ..... Clarissa Fitzgerald
The Prevalence of Borrelia Lonestari in Central Nebraska
Mentor – Julie Shaffer

2:15 pm ..... Kati Frankenberg
Identifying the binding location of atrazine and its metabolites on human serum albumin using high performance affinity chromatography
Mentor – Annette Moser

2:30 pm ..... Brooklynn Venteicher
Challenges of Using Rational Design to Optimize Substrate Specificity for the Promiscuous L-type Amino Acid Transporter 1 (LAT1)
Mentors – Allen Thomas, Jerome Campbell, Huan-Chieh Chien, Arik Zur, Claire Colas, Kathleen Giacomini, & Avner Schlessinger

2:45 pm ..... Evan Olson
Binary Operations Involving Roots of Unity
Mentor – Jia Huang

3:00 pm ..... Jenilee Woltman
Effects of Using Animal-Assisted Therapy on Picture Recognition, and Agitation on Older Adults with Mild to Severe Dementia in Long-Term Care.
Mentor – Ladan Ghazi Saidi

NSU 312

1:30 pm ..... Brittany Hanzlik
The Assessment of Coping Abilities and Intrapersonal Communication Modes for Adults with a Chronic Disease and/or Disability
Mentor – Richard Mocarski

1:45 pm ..... Chloe Murphy
Edward Elgar's Sea Pictures: A Personal Musical Journey
Mentor – Anne Foradori

2:00 pm ..... Elizabeth Hawney
The Art of Science
Mentor – Dena Harshbaerger

2:15 pm ..... Cynthia Iloghalu
Public Opinion on the Therapeutic Use of Cannabis: A Cross-Cultural Analysis
Mentor – Sharon Obasi

2:30 pm ..... Alyssa Hoffman
Annotated Bibliography on Social Work Practice Classes Taught Online
Mentor – Maha Younes

2:45 pm ..... Taylor Stewart
Innovation in Teacher Preparation through Experiential Learning: PETE Undergraduate Perception
Mentor – Megan Adkins

3:00 pm ..... Danielle Tilley
Teacher Perceptions of the Influence of Technology Integration on Childhood Obesity and Student Understanding of Physical Activity Levels
Mentor – Megan Adkins

Undergraduate Oral Presentation Abstracts

Biology

Clarissa Fizgerald

Mentor: Julie Shaffer

Title: The Prevalence of Borrelia Lonestari in Central Nebraska

At the University of Nebraska at Kearney a study is being conducted on a tick born bacterium called Borrelia lonestari. B. lonestari is vectored by Amblyomma americanum, and is a related bacterium to Borrelia burgdorferi, which causes Lyme disease. B. lonestari causes variant Lyme disease, which has similar symptoms to Lyme disease including the bullseye rash. Both diseases are treated in their early stages with low doses of similar antibiotics. In Nebraska the tick which carries Lyme is not present; however, there are reported cases across the state every year which were later classified as false positives. This has created confusion in the medical field. Our tests cover both male and female Amblyomma americanum, which we are using to gain a better understanding of the risk of variant Lyme Disease and the concentration of the disease in the tick population which has been harvested. Comparisons can be made for the presence of the bacterium in male and female ticks because females feed at the adult life stage, while males do not and are less likely to transmit the disease. By testing these ticks in 2017 and 2018 it has been confirmed that B.lonstari is present and growing in Nebraksa.

Jose Ortega

Co-Authors: Caleb Capellen & Roman W Schmidt

Mentors: Surabhi Chandra & Diganta Dutta

Title: High Glucose Conditions Affect Physical Characteristics of Breast Cancer Cells and Increases Proliferation Through Polyamine Pathway

Background and Hypothesis: Hyperglycemia is known as a source for increasing cancer cell proliferation and furthering metastasis. Increased blood sugar levels are known to reduce the effects of cancer therapeutics. Polyamines (putrescine, spermine, and spermidine) are ubiquitous in cells and are known to be involved in vital processes such as cell growth, replication, and transcription. Polyamines have also been shown to have increased levels in cancers such as colon and skin. We hypothesized that polyamines are involved in proliferation of breast cancer cells under diabetic conditions. Furthermore, diabetic states affect mechanical properties such as cellular elasticity in cancer cells, which can further exacerbate proliferation and induce invasion. Methods and Results: Cell lines used in this study included MDA-MB-231 (late stage breast cancer) and MCF-10A (normal breast epithelial cells). Cells were treated with normal glucose (NG, 5mM) or high glucose (HG, 25mM) in the presence and/or absence of polyamine synthesis inhibitors. Mechanical properties of the cells were monitored using atomic force microscopy (AFM) under different treatments of glucose. HG treatments increased cell proliferation in both cell lines. However, treatments in the presence of ornithine decarboxylase (polyamine synthesis enzyme) inhibitor, difluoromethylornithine (DFMO) prevented this increase in cell proliferation. DFMO was also able to decrease the spermidine levels with glucose treatments. AFM showed breast cancer cells have a smaller modulus of elasticity (22.1kPa) versus the normal breast epithelial (46.9kPa) under NG conditions. HG conditions reduced the elasticity in both cell lines with the cancer cell line still having the smaller modulus. Conclusion: Polyamine synthesis pathway is involved in normal breast epithelial and breast cancer cell proliferation under HG. The physical characteristics (elasticity) between breast cancer cells and normal epithelial cells are distinguishable. These methods help provide a better understanding for the role of diabetes in proliferation and invasiveness of breast cancer cells.

Alaini Priebe

Co-Authors: Olivia Hyde, Lydia Fritchse, & Luke Hamilton

Mentors: Surabhi Chandra, Vasundhara Balraj, & Mahesh Pattabiraman

Title: Antinociceptive Action of 3-methoxy Cinnamic Acid Dimmers on Adenosine Receptors

Chronic pain has been shown to affect more people than diabetes, heart disease, and cancer combined. Due to nervous system related side-effects with opioids, gastrointestinal dysfunction associated with non-steroidal anti-inflammatory drugs (NSAIDs), and cardiovascular

anomalies with cyclo-oxygenase-2 inhibitors (COX-2), the search for alternate pain methods has increased over the past few years. Early studies of a dimer of cinnamic acid, Incarvillateine (INCA), derived from the Chinese herb Incarvillea sinensis, has shown its primary antinociceptive action through the adenosine receptor. The adenosine receptors have four members, A1, A2A, A2B, and A3, with A3 having shown the least amount of adverse side effects. We hypothesized that our derivates of cinnamic acid, which structurally mimic INCA, would work primarily through this adenosine A3 receptor. Compounds were synthesized using the CMP photodimerization method. 3-methoxy cinnamic acid dimer (CAD) was shown to suppress pain primarily in the inflammatory phase, and the dimer binds to the adenosine 3 receptors (as revealed by computer modeling). 3-methoxy CAD compounds were tested in combination with Theophylline (adenosine blocker, 2mg/kg) and Naloxone (opioid blocker, 2mg/kg) and confirmed that they were working through the adenosine pathway instead of an opioid pathway. 3-methoxy CAD was further tested using an antagonist for specific adenosine receptors. Results suggested that 3-methoxy CAD is working through the either the A2A or the A2B adenosine receptor (A2A-SCH58261, A2B-PSB603). Our further characterization and selection of CAD analogs, with predominant adenosine receptor action, will help us to generate a new class of antinociceptives with precise chemical modifications.

Chemistry

Kati Frankenberg

Mentor: Annette Moser

Title: Identifying the binding location of atrazine and its metabolites on human serum albumin using high performance affinity chromatography

Human Serum Albumin (HSA), the most abundant transport protein in blood, is able to bind a broad range of solutes including herbicides. In this study high performance affinity chromatography (HPAC) was used to measure the binding locations of atrazine and three of its main metabolites on HSA using competitive zonal elution and the probe compounds R-warfarin and L-tryptophan. The binding location of atrazine and its metabolites, hydroxyatrazine and deisopropylatrazine, was found to be Sudlow Site I due to the observed direct competition with R-warfarin. Separate competitive binding studies for all four compounds with L-tryptophan showed no competition at Sudlow Site II. Results from an additional study with desethylatrazine will also be presented.

Brooklynn Venteicher

Co-Authors: Karissa Finke, Seth Springer, Laura Stoner, Evan Augustyn, & Colton Hall

Mentor: Allen Thomas, Jerome Campbell, Huan-Chieh Chien, Arik Zur, Claire Colas, Kathleen Giacomini, & Avner Schlessinger

Title: Challenges of Using Rational Design to Optimize Substrate Specificity for the Promiscuous L-type Amino Acid Transporter 1 (LAT1)

The L-type amino acid transporter 1 (LAT1, SLC7A5) allows dietary amino acids to enter the brain, as well as transporting drugs that resemble natural amino acids (e.g. gabapentin and L-DOPA). As amino acid-drug conjugates (prodrugs) must compete with millimolar concentrations of endogenous amino acids for the transporter, it would be beneficial to obtain more potent amino acid promoieties. To better understand key specificity determinants that could improve potency, we developed models of the LAT1 binding site to guide the design and synthesis of substituted analogs of phenylalanine and histidine (e.g. Figure 1). Furthermore, we evaluated the structure-activity relationship (SAR) for both enantiomers of several naturally occurring LAT1 substrates. Analogs were tested in cis-inhibition and trans-stimulation cell assays to determine potency and uptake rate. Remarkably, LAT1 can transport amino acid-like substrates with wide-ranging polarities including those containing ionizable substituents (i.e. carboxylic acid and amine). Additionally, the rate of LAT1 transport was generally non-stereoselective, even though our SAR data suggest that enantiomers likely exhibit different binding modes. Though our models have helped us to generate hypotheses for ligand design, they are currently unable to explain some of the divergent SAR that we have observed for this seemingly capricious transporter. We will present the synthesis and SAR of novel LAT1 substrates and inhibitors, as well as provide examples of how our models have fared in predicting ligand-transporter interactions. Our findings have greatly expanded what is known about LAT1 substrate specificity and has broad implications to the development of new treatments for brain disorders and cancer.

