

*19th Annual  
University of Nebraska at Kearney*

# *STUDENT RESEARCH DAY*

*Tuesday, April 11th,  
2017 in the Nebraskan  
Student Union*





# Schedule of Events

Tuesday, April 11, 2017



7:30 am to 9:00 am ..... Students set up posters in  
Pondersoa Room of the Nebraskan  
Student Union

9:00 am to 11:00 am ..... Poster Judging

12:00 pm to 1:15 pm ..... Luncheon with Guest Speaker,  
Dr. Christine E. Cutucache

1:30 pm to 3:30 pm ..... Oral Presentations & Performances  
Open Poster Viewing

3:30 pm ..... Awards Ceremony & Reception

# Guest Speaker

Dr. Christine E. Cutucache, Ph.D.



Christine E. Cutucache, Ph.D. is the Haddix Community Chair of Science and Assistant Professor of Biology at the University of Nebraska at Omaha (UNO) in the College of Arts and Sciences.

Hailing from Jackson, Wisconsin, Dr. Cutucache traveled to Nebraska to complete her education. She received her Bachelor of Science from the University of Nebraska at Kearney in 2008 and her Doctor of Philosophy in Genetics, Cell Biology, and Anatomy in 2012 from the University of Nebraska Medical Center. Dr. Cutucache worked as an Instructor at UNO from 2012-2014 and then was appointed the Haddix Community Chair and Assistant Professor of Biology in 2014.

Dr. Cutucache studies tumor immunology (specifically tumor-induced immunosuppression in B- and T-cell leukemias and lymphomas) as well as Discipline-Based Education Research (so called 'DBER'). She is interested in student-centered, inquiry-based practices to improve learning outcomes.

As an undergraduate, Dr. Cutucache was active in undergraduate research and now leads a productive laboratory filled with undergraduates, affording them the same opportunities. Dr. Cutucache teaches microbiology and cancer biology as well as courses to prepare graduate students and teachers to conduct DBER.

Dr. Cutucache leads an after school outreach program called NE STEM 4U to provide high-quality, engaging immersion experiences for youth in science, technology, engineering, and mathematics. A team of undergraduates (currently 50) implement the after school STEM lessons as part of their pre-professional training in 3 areas: teaching, research, and mentorship. The NE STEM 4U project is a collaborative project between the University and Community Partners and stakeholders.

During her tenure, Dr. Cutucache has secured \$6.7 million in funding, and has published 25 peer-reviewed articles on her research. She has delivered over 40 presentations on her work around the world with most including undergraduate research students as co-authors or co-presenters.

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# Poster Abstracts



## Fine Arts & Humanities

### Communication

#### **Poster 1 – Samuel Harper**

Mentor: Dr. Nanette Hogg

Title: *Determining Factors Influencing Recycling Habits in College Students*

The purpose of this study is to determine the internal and external factors that affect UNK students' outlook on recycling. The study highlights statistics of recycling habits of UNK college students and the determining factors as to what makes these college students want to recycle. It is an important topic because college students are the future leaders of the world, and how they decide to use resources will impact the world on a large scale. Information regarding students' recycling behavior and attitudes were collected in an online survey. A group of 1000 randomly picked UNK students were invited to take the online survey. The results were studied and researchers found significant differences between recycling habits and categories of wealth, political party, college year, academic program, and housing style. A website

was created to display interactive information about recycling habits of UNK college students. The website displays the results of the study and also shows UNK students how they might be able to make a difference in the environment. The purpose of the website is to inspire college students to recycle. A website brings the necessary information to a medium that college students can easily access. By collecting information on current recycling habits, college students will have a chance to make the world cleaner for future generations.

#### **Poster 2 – Simon P. Tye**

**Co-Authors – Michael Forsberg, Emma Brinley Buckley & Jeff Dale**

Mentor: Dr. Mary Harner

Title: *Phenology of a North American Beaver (*Castor canadensis*) lodge near the Platte River, Nebraska with time-lapse photography*

North American beavers (*Castor canadensis*) modify ecosystems by felling trees, damming waterbodies, and building structures. Many studies have focused on these terrain modifications, specifically their influence on hydrology, habitat heterogeneity, and niche diversity in the surrounding environment; however, few studies have quantified commensal or opportunistic activities directly associated with their structures. We used time-lapse photography to monitor a beaver lodge on

a human-excavated pond adjacent to the Platte River in central Nebraska. We captured images every ten minutes over nine months with a modified security camera and recorded beaver activity, lodge maintenance, and other animal activities. We compared activity patterns to hydrologic, temporal, and weather conditions. Herein we describe the activity patterns of beaver, other animals, and the changing structure of the lodge, as well as observations of dozens of other species associated with the lodge during distinct seasons and time periods. We also illustrate how visual imagery can be combined with biological data to further the understanding of science and ecological interactions in presentations to both technical and nontechnical audiences.