Communication

Brittany Hanzlik

Mentor: Richard Mocarski

Title: The Assessment of Coping Abilities and Intrapersonal Communication Modes for Adults with a Chronic Disease and/or Disability

With young people now accounting for nearly half of the population worldwide, they are becoming the center of global health policies. (Eleftheriou, Ioannou, Isenberg, & Wedderburn, 2014). In recent literature, there has been a further development in the study of

resiliency and individuals' ability to cope with adversity (Figly & Karairmak, 2017). With there being a range of responses toward these types of situations, it's vital to obtain knowledge in how young adults cope with and face adversity head on. Specifically, living with a chronic disease and/or disability can be challenging in many ways. How one copes and accepts these challenges, situations, and/or experiences is the center of this research project. Through on online survey, individuals will address their resiliency skills, abilities to cope with their chronic diseases/disabilities, and other aspects regarding intrapersonal communication and how one communicates with themself to get through adverse events. It is the hope that the data obtained from this online survey provides insight toward how individuals with chronic diseases/disabilities cope with their condition.

Communication Disorders

Jenilee Woltman

Mentor: Ladan Ghazi Saidi

Title: Effects of Using Animal-Assisted Therapy on Picture Recognition, and Agitation on Older Adults with Mild to Severe Dementia in Long-Term Care.

The effects of a therapeutic recreation intervention using animal-assisted therapy (AAT) on the picture recognition and agitated behaviors of older adults with mild to severe dementia were examined using a Picture Recognition Activity (PRA), Agitation Behavioral Scale (ABS; Corrigan, 1989), and a General Care Survey. The pilot study was conducted at a long-term nursing facility in rural Nebraska and consisted of 5 residents with various stages of dementia. All residents had over two reported incidents of agitation within two months before the study took place. The study consisted of four sessions without an animal-assisted therapy dog, and four sessions with a certified therapy dog accompanying them while participating in the PRA. The results of this study showed a decrease in agitated behaviors by an average of 31.8%, and an increase of 19.6% of General Health cooperation (including food intake.) The PRA had an increase of 28% of questions answered using an AAT dog and had a response time decrease an average of 9500 millisecond per correct answer responded for the 30 questions included. Mean Length of Utterances (MLU) were tracked for all sessions during the PRA, and MLU's increased over 67.4% among all 5 residents when using an AAT dog verses doing the PRA without an AAT dog. Results of this study showed statistically significant decreases in agitated behaviors and a significant increase in resident General Health cooperation, picture recognition, response times, and mean length of utterances. This study concluded that AAT is an effective method to help adults with moderate to severe dementia to decrease agitation and increase general care cooperation and picture recognition.

English

Megan Gifford

Mentor: Rebecca Umland

Title: Dante's Trek into a Far-Off Galaxy

This essay will demonstrate the influence of Dante's "The Divine Comedy" (c.a. 1300) on "Star Wars" (1977-2005) and "Star Trek" (1966-1969). Dante's conception of "The Divine Comedy" as a journey through subterranean and celestial realms had a direct impact on the development of science fiction and how both George Lucas and Gene Roddenberry designed their universes. Tracing the literary heritage of "Star Trek" and "Star Wars" sheds light on ways in which Dante influenced the creation of both science fiction franchises and on ways he permeates modern culture. In addition to his influence as a world-builder, Dante also exercised influence through the structure of his pilgrim's journey, and using Joseph Campbell and his idea of the monomyth as outlined in "The Power of Myth" (1988). Commonalities of character typologies and the hero's journey among "Star Trek", "Star Wars", and "The Divine Comedy" will be examined. Dante, Lucas, and Roddenberry all explored the struggle between good and evil, for instance, a close comparison of Virgil as characterized by Dante with Spock and Yoda reveals ties among all three configurations of the wise guide and the transformative quest of Dante's pilgrim is mirrored in these two science fiction blockbusters. Close examination of the medieval poet and his creation verifies the continued presence of "The Divine Comedy" in Western culture.

Chase Harrison

Mentor: Denys Van Renen

Title: The Enduring Critic: Richard Brinsley Sheridan and the Theatre of War

This study was conducted in correspondence with the work of Richard Brinsley Sheridan. The major focus and course for this study was the examination of Sheridan's revered plays: The Critic (1779), The Camp (1778), The School for Scandal (1777), and The Rivals (1775). Robert W. Jones' review, Sheridan and the Theatre of Patriotism, was utilized as a secondary source. This essay will examine Sheridan's plays from the 1770s, illuminating how his plays comment on the American Revolution and social reformation.

As one of the most successful playwrights of his age, Sheridan became a prominent member of English society. We see through his work as a writer and director for the stage that Sheridan took advantage of his fame in a continual attempt to reach an increasingly educated British populace. Like many artists of the Revolutionary War Era, Sheridan appealed to the majority of audiences and critics by his use of satirical premises. For example, in The Camp, a little-discussed play, Sheridan strayed

from his proverbial norm of the time and utilized musical numbers and fantastic stage décor to repeatedly draw in crowds. However, Sheridan differs from most playwrights in that, rather than simply pleasing audiences, his ultimate goal was to educate them. This aim to educate is exemplified through Sheridan's scripts as he embedded entertainments – plays and military exercises – within his works to undo stereotypes and teach social etiquette. Now, over two centuries later, Sheridan's work is still staged on an international scale. This continued popularity reinforces the claim that Sheridan's work offers solutions to contemporary social and political issues, such as the role of the theatre in helping a wider audience understand the implications of war.

Erica Wood

Mentor: Rebecca Umland

Title: The Evolution of Modern Marriage in 19th-Century Literature

The 19th century ushered in an age in which marriage focused on compatibility and love, replacing an old world concept that viewed marriage as a means of merging political power and wealth. Marriage in the Victorian era, especially, serves as a precursor to what we understand it to be today. Evidence that the 19th century changed the concept of marriage can be seen by the fact that it is a central subject in its literature and culture. We can particularly see this in the novels of authors such as Jane Austen in the beginning of the 19th century and Thomas Hardy at the end of the 19th century. However, a question arises as to why this is so. In order to better understand this rising interest in marriage, I examined these two influential writers and a few of their representative novels: Sense and Sensibility (1811), Pride and Prejudice (1813), and Mansfield Park (1814) by Jane Austen and Far From the Madding Crowd (1874), Tess of the D'Urbervilles (1891), and Jude the Obscure (1895) by Thomas Hardy. The novels of Jane Austen in the early part of the century are representative of the shift away from the medieval idea of marriage as a means to retain power, and an interest in exploring human happiness through married love. It also signaled the start of a real interest in redefining what marriage should be. The novels of the Brontës, Tennyson, and the Brownings in the middle of the century act as a midway progression in redefining what marriage should be, but do not essentially differ from the works of Jane Austen. Thomas Hardy, in the latter half of the 19th century, shows both continuity and a departure regarding marriage. It is from these influential works that our modern notion of marriage originates.

Family Studies & Interior Design

Cynthia Iloghalu

Mentor: Sharon Obasi

Title: Public Opinion on the Therapeutic Use of Cannabis: A Cross-Cultural Analysis

Globally, policies regulating the therapeutic use of cannabis are undergoing changes with more countries supporting the therapeutic use of cannabis. In 1937 the commercial cultivation, distribution, and use of cannabis and hemp products were illegal in United States (Mickey, Gregory & Rosenthal, 2011). More recently, however, because of medical breakthroughs, public interest has increased, some states in America has now permitted it for therapeutic and recreational use. Other countries across the globe including Canada, Uruguay, Lesotho, have adopted similar policies. Nigeria often referred to the giant of Africa has been hesitant to consider policy favoring the therapeutic use of cannabis. Nontherapeutic use of cannabis is common in certain parts of Nigeria. However, the therapeutic use seems to be less known in Nigeria in comparison with other countries including the United States. Thus, this exploratory study examined public opinion on the therapeutic use of cannabis in Nigeria and the U.S. Participants (100 from Nigeria and 88 from the U.S.) completed an online Qualtrics survey designed to examine the diversity of public opinion on the therapeutic use of cannabis. Cross-cultural comparisons indicate that Nigerian participants were significantly less aware of the therapeutic use of cannabis and less inclined to support policies encouraging the therapeutic use of cannabis. Results also indicate that persons who identify as being religious were less likely to support policies on the therapeutic use of cannabis for fear of abuse. These preliminary findings provide a basis for further research into the therapeutic use of cannabis in Nigeria, provide a means of educating Nigerians on the therapeutic use of cannabis and serve as an initial foray into providing evidence to support policy and practice on the therapeutic use of cannabis in Nigeria.

History

Cannon Marchand

Mentor: Mark Ellis

Title: Students in Service

During and after the conclusion of World War II the Nebraska State Teachers College Faculty (now UNK) worked to memorialize the students from the college that sacrificed their lives in the War. This work was primarily done by Carrie Ludden, a long-term faculty member, with the support of President of the College Herbert Cushing.

Ludden collected letters, photos, and other documents about the men and women from the college in the war. This work was then used to produce memorials in the 1946 Yearbook and Quarterly Bulletin. The collection of documents was then maintained by UNK alumni association organizer and athletic staff member Don Briggs. After his death the collection was passed to the UNK Archives where it is today.

The collection is now being digitized on the UNK archives website https://openspaces.unk.edu/. This is being done so the sacrifices of the service members from UNK can continue to be remembered into the future. It is also to be used for research into the war and contributions from the college in Kearney. Most recently the documents have been used to shed light on the contribution of small teacher colleges in providing the bulk of the aviators that served in the war.

Macey Stall

Mentor: James Rohrer

Title: The Diaries of Verna Holmes

Verna Holmes was a young woman, at the time of her diaries, living in Overton, Nebraska during the Progressive Era. Specifically, during the years 1904, 1907/8, and 1909. During this time Verna's diaries cover events such as her high school graduation, traveling on the Union Pacific Railroad, attending college at Cotner College in Bethany, Nebraska, as well as everyday aspects of her life.

By analyzing these diaries, you begin to see day to day events that give us a small window into the life of a young woman at this time period. These aspects include religion, education, and going against feminine standards.

Megan Steinhauer

Mentor: Jeff Wells

Title: Perkins' Past: The Life of Edwin Perkins Before Kool-Aid

Edwin Perkins invented Kool-Aid in Hastings, Nebraska in 1927 when he was thirty-eight years old; his life leading up to the invention of Kool-Aid was noteworthy in which his familial upbringing can be credited towards his success as an entrepreneurial business man. Edwin Perkins and his family moved to many different places within Nebraska because of the influences of family ties, available resources, and the railroad before moving to Chicago, the food industry capital in the 1930s, once Kool-Aid flourished. The decision of David Perkins, Edwin's father, to open up a mercantile when Edwin was younger allowed him to experiment and learn business skills that ultimately guided his entrepreneurial lifestyle and allowed him to experience owning his own business. Though Perkins invented more than just Kool-Aid, his well-known fruity drink is still thriving today because of his ability to take risks and make decisions that led him to be a leading business man in the mid 1950s. My research analyzes the experiences and decisions of Edwin Perkins in his early life before he moved to Hastings that allowed him to be so successful in Nebraska during the time periods of World War II before the Great Depression. His knowledge gained during this time allowed him to be prosperous during the Great Depression and years after.

Parker Witthuhn

Mentor: Jeff Wells

Title: World War I: The Soldiers of Kearney State Normal School

This project originated out of Dr. Jeff Wells' Nebraska History course here at UNK. The purpose of the assignment was to use primary source information from local archives like the University Special Collections and Archives at the Calvin T. Ryan Library and the Buffalo County Historical Society/Trails & Rails Museum Archives, to develop a research project that would contribute to Nebraska History. Using letters, poems, newspapers, and yearbooks found in those previously mentioned archives, as well as other scholarly sources, this article dives into the diverse roles that some 401 Kearney State Normal School students and staff played during the First World War.

Not long after the US entered WWI in April of 1917, the government began drafting millions of young men into the military with the Selective Service Act and encouraged volunteers to join up through an intense propaganda campaign. The normal school saw a population drop and a demographic shift as the male students were drafted and volunteered in their home counties across Nebraska by the dozens. Soldiers from KSNS served as airmen, flame and gas engineers, artillery gunners, seamen, infantrymen, medics, and many other positions during the US's involvement in the war. Three students from the school were killed and many others were wounded or fell ill by November 11, 1918 when the armistice was signed to end the fighting. With the 100th anniversary of the armistice this past November, remembering the impact of WWI on this institution may help the current UNK community foster a better future.

Kinesiology & Sports Sciences

Taylor A Stewart

Mentor: Megan Adkins

Title: Innovation in Teacher Preparation through Experiential Learning: PETE Undergraduate Perception

Clinical practice and field experiences are key elements in equipping pre-service teachers with essential knowledge, skills, and dispositions to become a well-prepared, confident, quality teacher. Many university PhysEd teacher preparation programs across the country rely strictly on peer teaching rather than providing the opportunity for

their students to teach children. The aim of this study was to investigate pre-service physical education teachers' self-assessment of their confidence and competence levels in course preparation and achievement after having the opportunity to teach for 8-weeks in an experiential PhysEd teaching lab prior to student teaching. Sixty-eight male & female pre-service teachers, nineteen to twenty-four years of age, categorized as junior status or higher in their educational program at UNK completed the Achieving the NASPE Standards Inventory and the Course Preparation Effectiveness Survey (Chen, 2003; AL-Tawil, 2009). The result indicated pre-service teachers felt they were more prepared through the experiential teaching lab, and confident in their teaching compared to only being provided the opportunity to teach peers. Additionally, students were adequately prepared in the disposition of pedagogy, reflected on the total score of the NASPE standard inventory. Conclusive evidence was found through the results of the study that experiential learning experiences should be further explored by other university PhysEd programs rather than completing the traditional peer practice teaching approach.

Danielle Tilley

Mentor: Megan Adkins

Title: Teacher Perceptions of the Influence of Technology Integration on Childhood Obesity and Student Understanding of Physical Activity Levels

Technology integration in PhysEd has expanded within the last five years due to affordability, advances in technology, and teacher interest. Over the next four years it is projected that wearable technology in schools will grow by forty-six percent (Technavio, 2018). Incorporating wearable technologies into the physed classroom changes instructional strategies utilized by teachers and could positively affect a child's motivation to workout, therefore increasing physical activity levels, and potentially decreasing the number of children categorized as overweight or obese. To date minimal research has been conducted in relation to the influence of wearable technologies in the PhysEd classroom which is why for the past three years I have studied this topic in my URF projects. The purpose of this presentation is to provide an overview of my past URF projects related to technology and PhysEd and to discuss the study results from my final project. Past URF studies have focused on the child perspective of wearable technologies in PhysEd. The current study attempts to identify physed teacher perceptions of their school's current wearable technology resources and how these resources assist their instructional strategies to address concerns of childhood obesity through the achievement of physical activity recommendations. Participants in the study were licensed, practicing physed teachers from across the country who taught in the Pk-12 setting. A survey was sent to participants including questions from the "PhysEd Teachers' Perceptions Role in Impacting Childhood Obesity" and "The Perceptions of Student Motivation Questionnaire." The presentation will articulate the importance of integrating technology into PhysEd, results of the current study, correlations between findings from all research I have completed and my overall experience and impact the Undergraduate Research Fellow program has provided me for the past three years to prepare me to become an educator.

Mathematics & Statistics

Evan Olson

Mentor: Jia Huang

Title: Binary Operations Involving Roots of Unity

For certain binary operations * defined using a root of unity, we study the results obtained from an expression x_0*x_1*....*x_n by inserting parentheses and permuting variables.

This is related to the nonassociativity and noncommutativity of such an operation. We find a recursive description of the sign patterns in the results, and precisely count distinct results in some special cases.

Music, Theater, & Dance

Chloe Murphy

Mentor: Anne Foradori

Title: Edward Elgar's Sea Pictures: A Personal Musical Journey

Sir Edward Elgar (1857-1934) composed the cycle of five songs, Sea Pictures, op. 37 (1899) for noted British contralto Clara Butt. Elgar arranged this cycle for both contralto and orchestra, and contralto and piano. Miss Butt sang première performances of each setting only five days apart in October 1899, with Elgar at the podium and the keyboard. The songs are cyclical, with a primary melodic motif from the first song reappearing throughout the cycle. The structure of the songs is reminiscent of the movements of a Romantic Period symphony – alternating slow and fast tempi and longer and shorter songs in both strophic and through-composed structure. The entire set of songs is twenty minutes in length and depict five distinct moods of the sea. Sea Pictures was written in a prolific year of Edward Elgar's compositional output during which he composed two other major works, Enigma Variations, op. 36 and The Dream of Gerontius, op. 38. In 1899 at the age of forty-two, Elgar married Caroline Alice Roberts, eight years his senior. A respected author of prose and poetry, C. Alice, as she was known professionally, collaborated with him as text author of eighteen vocal works, including the second song, "In Haven" of Sea Pictures. This paper considers

Edward Elgar's personal musical journey from a humble largely self-taught musician influenced by a diverse group of continental composers such as Dvorak, Brahms, Wagner, and Delibes to a significant composer whose unique and mature voice emerged in profound orchestral works by 1899. Elgar's seminal work for solo voice and orchestra, Sea Pictures will form the basis for this discussion

Political Science

Jasmine Baeringer

Mentor: Charles Rowling

Title: Race to the bottom?: Consequences of Globalization on Labor

In a world where money drives almost all activity, Unites States' companies are "forced" to participate in a cycle of competition with other businesses to maintain high sales and maximize profits. "Globalization and its Discontents: Revisited" by Joseph Stiglitz is one source that facilitates understanding of the United States' role in the international system in a broader sense. Essentially, to continue earning money, various corporations have shifted their production overseas, to developing countries, in order to capitalize on the higher productivity, lower wages, and lenient labor standards. Are companies like Walmart and Starbucks exploiting overseas workers? Should these developing countries be satisfied with any sort of growth, even if the system is not in their favor? Are these workers satisfied with their jobs? The answers are not simple ones, and the truth, as it often does, lies somewhere in the middle.