## English

### **Poster 3 – Megan Kreutzer**

Mentor: Dr. Martha Kruse

Title: *Caution: Censored Material Ahead*

This research project examines the geographical trends involving censored, challenged, and banned books in K-12 settings across the United States. Twenty of the most commonly banned and challenged books are examined to identify geographical patterns and the basis of challenges, including social justice themes and authors' treatment of diversity. Even if clear regional/geographical and/or thematic trends do not emerge as a result of the study, the examination of these books will still yield interesting data regarding censorship and the school curriculum. This study will also examine the effects of

self-censorship among educators through a survey sent to members of the National Council of Teachers of English (NCTE). The survey provides current data regarding external and self-censorship among Language Arts teachers throughout the United States.

Overall, the research conducted in this project will provide information about banned and challenged books, including geographical and self-censorship trends.

### **Poster 4 – Ian Roesler**

Mentor: Dr. Denys Van Renen

Title: *“An Irish Entertainment”*: George Farquhar, Comedy, and the English Stage

Helen Burke astutely asserts that, although stereotypical in nature, the abundance of Irish jokes in England during the Restoration period of drama shows not only the disdain of the English toward the Irish, but also informs the lives of the Irish as immigrants. From the several volumes of Irish joke books in 17th and 18th century England, Burke gleans a better understanding of the plights and attributes of the Irish immigrant through English humor such as cultural aspects, work ethic, inventiveness, and magnanimity. The Anglo-Irish playwright of the early 18th century, George Farquhar, utilized the medium of comedy and the stereotypical Irishman as a means to both reinforce and challenge the English narrative. Through his Irish characters Farquhar both entertained his audience and set the stage for a different narrative of the Irish migrants. Using an Irishman by the name of Foigard in *The Beaux' Stratagem* (1707) who disguises himself as a French priest to reinforce the stereotypical nature

of the Irish, Farquhar also embeds in his works characters that stir the feelings of the English at the time. In his early play *Love and a Bottle* (1698), Roebuck, a penniless debonair who travels to England to escape his fate as a father, challenges the English stereotypes with his charm and ability to socialize within English society. Teague and Macahone also challenge the stereotypes of the Irish fool in *The Twin Rivals* (1702) and *The Stage Coach* (1704) respectively, as these characters work to bridge the gap of two nations not that dissimilar from Farquhar's perspective. While some argue that these four characters harden Irish stereotypes, I insist that they ultimately challenge the stage Irishman in English society and lay the foundation for a true Irish identity through comedy.

### **Poster 5 – Ashley Shaffer**

Mentor: Dr. Megan Hartman

Title: *The Benjamin Harris Story: a Science Fiction Novel*

For my undergraduate research project, I have worked over the past year with Dr. Megan Hartman on writing a science fiction young adult novel. The basic premise of the novel is that a young man who was in an accident is saved by having his mind uploaded into a virtual reality program. However, everything begins to go wrong when he realizes the company that saved him is not as trustworthy as he thought.

The first learning objective of this project was for me to write and produce a publishable manuscript, or at least the working draft of said manuscript. The second objective of this project was for me to increase my personal knowledge of what constitutes a good novel in my

selected genre (science fiction), including plot structure, world building, characterization, etc. This goal has been achieved both through the writing of the novel and by reading supplemental materials. The supplemental materials have included primary texts like the *Otherland* tetralogy by Tad Williams and *Ready Player One* by Ernest Cline, which are similar books to the one I am working on. I have also read secondary texts like Stephen King's *On Writing*, which have broken down the science fiction genre through analysis and provide a more concrete explanation of the genre and its elements.