Mia Grant

Mentor: William Aviles

Title: Socialist Feminism in Theory and Practice

Feminism and socialism have long been viewed through two separate lenses. Historically, feminism is known for advancing women's rights in order to reduce inequality between women and men. Socialism advocates for the worker, as the theory holds that the means of production should be owned communally by the workers. However, socialist feminists seek to combine the two in order to analyze women's oppression. This paper will examine the clear link socialist feminists see between capitalist exploitation and the patriarchal domination of which women have been subjected. With the two theories combined, the intersection of gender and class work together to produce a system that produces inequalities between women and men. Theorists such as Silvia Federici, Zillah Eisenstein, and Alexandra Kollontai have each examined this link. This paper will consider the interconnections between these theorists through an exploration of their central works that are focused upon the exploitation caused by capitalism and patriarchy. This intertwining can also be used in analyzing current trends in feminism. Many current politicians, such as Alexandria Ocasio Cortez, Rashida Tlaib, and Ilhan Omar have not shied away from socialist politics. However, whether they are putting the theoretical framework of socialist feminism into practice will be examined.

Makenzie Petersen

Mentor: Diane Duffin

Title: Improving Teaching by Improving Teachers: What Nebraska is Doing in Regard to Professional Development of Educators

Within the last forty years, Finland has undergone an extreme education reform in which they have been able to change their entire reputation from having mediocre academic performance to being one of the most prominent education leaders in the world. This success is attributed to many factors including teacher professional development. This project is part of a larger comparative analysis between Finland and the US. To understand how education policymakers in the US attempt to improve teaching, this study examines the policy framework governing teacher professional development in Nebraska.

There is not one distinct list of rules regarding professional development within the Nebraska Department of Education, but instead, the criteria are found within Rule 10 of Title 92 of the Nebraska Administrative Code, chapter 79, section 830 of the Nebraska Revised Statutes, and among the various school policies. To understand the full range of professional development practices in the state, I sampled eight Nebraska school districts of varying size and complexity. I then read each district's professional development policy and assembled a classification scheme. The school policies and regulations for the sampled schools explained how their faculty could satisfy the professional development criteria stated within the Nebraska Unicameral Statute 79-830, listing both what is outlined within the statute and many of the equivalencies that could also satisfy the criteria.

Through this research, I have found it evident that the Nebraska Department of Education puts an emphasis on the importance of professional development, but because of the laxity within the equivalencies of the required professional development, the state may not be reaching its highest potential of professional development within educators.

Jesus R Ramirez

Mentor: Joan Blauwkamp

Title: A Survey Experiment in Attitudes about Gun Control

This paper researches the effects that question wording may have on gun-control attitudes of UNK students. Question wording may cause a respondent to support a policy that they might not have if extra word cues

were not included. Researchers have used multiple methods: question wording interacting with other factors, changing the survey order and organization, and using deliberate contextual cues that may affect respondent's attitudes. Although there has been countless research on how question wording effects other policies, not many researchers have strongly focused on gun-control attitudes or have not conducted their own experiments. Instead of researching the effects of question wording, researchers also tend to focus on how gun-control policies are viewed by the public after a major shooting event has occurred. This researcher will study how question wording influences attitudes—without depending on a major event having taken place. It similarly follows the study—conducted by Borrelli and Locerbie (2008)—that measured what the effects were of using a "prestigious" word, or phrase, on the American public attitudes for the Gulf War and the Second War with Iraq. They found that using these words or phrases had a great impact on the responses that the participants gave. This paper will explore how the mentioning of a gun-control policy influences a respondent's attitude toward that policy. It is hoped that this study will inform the public about how their responses may be influenced by question wording.

Social Work

Alyssa Hoffmann

Mentor: Maha Younes

Title: Annotated Bibliography on Social Work Practice Classes Taught Online

There is a demand for education classes to be presented in an online format. Social Work programs have been hesitated to transfer practice classes from the traditional face-to-face format to the online web-based format. Compiling the previously completed research in an annotated bibliography allows for better assessment of undergraduate social work practice classes online. Some questions attempting to address include. What are the concerns for online teaching of undergraduate social work practice skills? What, if any models exist for teaching online social work practice courses? How effective are online formats in teaching social work practice skills? What strategies are employed to promote acquisition of skill, student engagement, and community building? How do learning outcomes differ when comparing online and traditional face-to-face social work practice classes? The compiled research shows social work practice classes can be taught online; however, the considerations which need to take place in advance are monumental.

Teacher Education

Elizabeth Hawney

Mentor: Dena Harshbarger

Title: The Art of Science

The purpose of this study was to show that art can be used in an inquiry-based lesson plan to increase the engagement and connections that students make during the lesson. The science lesson was taught to a group of third grade students in a mid-western elementary school. The lesson incorporated several components; (a) A science related picture book for the teacher to read aloud; (b) class discussions; (c) an inquiry-based learning activity, (d) science journaling, and (e) an art project. The findings of this study provided preliminary evidence of students increased vocabulary, science knowledge and high student engagement. Future studies will be designed to gather additional data related to these areas. The study was found to have limitations and further research is planned in the future.

UNK Graduate Programs

Online Programs

Art Education (MAEd)
- Classroom Education Emphasis
- Museum Education Emphasis

Biology (MS)

Curriculum & Instruction (MAEd)
- Early Childhood Education
- Elementary Education
- Reading/Special Education
- English as a Second Language
- Secondary Education
- Instructional Effectiveness
- Transitional Certification
- Montessori – Early Childhood
- Montessori – Elementary I
- School Librarian
- STEM (Science, Technology, Engineering, and Math)

English (MA)
- Writing Emphasis

Higher Education Student Affairs (MSEd)

History (MA)

Instructional Technology (MSEd)
- Instructional Technology
- Information Technology
- Leadership in Instructional Technology
- School Librarian

Long-Term Care Management (MS)

Music Education (MAEd)

Physical Education – Master Teacher (MAEd)
- Pedagogy
- Special Populations

Reading PK-12 (MAEd)

School Principalship PK-8 or 7-12 (MAEd)

School Superintendent (EdS)

Supervisor of Special Education (MAEd)

Science/Math Education (MSEd)

Spanish Education (MAEd)

Special Education (MAEd)
- High Ability Education (Gifted)
- Advanced Practitioner
- Behavioral Intervention Specialist
- Assistive Technology Specialist
- Inclusive and Collaboration Specialist
- Functional Academic Skills and Independent Living
- Special Education Generalist

Campus Programs

Athletic Training (MATR)

Biology (MS)

Business Administration (MBA)
- Accounting
- Generalist (Blended)
- Human Resources
- Human Services
- Marketing

Clinical Mental Health Counseling (Blended - MSEd)

English (MA)
- Literature
- Creative Writing
- Children's and Adolescent Literature

Exercise Science (MAEd)

General Physical Education (MAEd)
- Sports Administration
- Recreation and Leisure

History (MA)

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- Elementary (Blended)
- Secondary (Blended)

School Psychology (EdS)

Speech/Language Pathology (MSEd)

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- Public History Certificate
- Spanish Graduate Certificate

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gradstudies@unk.edu

Graduate Poster Abstracts

Behavioral & Social Sciences

Counseling and School Psychology

Poster G01 – Robyn King

Co-Authors: Alexa Allgood, Tom Polinko, & Matt Ulrich
Mentor: Jennifer Joy

Title: Socioeconomic Status Effects on 4th and 5th Grade Reading Scores

The purpose of our study was to examine if socioeconomic status (SES) is a predictor of Measures of Academic Progress-Reading (MAP-R) and Dynamic Indicator of Basic Literacy Skills (DIBELS) scores for 4th and 5th grade students. Students were divided into two groups low socioeconomics status (LSES) and non-low socioeconomic status (NLSES), measured by Free and Reduced Lunch status. Archival data were gathered from sixty-nine 4th and 5th grade students in small Midwestern school district. SES was a significant predictor of MAP-R scores for 5th grade students. The findings suggest socioeconomic status may impact standardized assessment scores.