## History

### **Poster 6 – Halley Gaucher**

Mentor: Dr. Jinny Turman

Title: *Frank Museum Stenciling*

This research project started as a class project and then became an internship. As a class, the question was how should the interior of the Frank Museum reflect the past and how to preserve the history? In order to understand the interior of the house, there are some original photographs and exposed stenciling remaining from the Frank family to get a clear image. However, there are rooms that the photographs are unclear images of the remaining stenciling and unable to reproduce a close match to the stencil. These rooms require researching the stencil patterns that were popular during the 1880s-1890s. Each room on the first floor will have stenciling that fit the context of the room and the aesthetics of the time period. Obviously, the stenciling in the servants areas will be less



elaborate than the great hall. The process of stenciling is being done different than it would have in 1889 when the house was built. For the most part the original stenciling was done from a pattern, but mainly by hand which means there are some imperfections. Today the stencil pattern is laser cut onto a sheet of Mylar. Then temporarily placed on the wall and measured to ensure the pattern is even. Once the stencil is properly placed and taped on the wall it is painted with a color that is fitting for the room or the particular stencil. Unfortunately, it is expensive and time consuming to redo the stenciling the original way. The paint that would have been used was vegetable based and the shimmer of the stencil was from gold leaf. The paint that is used is latex and the shimmer is metallic paint. The differences lead to the main goal, to restore the stenciling to get a clearer picture of the house interior.

## Modern Language

### **Poster 7 – Elizabeth Schott**

Mentor: Ana Tejada

Title: *Teaching vocabulary: A multiple case study of ELL teachers*

With the increasing number of students that do not speak English or need to improve their proficiency while attending Central Nebraska elementary schools, it is important to engage students through different techniques. Game-based learning is a strategy that may be used by teachers to engage students and improve their language skills and more specifically academic vocabulary. The aim of this study is to prove the effectiveness of the usage of games when building academic

vocabulary for English Language Learners (ELL). This study will examine whether elementary ELL students gain as many benefits as middle school ELL students from engaging in game-based learning. ELL teachers in Central Nebraska were invited to participate in an interview about their teaching methods and how they incorporated games into their lessons when building academic vocabulary. The results of this study found that incorporating games into learning resulted in students having fun and advancing their vocabulary.

## Music & Performing Arts

### **Poster 8 – Tierney Casper**

Mentor: Dr. Sharon Campbell

Title: *The Effects of Music and Swimming Therapy on Children Diagnosed with Autism Spectrum Disorder*

In the 2016-2017 academic year I have researched techniques of music therapy and swimming therapy and the affects these two therapies have on children diagnosed with Autism Spectrum disorder. I found that both music and swimming therapies tend to be used as calming protocols to relieve stress and anxiety in these children. My Student Research Day poster will present abstracts from my literature review as well as my proposal for future research, including a case study next year which will strive to integrate the two therapy modes into a calming protocol for Autistic children.

**Poster 9 – Jordan Isabella Hoppens**

Mentor: Dr. Valerie Cisler

Title: *Fostering Metacognitive Skills via Piano Curriculum*

Metacognition (the process of thinking about thinking) allows students to handle abstractions and transfer their comprehension across disciplines. Students possessing metacognitive skills are capable of growing into independent learners. As a piano instructor, one should strive to provide students with an understanding of both self-awareness and the foundational skills in ‘how’ to learn. The field of music exemplifies the necessity for the development of metacognitive proficiency while also offering the opportunity for daily practice. This project was designed to provide students with effective strategies for learning metacognitive aptitudes through the use of programmatic piano literature from each major musical era: Baroque, Classical, Romantic, and the 20th c. For novice musicians, program music provides easier access to imagery, aiding in musical interpretation. Potential technical and interpretive challenges for each piece were identified and specific pedagogical strategies developed to enhance a student’s metacognitive cognizance. Strategies address aural/kinesthetic awareness, music theory analysis, and imagery (as related to the programmatic elements of the repertoire). Students’ mastery of metacognitive skills will be assessed through the assignment of an “on-your-own” piano piece that demonstrates successful independent learning.

**Poster 10 – Alyssa Wetovick**

Mentor: Dr. Sharon Campbell

Title: *Music Teachers National Association, Young Artist Competition*

In January, 2017, I traveled to Boulder, Colorado to compete as Nebraska’s representative in the West Central Regional Division of the Music Teachers National Association, Young Artist Competition. Serving as the representative for Nebraska took countless hours of preparation, both individually, and with my collaborative pianist, Dr. Jayoung Hong. In order to be selected as Nebraska’s representative, I prepared seven different selections that encompassed at least four different languages.

The songs that were selected to complete my recital program came from a variety of musical and historical eras. Wolfgang Amadeus Mozart, Maurice Ravel, and Aaron Copland are examples of a variety of composers who wrote my program selections. Classical, Romantic, and twentieth century styles were all showcased in a well-rounded and pleasing program.

# Behavioral & Social Sciences

## Criminal Justice

### **Poster 11 – Courtney Hays**

Mentor: Dr. Julie Campbell

Title: *Victimization Among Law Enforcement Officers: An Assessment of Officer Perceptions*

At first, viewing law enforcement officers as victims of crime may be a difficult concept to grasp. Law enforcement officers are often viewed as strong and fearless, but rarely as victims. Unfortunately, because of the dangerous nature of the occupation, thousands of law enforcement officers are injured or even killed in America every year. According to the Bureau of Labor Statistics, the risk of injury and physical assault when law enforcement officers perform daily professional duties surpasses most other occupations (Bureau of Labor Statistics, 2015). In 2013, the Uniform Crime Report reported that 49,851 law enforcement officers were assaulted in that year alone, and 29% of those officers sustained significant injuries (Uniform Crime Report, 2014). In addition to physical injuries, officers are also subject to emotional injury, trauma, and fear. The impact of physical and emotional injury, and more specifically whether or not law enforcement officers are fearful while on and off duty, has not

been extensively researched. This research explores how fearful law enforcement officers are when performing their job duties, as well as the factors that contribute to that fear. Data was collected through in-depth interviews conducted with sworn law enforcement officers from multiple agencies in Central Nebraska.

## Family Studies & Interior Design

### **Poster 12 – Julie Bruns**

Mentor: Dr. Toni Hill

Title: *Infant Communication: Exploration of non-verbal communication in infants*

This project will be a poster presentation exploring existing research on non-verbal communication with infants including the teaching of sign language to infants. Multiple studies have been reviewed that focus on infant signs with each one emphasizing a different attribute. In exploring these studies, each study has been summarized and salient information categorized to allow for cross study comparisons. This project will be beneficial with future research and studies within the topic to learn more about the intersection of signs, communication, and child development.

### **Poster 13 – Deavon Carey**

Mentor: Dr. Mickey Langlais

Title: *Do Siblings Know Best?: The Role of Sibling Approval for Romantic Relationships*

Studies have illustrated that relationships with siblings during young adulthood may

mirror adult relationship quality (Roberston, Shepherd, & Goedeke, 2014), but few studies have examined how approval of a relationship by siblings may impact relationships between siblings as well as the quality of individual romantic relationships, despite calls from researchers (Killoren & Roach, 2014; Miller, 2012; Susan, McHale, & Feinberg, 2015). The goal of this study is to examine how individuals' approval of sibling romantic relationships influences the quality of their siblings' romantic relationships. We hypothesized that sibling approval would positively predict siblings' relationship quality. Participants were recruited online via advertisements in local Facebook pages, resulting in a sample size of 94 (88.3% female, Mean age = 21.3, 92.6% white) participants and 26 of their siblings (61.5% female, Mean age = 23.5, 92.3% white). Hierarchical multiple regression analyses revealed that participants' approval of their siblings' romantic relationships was positively related to perceptions of sibling's relationship quality. For instance, approval was positively associated with relationship satisfaction ( $B = .88, p < .001$ ), commitment ( $B = .58, p < .001$ ), and communication ( $B = .57, p < .001$ ). However, participants' approval of siblings' actual relationship satisfaction was not significant ( $B = .04, p = .85$ ). Additionally, siblings' approval of participants' relationships was not significantly associated with participants' relationship satisfaction ( $B = -.02, p = .93$ ). Based on findings of this study, participants are likely to perceive their siblings' relationships are lower in quality if they do not approve of these relationships. Yet, approval does not appear to significantly predict the actual

quality of these relationships. Implications regarding sibling relationships and romantic relationship quality will be discussed.