Poster G02 – Kloreace Linke

Co-Authors: Taylor Strong & Klint Conroy
Mentor: Jennifer Joy

Title: The Impact of English Language Proficiency and Socioeconomic Status on Map and Dibels Scores

The purpose of the present study was to determine if socioeconomic status and English language proficiency would predict standardized assessment scores (MAP-Reading and DIBELS) in the fourth and fifth grade. To do this, the effects of socioeconomic status and English language proficiency were investigated in terms of academic success. For this study, our research question was: How does poverty (Free and Reduced Lunch vs. Non-Free and Reduced Lunch) and ELL status predict DIBELS scores and MAP-R scores for fourth and fifth grade students?. Archival data from 58 forth grade students (N=29 DIBELS, N=29 MAPS-R) and 74 fifth grade students (N=38 DIBELS, N=36 MAP-R) were analyzed. Results, implications, limitations, and future research directions will be discussed.

Poster G03 – Gretchen K McBride

Mentor: Tammi Ohmstede

Title: Kindergarten Outcomes on Academic Readiness Skills

Kindergarten students are expected to make significant academic progress during their first year in a structured learning environment, regardless of their socio-economic status, gender, or if their primary language is not English. In this study, archival data from 258 kindergarten children in a rural, mid-western public school were obtained. The Bracken School Readiness Assessment (BSRA-3) from the fall of 2012 and spring of 2013 was used to assess the amount of academic knowledge gained during that school year. A strong relationship was identified between the fall and spring BRSA-3 assessment scores, as well as between fall assessment scores and English language learner status. However, no significant effects or interactions were found between socio-economic status, gender, and scores. Each student entering kindergarten arrives with their own individual strengths and areas of need or challenges. Schools must be ready and able to adjust their academic expectations and curricula to match the unique needs of each student, in order to ensure they all receive appropriate instruction to build the basic foundations of education required to be successful.

Poster G04 – Tanya Rasher-Miller

Mentor: Tammi Ohmstede

Title: School Readiness Predicting Early Literacy Skills and Academic Achievement

As set forth within the No Child Left Behind Act of 2001, the current emphasis on accountability to help assure adequate academic performance of school-age children has increased the number of schools assessing children at the entry level. Schools are targeting students as young as preschool or kindergarten to determine the factors that predict academic success on assessments. Although all factors are of interest, low socioeconomic status (SES) and English Language Learners (ELL) were two chosen for this study. A common assessment is the Measure of Academic Progress (MAP) Assessment, which is administered in the beginning, middle and end of the school year. This study looked at the predictive validity of early academic measures on reading and math achievement of students. This study addresses the question whether the Bracken School Readiness Assessment (BSRA) is predictive of MAP reading and math when controlling for the socioeconomic

status (SES) and the English Language Learners status (ELL). The data for this study is from archival data from a Midwest school during the 2012-2013 academic school years. The data includes 147 students from an elementary school. Findings support the hypothesis that the BSRA scores are predictive of first grade MAP reading and MAP math scores.

Poster G05 – Jacob Sandman

Mentor: Douglas Tillman

Title: Global Partnerships: Bringing the World to Your University

Exhibited on this poster is a model for the creation and maintenance of an international collaboration between universities in the area of mental health. A step-by-step process is described followed by its real life application to a joint research study currently underway. Finally, the implications of such a model are explored to minimize mistakes and enhance the positive effects of international collaboration for students, faculty, and university administration.

Poster G06 – Courtney Schendt

Co-Authors: Carlynn Sjomeling, Madison Pleak, & Jessie Walter

Mentor: Jennifer Joy

Title: Reading Curricula Impacts on High-Stakes Testing

The purpose of this study is to provide school districts the efficacy of two elementary reading curricula (i.e. Treasures, and Novel Ideas.)

Student proficiency was explored by collecting results of the benchmark assessment Measures of Academic Progress (MAP)- Reading, during the spring semester of a school year from 3-6th grade students.

Students scored higher on the MAP-Reading assessment after the reading instruction from Novel Ideas curriculum.

A significant difference was found in the group of students in 4th through 6th grade and no statistical significance found within 3rd grade spring MAP-Reading scores.

Findings suggest that student's may perform better on high stakes tests after utilizing the Novel Ideas curriculum.

Poster G07 – Misty Wroblewski

Co-Author: Lynsdy Rinehart

Mentor: Tammi Ohmstede

Title: Poverty as a Predictor for Academic Performance in Kindergarten and First Grade

Early learning has long been recognized as pivotal in a child's long-term academic success, suggesting that early intervention has been shown to be one of the most effective ways to positively impact student achievement. Poverty is defined as the extent to which an individual goes without resources, when it comes to academic performance a lack in resources can mean an increased in achievement gaps. Monitoring student achievement and progress provides educators with information needed to help decrease achievement gaps between students living in poverty and those with more resources. For this study, data were gathered from 109 Kindergarten and 100 First grade students at a Midwestern school district and analyzed. This study found that poverty demonstrated a significant effect on DIBELS scores. For educators, this may require diligence and fidelity with interventions to help bridge the gap of students with a socio-economic disadvantage.

Professional & Applied Studies

Communication Disorders

Poster G08 – Joslynne Alms

Mentor: Ladan Ghazi Saidi

Title: Performance of Older Adults in Auditory Simon Task: Noise Vs. Silence

Functional magnetic resonance imaging (fMRI) has become a frequently used neuroimaging method for cognitive neuroscience research and clinically-based applications over the past two decades. Evidence suggests that the scanner noise emitted during fMRI may decrease cognitive performance – including language and auditory cognitive processes – although this effect is largely unknown. Additionally, it has been shown that noisy conditions as a whole may evoke decreased performance in older populations. The purpose of the current study was to compare the performance of older adults in fMRI noise and silent conditions in an auditory Simon task. Twenty right-handed older adults between the ages 60-85 participated in this study. All participants were healthy with normal hearing. A neuropsychological battery was administered prior to the primary Simon task to control for confounding variables between monolingual and bilingual participants. An auditory Simon task was administered under two experimental conditions: 1) silence, and 2) broadband noise generated by the fMRI scanner. The participants were presented the stimulus word "gauche" ("left") or "droit" ("right") either congruently or incongruently to the reference ear via insert earphones. Additionally, functional responses were recorded in a control condition in which the stimulus was presented neutrally, that is, presented in both ears. A one-way ANOVA was used to compare mean accuracy rates (AR) while a one-sample t-test was used to compare mean response times (RT) between the fMRI and noise conditions. Statistically significant differences were found between fMRI noise and silence for both AR and RT. Results indicated that fMRI scanner noise positively affected Simon task performance, as the participants were quicker and more accurate at responding to an auditory stimulus while in the fMRI noise condition. In combination with the bilingual advantages of our population sample, these findings may be supported by the view that noise conditions recruit increased attentional control.

Poster G09 – Elaina Eddy

Mentor: Philip Lai

Title: Speech and Gesture Differences in Individuals Based on Levels of Task Difficulty

Communication using verbal and nonverbal channels is vital for conversation. Nonverbal channels consist of communicative gestures that are typically co-verbal and provide information consistent with the verbal message but can provide information not contained in the verbal message (Scharp et al., 2007). The purpose of this study was to explore how individuals communicated after engaging in tasks consisting of three different levels of difficulty. A secondary aim of this project was to assess David McNeill's Growth Point Hypothesis (2005), proposing language and gesture form an integrated system. We devised a micro-analytic coding scheme investigating how individuals use and integrate speech and gestures during social interaction. Six adults participated, with two adults completing the most physical task, two completing a physical task while seated, and two completing the non-physical task. Multi-tier annotations were created based on behaviors from video data using Eudico Linguistic Annotator (ELAN). Results showed that after completing a task, interview times tended to be shorter in post-interview than pre-interview (Mean % drop-off between the two interviews = -25.17%) suggesting the context of the interview played a role in conversation times. Open-ended questions from the pre-interview may have provided participants with more leeway in expression. Task difficulty seems to be playing a role, since the two greatest drops in timing were in the most complex task (-55.55% and -48.51%), the next timing drops were in the seated physical task (-34.09% and -29.19%), and the least amount of time change between the two-interviews were found in the non-physical task (-16.11% and +32.4%). With respect to gesture, four of the six subjects decreased gestures from pre-interview to post-interview, suggesting data for the most part fits McNeill's hypothesis. The two subjects in the most difficult task decreased their gestures, suggesting task difficulty may impact how one expresses after performing a task.

Poster G10 – Breana Johnson

Mentor: Philip Lai

Title: The Relationship Between Facial Expression, Communication, and Task Difficulty

Facial expressions are central to many aspects of social communication. In a successful conversation, participants need to identify emotions from both verbal and nonverbal channels of communication (Itier & Batty, 2009). Facial expressions can provide important information such as a person's attitudinal response, attentional focus, and a person's current emotional state or response. The goal of this study is to investigate how individuals communicate,

use, and integrate facial expression with speech, as adults complete tasks varying on different levels of difficulty. The majority of past facial expression studies have examined an individual's ability to decode facial information, focused on facial decoding and perceptual skills. There are few studies that have examined the production of spontaneous facial expressions in adults. For this project, three tasks were created. In the easy task, a person would be sitting down and reading a manual. In the middle-average difficulty task, a person would be sitting down, moving marbles in certain patterns. In the most difficult task, a person would be moving around various sports balls in patterns. In this NASA-sponsored project, two adults each completed the easy task, middle-average task, and difficult task. To capture facial expressions, we used the software platform called Eudico Linguistic Annotator (ELAN). Comparing pre-interview to post-interview, four of the six subjects decreased their rates of facial expressions (Means per minute: pre-interview 7.88 vs. post-interview 6.67). This trend was also observed in interview times, as five individuals were not as expressive in the post-interview compared to the pre-interview. Furthermore, the two subjects in the most difficult task both decreased their facial expressions, suggesting that task difficulty may play a role. A future project will assess teamwork and whether the pressures of working in a team affect facial expressions and communication.