#### **Poster 14 – Shannon Duff**

Mentor: Dr. Mickey Langlais

Title: *"Are we on the same team?": The influence of relationship status and quality on athletic performance*

Although there have been studies regarding relationships and sports (Gardner, Vella, & Magee, 2015; Jackson et al., 2017), few studies have examined how relationship status and quality of relationships influences athletic performance. Current research shows that performing well in sports can be conducive for relationships, but the reciprocal relationship has yet to be explored (Miller, 2012; Moran & Weiss, 2006). It is important to understand how relationship status and quality predicts athletic performance in order to help athletes and athletic teams maximize their potential. In essence, by performing well in sports, individuals' romantic relationships can become stronger. In order to address these limitations in the literature as well as address this important issue, I will examine if there is an association between relationship status and quality for athletes' levels of athletic performance. Data for this study comes from an online survey of athletes from the University of Nebraska-Kearney. A variety of sports will be represented through this research project. I will use multiple regression analyses to address the objectives of this study. Further implications of this study will be discussed.

**Poster 15 – Breanna Hiner**

Mentor: Dr. Toni Hill

Title: *Preventing Assault: Title IX Training on Single-Sex Campuses*

Sexual assault is a common occurrence on college campuses with 23.1% of females and 5.4% of males experiencing an assault while undergraduate students (Rape, Abuse, and Incest National Network, 2016). Title IX is a federal policy that works to create gender equity in educational settings. Most recently, Title IX has been applied to sexual harassment and assault, especially on college campuses. Sexual assault occurs to both men and women and occurs on coed and single-sex campuses. The purpose of this project was to identify Title IX training programs present on single-sex campuses. These programs could be either mandatory or optional for either students or staff and faculty. Each aspect was considered. Eight campuses were identified from previous projects and their campus websites were searched for specified search terms. It was found that many of the campuses had programs available, both mandatory and optional, for students. However, programs for staff and faculty were not found as frequently. In order to keep campuses safe, students and staff should be well informed about Title IX and related policies.

**Poster 16 – Molly Moeller**

Mentor: Dr. Mickey Langlais

Title: *Social Media Takeover: Exploring the Role of Attachment*

The use of social media has grown exponentially over the decade. Currently 1.18 billion people check Facebook daily, which represents approximately 1 out of

every 7 people in the world. Despite the popularity of Facebook, individuals commonly report using multiple social media platforms (Piwek & Joinson, 2016; Utz et al., 2015), which could potentially increase the frequency and duration at which people check social media. The top four most popular social media platforms are Facebook, SnapChat, Instagram, and Twitter (Lenhart, 2015). Recent studies have demonstrated that attachment style is related to Facebook use (e.g. Fox & Tokunaga, 2015). However, few studies have examined the role of attachment style and security for how and why individuals use social media. The goal of the current study is to examine how the four different adult attachment styles (secure, fearful, preoccupied, and avoidant) use social media, why they use social media, and the implications of using social media for their well-being. Data comes from 55 college students who completed a daily diary for ten straight days regarding their social media use. First, we examined mean differences in social media use across each attachment style using ANOVAs and Bonferroni post hoc analyses. Results revealed that preoccupied individuals reported significantly higher means and maximum time spent on Facebook than individuals who were secure. However, there were no mean differences for other social media platforms. Next, using hierarchical multiple regressions attachment security is positively associated with the number of minutes individuals spent on SnapChat daily ( $B = .41, p < .05$ ). However, attachment security and style were not associated with daily minutes spent on Facebook, Instagram, and Twitter. Based on these results, attachment style can help explain how

and why people use social media. Implications regarding attachment security and social media use will be discussed.

**Poster 17 – Siera Schwanz**

Mentor: Dr. Mickey Langlais

Title: *Examining the Moderation of Sex and Centrality of Religiosity for Affectionate and Sexual Behaviors*