Poster G11 – Rachel Southard

Mentor: Philip Lai

Title: The Role of Attention and Eye Contact in Speech after Completing Tasks Varying on Physical and Mental Exertion

Direct eye contact and averted eye gaze can dictate turn-taking behaviors in conversation. During conversation, gazing away may signal a breakdown in communication (Keltner, 1995). The goal of this study is to investigate whether task difficulty affects the amount of eye contact completed when participants discuss their finished task. Previous studies have found a link between task difficulty and gaze behavior (e.g. Pollatsek et al. 1986). Eye contact was isolated in a software platform called Eudico Linguistic Annotator (ELAN). Annotations began when the individual gazed towards the face of the interviewer and ceased when the gaze left the interviewer. There were three different levels of physical activity, the first being the most physical where individuals are completing a task on their feet, the second level being a physical activity only requiring their hands and finally the third level where the individual would be sitting down and reading a manual. Two adults were randomly assigned to each task difficulty. Results showed that when comparing the length of the pre-interview to post-interview, 5 out of 6 individuals' interview times tended to be shorter in the post-interview. With respect to eye contact, four of the six subjects decreased their rates of eye contact. The four decreased on average of 3.1 fewer instances of eye contact per minute. The context of the interview and task exertion and physical activity, seem to have an effect on an individual's eye gaze behavior when conducting an interview. Perhaps the performance on the task (i.e. having difficulty completing the task) may influence how an individual would express themselves after the task is over. Future studies will investigate teamwork, and how eye gaze behaviors play a role when individuals are dependent on their partners to complete tasks that is time-sensitive for their team.

Graduate Oral Presentation Schedule

Ponderosa C

8:00 am ..... Justin Horn
Effects of Climate on the British Isles and English Civil War
Mentor – Mary Ailes

8:30 am ..... Nathan Mauslein
An Empire Divided: The Rivalry between Austria and Prussia from the Prussian Perspective
Mentor – Mary Ailes

9:00 am ..... Robyn King
An Assessment of Self-Proclaimed Transgender and Gender Diverse Behavioral Health Providers
Mentor – Richard Mocarski

9:30 am ..... Tina Schumacher
Deeper Understanding is Forged Through Allusion
Mentor – Maria O'Malley

10:00 am ..... Ruby Bell
Gender Affirming Healthcare, Cultural Competency, and Training of Professionals
Mentors – Sharon Obasi & Richard Mocarski

10:30 am ..... Megan Naylor
Speech Production of Children with Hearing Loss
Mentor – Jan Moore

Ponderosa D

8:00 am ..... Robert Ritson
Obscured Sun, Obscure Behavior: Exploring the Effects of a Solar Eclipse on Animal Movement
Mentors – Dustin Ranglack, Nate Bickford, & Melissa Wuellner

8:30 am ..... Shannon Schlater
How Perches, Small Mammal Abundance, and Vegetation Influence the Presence of Red-tailed Hawks
Mentors – Dustin Ranglack & Nate Bickford

9:00 am ..... Cody Willmore
Aquaponic Systems: A Comparative Assessment of Commercial and Reclaimed Crop Production Systems
Mentors – Marc Albrecht & Nate Bickford

9:30 am ..... Miranda Reinson
Resource Selection of White-Tailed Deer (Odocoileus Verginianus) During the Growing and Non-Growing Seasons
Mentors – Dustin Ranglack & Nate Bickford

10:00 am ..... Jourdan Ringenberg
Habitat Selection and Spatial Distribution of Eastern Cottontail Rabbits in a Fragmented Agricultural Landscape
Mentors – Dustin Ranglack & Nate Bickford

10:30 am ..... John Rech
A Catalyst Between Two Different Realms of Education: The UNK Home School Physical Education Program
Mentor – Megan Adkins

Graduate Oral Presentation Schedule

NSU 310

8:00 am ..... Tessa Burford
Literary Portraiture: Framed by Societal Constructs
Mentor – Maria O'Malley

8:30 am .....Zach Weber (Zoom)
Syntactical Patterns and Rhetorical Modes in Modern Political Discourse
Mentor – Maria O'Malley

9:00 am .....Gregory F. Withrow (Zoom)
Two Sides of One Coin: Base Differences Between World War II British and American Airborne Force Structures
Mentor – Mark Ellis

9:30 am ..... David Blakely (Zoom)
Mormon Church Participation in the Great War Effort: The Coming of Age of a Nineteenth Century Religion
Mentor – Douglas Biggs

10:00 am ..... Blake Weeder (Zoom)
Water, Fuel, and Forage: Environmental Realities and the Viability of Fort Kearny on the Platte
Mentor – David Vail

10:30 am ..... Meaghan Pasbrig
Camp Grant Massacre of 1871: The Trial
Mentor – Jeff Wells

Graduate Oral Presentation Abstracts

Biology

Miranda Reinson

Mentors: Dustin Ranglack & Nate Bickford

Title: Resource Selection of White-Tailed Deer (Odocoileus Verginianus) During the Growing and Non-Growing Seasons

Resource selection has become a more prevalent topic in wildlife research due to the advancements in wildlife tracking technology and geographic positioning system (GPS). The most popular method of analyzing GPS collar data is through a resource selection function (RSF) to relate environmental variables at known GPS locations of animals to what is available. Resource selection is an important component of understanding wildlife ecology, particularly in areas influenced by anthropogenic disturbances, including habitat fragmentation through agricultural practices. Although white-tailed deer (Odocoileus virginianus) have adapted to intensively cultivated environments there could still be potential impacts, due to the rapid changes in landscape between the planting and harvest seasons. We will fit an RSF to examine white-tailed deer resource selection and make inferences at the population level between the growing and non-growing seasons in an area of high agricultural disturbance. White-tailed deer were captured during November 2017- March 2018/November 2018 – February 2019 using clover traps and drop nets. Each adult female was fitted with a GPS collar and each adult male captured received a GPS Global System for Mobile (GSM) ear tag to collect data every hour for two years, a fix rate of 24/day. We will examine the effects of season and environmental variables including distance to roads and water, NDVI, and canopy cover on white-tailed deer habitat use. Rapid changes occur in agricultural landscapes between the growing and non-growing seasons. Thus, we would expect to see deer use areas with higher percent cover rather than agricultural fields during the non-growing season, due to reduction in available cover. Management implications to address this selection change between the two seasons could include providing more cover and browse in areas of high agricultural intensity when the resources are limited on the landscape during the non-growing season.

Jourdan M Ringenberg

Mentors: Dustin Ranglack & Nate Bickford

Title: Habitat Selection and Spatial Distribution of Eastern Cottontail Rabbits in a Fragmented Agricultural Landscape

Knowledge about wildlife space use in response to environmental and climatic changes is necessary to conserve vulnerable species. Specifically, with further understanding of how species utilize the landscape, we can better manage their populations in hopes to provide a more symbiotic relationship between humans and wildlife. Rabbit species act as ecosystem engineers, as they perform behaviors that benefit other species and often their populations can be an indicator of ecosystem health. Understanding how ecosystems are impacted by climatic and environmental changes will prove necessary in the human population's adaptation to these changes. Eastern cottontail rabbits (Sylvilagus floridanus) live among us in a plethora of environments, yet little is known about their use of space across fragmented, agricultural landscapes or how they respond to habitat modifications and climate variances. As the climate continues to change and landscape modifications are in full force, the spatial distribution of rabbit populations will likely shift in response. We investigated the spatial distribution and habitat selection of eastern cottontails in fragmented farmland in south-central Nebraska. We captured and outfitted rabbits with radio-telemetry collars and tracked their movements for the duration of a year. Additionally, we collected vegetation and local weather data to analyze further potential factors that may influence the spatial patterns of rabbits. Utilizing remotely sensed imagery, we were able to plot rabbit locations in ArcGIS and determine patterns of habitat preference. Our initial findings suggest that rabbits utilize available habitat differently between the crop-growing and non-growing seasons. We believe this is in response to availability of protective cover and food resources that cropland offers in the growing season. Thus, proper management for rabbits in fragmented agricultural landscapes may include providing protective cover and opportunities to connect between fragmented habitats in the non-growing seasons.

Robert Ritson

Mentors: Dustin Ranglack, Nate Bickford, & Melissa Wuellner

Title: Obscured Sun, Obscure Behavior: Exploring the Effects of a Solar Eclipse on Animal Movement

A solar eclipse can alter atmospheric conditions and offer a unique opportunity to test their influence on animal behavior. To date, few studies have documented observations of animal movements during such rare events. The purpose of our investigation was to empirically quantify animal movement changes during the 2017 Great American Solar Eclipse through the use of GPS locations. We collected GPS tracking data from 9 species of birds (n=37) and 2 mammals (n=40) across the continental United States from August 20-22, 2017. Bird species included bald eagles (Haliaeetus leucocephalus), black vultures (Coragyps atratus), ferruginous hawks (Buteo regalis), golden eagles (Aquila chrysaetos), great blue heron (Ardea herodias), great egrets (Ardea alba), osprey (Pandion haliaetus), turkey vultures (Cathartes aura), and western gulls (Larus occidentalis), and mammal species included elk (Cervus canadensis) and mule deer (Odocoileus hemionus). A Wilcoxon signed-rank test for paired data was used to compare animal movements during the solar eclipse to those of the day before and after. Overall, a higher proportion of birds appeared to significantly alter their movement (p<0.1) during the eclipse than mammals, even though a larger proportion of the mammals experienced totality (100% obscuration of the Sun). Significant differences in movement were more likely to be found among individuals with more frequent GPS fix-rates. Obscuration seemed to be less important than duration in describing overall patterns. Examining how animals respond to environmental changes, such as those induced by a solar eclipse, can provide insight to the scale at which stimuli influence movements. This study supports that animals do acutely respond to environmental changes induced by a solar eclipse. Our results also underscore the importance of appropriate data for in order to adequately addressing research questions in movement ecology.

Shannon M. Schlater

Mentors: Dustin Ranglack & Nate Bickford

Title: How Perches, Small Mammal Abundance, and Vegetation Influence the Presence of Red-tailed Hawks

Raptor movement and behavior are strongly influenced by a raptors' need to acquire prey. As a result, we would expect species such as Red-tailed Hawks (Buteo jamaicensis), to inhabit areas with accessible and abundant prey. Red-tailed Hawks have previously been known to avoid areas of dense vegetation, likely due to the inaccessibility of prey, as well as areas of sparse vegetation, likely due to the absence of prey. In order to examine which habitat characteristics most strongly influence Red-tailed Hawk presence in a highly fragmented, agricultural area, we preformed roadside raptor surveys to determine areas of high and low Red-tailed Hawk use. We then conducted seasonal small mammal trapping and vegetation surveys in those areas. Our results suggest that utility poles, vegetation, and small mammal species richness all influence the presence or absence of Red-tailed Hawks. Specifically, we found summer low-use Red-tailed Hawk areas to have denser vegetation that may visually obstruct hunting Red-tailed Hawks. However, winter and fall high-use sites reported taller vegetation, which suggests that as long as the vegetation is not too dense, taller vegetation supports a higher quality hunting habitat for Red-tailed Hawks. Further, spring high-use sites reported lower small mammal species richness, while summer and fall high-use sites detected higher small mammal species richness.

Cody G Willmore

Mentors: Marc Albrecht & Nate Bickford

Title: Aquaponic Systems: A Comparative Assessment of Commercial and Reclaimed Crop Production Systems

As the global population increases, available food is decreasing, while becoming more expensive. Traditional agriculture is currently maintaining food production, but farmland is being lost to either poor soil or the housing industry. With declining agriculture and expensive food, families are looking for alternatives for readily available and inexpensive produce. One possible method is aquaponics. Aquaponics is the practice of growing plants by raising fish and using the waste as fertilizer. The advantage using these systems is they can be built in any space available. However, the designs used are very different and have limited research confirming how well they work. We evaluated the productivity of a commercial aquaponic system and an aquaponic system based on discarded material. This study used basil (Ocimum basilicum) and tilapia (Oreochromis mossambicus). The first experiment compared basil growth with equal numbers of plants in each system. The average wet weight of basil in the commercial system was 12.7 g 9.8 versus 2.0 g ± 2.2 in the reclaimed system. The commercial system produced more basil, but led to questioning how equal basil spacing would affect productivity. This poster will explain the productivity of basil between both commercial and reclaimed systems with equal numbers, equal density.

Communication Disorders

Megan Naylor

Mentor: Jan Moore

Title: Speech Production of Children with Hearing Loss

Permanent sensorineural hearing loss in children is a life-altering condition that impacts their language, literacy, auditory skills, and speech production. Over the last 2 decades there has been an abundance of research exploring outcomes of children with profound hearing loss who have obtained cochlear implants. There has been more limited research on children who wear hearing aids. The goal of this study was to investigate the relationship between severity of hearing loss and age variables on speech production abilities at 4, 5, 6, and 7 years-of-age. Twenty-four children with sensorineural hearing loss participated in this study. All of the children were assessed through the Colorado Home Intervention Program (CHIP). All of the participants were native English speakers, utilized hearing aids, used auditory-oral communication, and had hearing parents. None of the children had concomitant disabilities. Severity of hearing loss was measured by their pure-tone average (PTA). Age factors included age of identification, age of hearing aid fit, and age at the time early intervention began. Speech production was assessed utilizing the Goldman Fristoe Test of Articulation (GFTA) and speech samples recorded in their home with their parents. Percent Consonants Correct (PCC) and Percent Vowels Correct (PVC) measures were calculated from the speech samples. PTA was associated with speech production at 5, 6, and 7 years of age, meaning better hearing was significantly correlated with better speech scores on all measures. Surprisingly, age factors were not associated with any of the speech outcome measures at any age interval. Therefore, hearing loss severity with use of hearing aids was the most salient predictor of speech development in children with hearing loss.

Counseling & School Psychology

Ruby Bell

Mentors: Sharon Obasi & Richard Mocarski

Title: Gender Affirming Healthcare, Cultural Competency, and Training of Professionals

Transgender and Gender diverse (TGD) persons, approximately 1% of the U.S. population (Gates, 2011), often report barriers to adequate healthcare resultant of stigma and social discrimination (Norton and Herek, 2013; Holt, Hope, Mocarski & Woodruff, 2018). These barriers may include suboptimal care and even denied access to care (Redfern, 2014). The difficulty in obtaining adequate healthcare is compounded in rural communities where there are already limited healthcare providers (Healthy People, 2010).

One reason for suboptimal healthcare may be the educational preparedness of healthcare providers. The purpose of this study, therefore, is to assess the educational preparedness of healthcare personnel in rural settings to provide gender diverse affirming healthcare; to identify any deficits in the provision of healthcare; and, to determine any recommendations that may be utilized to minimize or eliminate deficits.

Two hundred participants will complete an online Qualtrics survey to assess their educational preparedness to provide gender-affirming care. Participants will include healthcare trainees or professionals as follows: Group1 – first or second year healthcare trainee (n=50), Group2 – third or fourth year healthcare trainee (n=50), Group3 – early professional (less than 5 years in practice; n=50) and Group4 – professional (5 or more years of practice; n=50).

Robyn King

Mentor: Richard Mocarski

Title: An Assessment of Self-Proclaimed Transgender and Gender Diverse Behavioral Health Providers

Health disparate and stigmatized groups often have trouble gaining access to care. Barriers to care include financial and physical issues and for stigmatized groups can include inappropriate or refusal of care. This is true for the Transgender and Gender Diverse (TGD) individuals, a growing segment of the population that estimates number 1% of the US. TGD persons have a heightened need to see behavioral healthcare providers due to elevated rates of anxiety, depression, and suicidality in the population. Furthermore, they are at the whims of archaic systems of gatekeeping for gender-affirming care that require one or two letters from behavioral healthcare providers prior to gender replacement therapy or affirmative surgical procedures--all procedures that have been shown to reduce depression and suicidality in the population. To find affirming providers, the population often turns to internet searches for gender-affirming behavioral healthcare professions. Therefore, the current study was an assessment of self-proclaimed TGD-affirming behavioral healthcare providers. The survey specifically looked at the providers' education and preparedness to work with the TGD population. Participants were selected through google incognito searches of 25 states and recruited via publicly available email addresses collected from the providers' public websites. Through an online Qualtrics survey, participants answered a series of questions about education, preparedness, and comfort levels when working with TGD clients. The implications of these findings could help guide the requirements for behavioral healthcare providers who work with TGD clients.

English

Tessa Burford

Mentor: Maria O'Malley

Title: Literary Portraiture: Framed by Societal Constructs

American author Henry James' novel, The Portrait of a Lady, semi-autobiographically explores the experiences and influences of travel abroad in Europe on the young American individual, which has long been critically fascinating. The social restrictions placed on gender roles and the perception of the individual during the Victorian-era, which was, ultimately, a period of intense social change, affected men and women, alike. The burden of societal expectation is displayed and explored throughout The Portrait of a Lady, particularly in its protagonist, Isabel, and the way she is viewed, exhibited both as an understandable character and as an image to behold. James' novel also explores the flip-side by examining the repercussions of an absence of the same social obligations that seemed to plague Isabel, as evidenced in the character of Ralph. These societal expectations greatly influence the choices and actions of individuals and these culturally-constructed perspectives affect the way the characters view themselves, their sense of responsibility as members of society, and the way they are viewed and understood by readers. Even the most uniquely willful members of a community are impacted by the culture of the society in which they live, as represented by Isabel. Her status as both highly independent individual and foreigner abroad act as a catalyst for exploring the tensions culminating during the era, such as American values versus Romantic culture and ideals, as well as the individual versus society and its expectations. Whether in Ralph's isolation from society and liberation from traditional roles, Isabel's abandoning of individualism for the preservation of social constructs, or even just in the way the characters are viewed by themselves, one another, and the reader, The Portrait of a Lady is teeming with examples of culturally enforced gender roles and the lasting effects of such on the psyche.