No studies to date have examined the importance of centrality of religiosity for relationships, meaning couples in romantic relationships doing religious activities together. Centrality of religiosity for romantic relationships may explain the association between religiosity and sexual behaviors in a relationship better than individual or partner religiosity. Previous studies primarily focus on individual religiosity and romantic partner religiosity, leaving a gap in understanding the overall centrality of religiosity within the romantic relationship. While the studies that do look at both partner religiosity and individual religiosity use single-item measure of what a couple would do together religiously this study used a stringent measure of centrality of religiosity for the romantic relationship. Additionally, studies have illustrated a gender difference regarding religiosity and sexuality. For example, one study found that women were more likely to have regular religious practices than men and regular religious practices was significantly associated with delayed onset of sexuality (Moreau, Trussell, & Bajos, 2013). Therefore, we also examine the moderating effect of gender and centrality of religiosity for sexual and affectionate behaviors. Data for this study comes from an online survey of young

adults from a region in the Midwestern United States (N=318). Hierarchical multiple regression analyses were conducted address the goals of the study. Results show that gender significantly predicted affectionate behaviors, intimate touching behaviors, and oral intercourse behaviors, illustrating that female participants reported significantly higher frequencies of these behaviors than male participants. Centrality of religiosity was negatively associated with each measure of affectionate and sexual behaviors. Additionally, the moderation between gender and centrality of religiosity was associated with affectionate behaviors, intimate touching, and oral intercourse behaviors. Participating in and discussing religiosity and spirituality may promote intimacy, prompting increases in affectionate and sexual behavior. Additional implications for romantic relationship development will be discussed.

## Geography & Earth Sciences

**Poster 18 – Trey Ertmer**

**Co-Authors – Nathan Moore & David Urban**

Mentor: Dr. Paul Burger

Title: *A GIScience Location-Allocation of a National Weather Service (NWS) Radar Tower in the Great Plains*

National Weather Service (NWS) Radar Towers are dispersed throughout the United States and are strategically placed to cover as much of the U.S. population as possible. A few areas are not covered by these radar towers, but for the most

part, they are not prone to extreme weather events that occur east of the Rocky Mountains. In the Great Plains of the United States, extreme weather is a common occurrence in the spring and summer months in the region spanning from North Dakota, south to Texas. Currently, in this severe weather prone region there is an area that the NWS towers do not cover in central South Dakota and northern Nebraska where there is a significant unserved population. A maximum coverage location-allocation in ArcMap is used in conjunction with block group level population data, existing radar towers and a street network to identify a site for new a NWS radar tower that covers the majority of this unserved population to provide them warning in the event of severe weather.

#### **Poster 19 – Jordyn Goodman**

Mentor: Dr. H. Jason Combs

Title: *Stalin and the Forced Migration of Union of Soviet Socialist Republics*

World War II changed the dynamic of several countries in Europe. The way that each functioned within their own borders as well as interactions with those outside their territory. Over the course of the late 1920s and throughout the 1930s, Joseph Stalin took control of the Union of Soviet Socialist Republics. Stalin took Lenin's ideas of communism and applied his own personal touch to it. For one, Stalin implemented his migration program during this period and it slowly expanded. It was not until the new world organization during and after WWII that real opportunity for Stalin to change the internal boundaries of Russia was created. Over the course of twenty years Stalin changed how individuals lived in

the Union of Soviet Socialist Republics (USSR). This project considers how Stalin's personal troubles ultimately shaped his politics and played a role in forced migration patterns in Russia.

#### **Poster 20 – Amanda Kirkland**

Mentor: Dr. Nathan T. Eidem

Title: *An Assessment of the Potential Impacts of Brexit on Tourism*

This article explores the potential effects on tourism the United Kingdom's (UK) vote to leave the European Union (EU) will have. Historical tourism trends are analyzed from The World Travel and Tourism Council's (WTTC) database along with relevant cases from the literature. Comparisons are made between similar key events, such as the formation of the EU, and the contribution of tourism to GDP and other data. Based on this assessment, potential future scenarios for the UK's tourism industry are presented for both international and domestic travel. Though the focus is on the UK, a broader discussion of potential impacts on the EU is included.

#### **Poster 21 – Ben Wagner**

**Co-Authors – Allen Chlopek, Justice Mott & Spencer Sydow**

Mentor: Dr. Paul Burger

Title: *GIScience Site Selection of a Nebraska Community College*

The mission statement for Central Community College in Hastings, Nebraska, encapsulates the goal of Nebraska's community colleges, "to provide access to quality student-centered instruction and learning support systems for individuals desiring higher learning." This study seeks to locate a

new community college in Nebraska. Geographic Information Science (GIScience) technology and the maximum coverage location – allocation heuristic are used in conjunction with 2015 Census Block Group data (demand) and existing community college locations (supply) to identify a new location that maximizes the targeted adult population attending community colleges within 100 network miles of each campus. Potential sites include any block group within two miles of town in which no current community college exists. A location 45 miles west O'Neill, Nebraska is identified that meets all of these criteria.