Zach Weber

Mentor: Maria O'Malley

Title: Syntactical Patterns and Rhetorical Modes in Modern Political Discourse

Classical rhetorical cannons have given way to ad hominem attacks in the wake of the exacerbated political polarization. Blatant character assassination in all levels of politics has become far more prevalent than respectful disagreement, concession to the opposition, or even veiled criticism. This essay objectively compares the rhetorical methods used by presidents Donald Trump and Barack Obama. The 44th president, Barrack Obama, was a skilled orator who used classical rhetorical methods and presented prepared argumentative speeches in formal settings. The 45th president, Donald Trump, frequently extemporaneously on social media. The language, devices, and syntax of each are starkly different. It is nearly impossible to compare the language and the methods and modes of their language side by side; however, both men have great control over their base and have swayed voters to their opinions repeatedly. Each of these two men continues to be extremely persuasive and influential despite their contrasting styles.

History

David Blakely

Mentor: Douglas Biggs

Title: Mormon Church Participation in the Great War Effort: The Coming of Age of a Nineteenth Century Religion

When the United States of America entered the World War I in 1917, a diverse population took up the cause of international liberty and largely abandoned previous policies of isolationism. The Church of Jesus Christ of Latter-day Saints was one of the groups that enthusiastically supported the war effort but also saw the conflict as an opportunity to prove their patriotism, and their loyalty to America. However, the church encountered some unique challenges along the way that included the need to justify violence towards the soldiers of the Central Powers, create a policy regarding German-American members and members residing in Germany and other enemy nations, and the expanding role of women in twentieth century society.

This paper will examine the war efforts organized by The Church of Jesus Christ of Latter-day Saints through its local congregations and church-wide service programs, and discuss the effectiveness of the programs. It will also look at the level of involvement of church leaders in each of these programs, and how the choice of activities reflected church doctrine and policy that was influenced by previous persecution by government agencies, and a perception that the Mormon community did not accept the same values as the rest of the United States.

Justin Horn

Mentor: Mary Ailes

Title: Effects of Climate on the British Isles and English Civil War

The paper looks at the effect of climate, specifically the Little Ice Age, on seventeenth century Great Britain. Climate is an important contributor to history, but is too often overlooked by historians. The Little Ice Age was a key contributor to troubles in the British Isles in the seventeenth century. The climatic changes the Little Ice Age brought to the British Isles helped foster an environment of strife which led to the English Civil War. The cool climate effected military campaigns during the

English Civil War. Also the changing climate effected wind patterns making William of Orange's invasion of England during the Glorious Revolution possible.

Nathan Mauslein

Mentor: Mary Ailes

Title: An Empire Divided: The Rivalry between Austria and Prussia from the Prussian Perspective

Midway through the early modern period, Central Europe experienced a relatively rapid shift in the balance of power and the creation of a two-century long rivalry. The rivalry between the House of Habsburg in Austria and the House of Hohenzollern in Prussia was formed over the course of the mid seventeenth century and the mid eighteenth century, with Habsburg Austria losing its hegemony over Central Europe, and Hohenzollern Prussia rising from Germanic backwater to a European superpower. This shift in political fortune stems from three key events in Prussian history, the Thirty Years War and Peace of Westphalia, the militaristic reign and creation of the Prussian military state under Friedrich Wilhelm I, and lastly the reign of Friedrich II (Frederick the Great) and his opposition to Austria in the Silesian Wars. Despite possessing a massive disparity in the size of its land, population, and economy relative to Austria, the Hohenzollern rulers turned Prussia into a Spartan state that punched far above its weight, and as a result became a direct challenge to Austria over the next two centuries.

Meaghan Pasbrig

Mentor: Jeff Wells

Title: Camp Grant Massacre of 1871: The Trial

The Camp Grant Massacre was an unprecedented moment of unspeakable violence by a diverse group of Anglo-Americans, Mexican Americans, and Tohono O'odham Indians against Apache Indians who lived on Camp Grant in the southern part of the Arizona territory in 1871. The attacking group slaughtered 144 Apache women and children at dawn on April 30, 1871. This tragic even was taken to trial where Apache Indians were ignored and practically omitted from participating. The court did not hear one testimony from an Apache Indian and after five days of trial the jury took nineteen minutes to declare the offenders "not guilty." After reviewing primary documents and various secondary resources this paper aims to review the trial that took place and evaluate the quality of representation given to the Apache Indians after this massacre. It was clear that this was an unfair trial conducted through the lens of prejudice and unequal practices in the court system in the Arizona territory in the late 1800's.

Blake Weeder

Mentor: David Vail

Title: Water, Fuel, and Forage: Environmental Realities and the Viability of Fort Kearny on the Platte

This project explores human-environmental relationships that shaped military decision-making at Fort Kearny and defined the viability of the outpost and its mission. The focus of this project is on human relationships forged with the outpost's surrounding ecology and the natural agency of local environmental factors. It argues that in the selection of a site for a military post on the Platte River, military engineers recognized "natural enemies" and "natural allies" within the local environment. With the necessitation of natural alliances in mind, components of the environment deemed essential to the sustainability of an American presence on the Platte and the nation's ability to secure and maintain an avenue for westward emigration were incorporated into the fort's planning – demonstrating that Fort Kearny became both reliant on and an extension of the local ecology. A discussion of natural agency in this case study reveals the limits of human-environmental relationships, tracing environmental impediments to the viability of a military outpost on the frontier, and its increasing reliance on larger, national environmental exchanges. Regional population expansion and technological innovations during Nebraska's tenure as a Territory extends this discussion of Fort Kearny's dependence on a regional ecology, recharacterizing the outpost's place within growing territorial and transcontinental ecosystems of communication, economic exchange, and transportation, which both challenged the fort's bonds with its immediate surrounding environment and questioned the necessity of a frontier outpost in a changing world.

Gregory F. Withrow

Mentor: Mark Ellis

Title: Two Sides of One Coin: Base Differences Between World War II British and American Airborne Force Structures

The first combat employment Allied of gliders in World War II initiated the invasion of Sicily in a tragic air assault upon the Mediterranean island. Delivering British infantry via tug aircraft towing a combination of Horsa and WACO gliders, British and American powered-aircraft aviators and glider pilots contended with the chaos of war, harsh weather, and even one another in Operation Ladbroke. The tense relations between Allied pilots attempting to carry out the invasion led Glider Pilot Regiment commander British Lt. Col. George Chatterton to campaign for a consolidation of British pilots, glidermen and paratroopers under one command after the resulting disaster. Suffering the fate of other men under his command, Chatterton's glider landed in the darkness of the sea short of Sicily. His

first-hand experience inspired his efforts to restructure the Glider Pilot Regiment, but these hard-learned lessons never translated into American airborne force structure. Despite complaints from U.S. airborne commanders, American paratroopers, glidermen and their pilots remained contentiously estranged until the very end of the war—when 17th Airborne Division leaders called upon glider pilots of Troop Carrier Command to fill a gap and form an infantry company, fighting alongside one another as equals after landing on the eastern bank of the Rhine during Operation Varsity, March 24, 1945. It is impossible figure how American airborne operations might have been effected had a similar command structure to the British been adopted, but on this day the glider pilots proved their capabilities in combat.

Kinesiology & Sports Sciences

John Rech

Mentor: Megan Adkins

Title: A Catalyst Between Two Different Realms of Education: The UNK Home School Physical Education Program

The definition of a catalyst is a person or thing that precipitates or causes an event, provoking a significant change, action, or impact. The UNK home school physical education program can be considered the catalyst to better prepare our future educators in the area of physical education, and positively impact children who are home schooled. The UNK home school physical education program is a hybrid education opportunity, combining physical education teachings for Kindergarten through 8th grade home school children with the experiential and practical education opportunity for university pre-service teachers pursuing the physical education profession. This presentation will serve as a review of the research completed alongside this program and additional impacts the UNK home school physical education program has had on all entities involved since its inception.

Teacher Education

Tina Schumacher

Mentor: Maria O'Malley

Title: Deeper Understanding is Forged Through Allusion

Political speechwriters search out the best possible words to express meaning their immediate audience and to audience who will be reached through other media. Captivating the audience is essential in order to be truly heard and one of the best ways to connect with an audience is to speak words they have heard before, to allude to messages from the past that carry emotional, logical, or moral (pathos, logos, ethos) weight. Political orators of the past and present often use the words of wisdom from history. When President Abraham Lincoln delivered his second inaugural address, he depended on this shared history to bring the people of the country together to rebuild the nation toward the end of the Civil War. This paper analyzes Lincoln's Second Inaugural address and its permutation through quotation and allusion in American culture. In particular, I focus on the line starting, "With malice toward none, with charity for all, …." The lines have been quoted and misquoted by many subsequent speakers and writers. But by reading the line in context of Lincoln's speech, I argue that when speakers use words that allude to the past they create a shared of the past to promote a shared sense of belonging among citizens.

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