#### **Poster 22 - Natasha Winfield**

Mentor: Dr. John Bauer

Title: *The Transcontinental Airmail Route in Nebraska*

This poster researches the history of the transcontinental airmail route through the state of Nebraska. The transcontinental airway extended from San Francisco, California to New York City, New York. The airmail service ran from 1918-1924. Pilots navigated the airway with the help of bonfires, concrete arrows, beacon lights, and newly developed radio signaling. This poster is to look specifically at the airmail route through the state of Nebraska. There were two major stops through the state: North Platte and Omaha. I collected my data sources with the help of historical Nebraska Aeronautical Charts and reliable resources such as the Federal Aviation Administration (FAA) and other various published articles and books.

#### **Poster 23 – Natasha Winfield**

Mentor: Dr. Jason Combs

Title: *Nebraska's Century and Heritage Farms*

This poster examines the land tenure and ownership of century farms—a term to note agricultural land held by a single family for more than 100 years—in Nebraska. Other states, such as Ohio and Tennessee, have evaluated patterns of settlement and ownership over time. To our knowledge, no studies have spatially analyzed Nebraska's century farms. This poster examines the settlement and ownership of Nebraska farms which have been owned by a single family, some from before statehood until now, using Geographic Information Science (GIS). Primary data was gathered from The Aksarben Foundation which maintains records for both Century Farms and Heritage Farms—those held by a single family for 150 or more—as well as reliable resources from various published articles and books.

## Kinesiology & Sports Sciences

#### **Poster 24 – Nicki De Vries**

Advisor: Dr. Megan Adkins-Bollwit

Title: *Are Homeschool Children as Physically Fit as Public School Children?*

Are there differences between elementary aged homeschool children and public school children's fitness levels? Research comparing academic performance between homeschooled children and similarly aged public school students



have been completed (Barwegen, et al., 2004; Dahlquist et al., 2006). Within these studies, results consistently show homeschooled children score higher in academics than public school children (Slatter, 2009). However, no research, to date, has been completed in relation to children who are homeschooled and their physical fitness levels. Therefore, the purpose of this study was to determine if homeschool children are as physically fit as public school children. Fifty public school, and forty-two homeschooled third through fifth grade (7-11 yrs) children completed the 20m FITNESSGRAM® Progressive Aerobic Cardiovascular Endurance Run (PACER) test. The PACER test is a normative-referenced, validated measurement that assesses cardiovascular fitness levels of children by having the students run the cadence indicated by the assessment protocol (Meredith, M. D., & Welk, G. J., 2005). The test involves continuous running between two lines in time to recorded beeps. The time between recorded beeps decrease each minute (level) requiring an increase in pace. The participant continues until they are unable to keep pace with the beeps. The total PACER test score equals the level, and number of shuttles reached before the child was unable to keep up with the recording for two consecutive ends. FitnessGram® software is used to analyze the scores of all participating children to determine individual and group fitness levels. We hypothesize homeschool children will be less physically fit than public school children because homeschool children do not participate in regular physical education and therefore do not receive the education about fundamental

movement patterns shown to influence physical activity levels as a child matures.

## Political Science

### **Poster 25 – Flor Acosta Marquez**

Mentor: Dr. Peter Longo

Title: *Education Policy and Nutrition*

The Healthy Hunger-Free Kids Act of 2010 caused copious amounts of discussion in numerous public education institutions. This research will provide an evaluation of the strengths and weaknesses of the Healthy Hunger-Free Kids Act of 2010. This analysis will also address the priorities of state and local enforcement of the act, and provide insight of programs that have had beneficial influences. Beneficial influences include, greenhouse initiatives, and farm-to school grants. These beneficial influences will be offered to explore future school nutrition programs

### **Poster 26 – Carson Messersmith**

Mentor: Dr. Peter Longo

Title: *Political Implications of Water Dispute Resolution: Kansas & Nebraska*

The use of natural resources has long been debated in both foreign and domestic regions of the world. This debate though has never been closer or more heated than for the residents of the Midwest. It is the utilization of water in this region that has led to many different studies and opinions. Water is the lifeblood to all humans both directly and indirectly. It sustains life by both providing one of the most necessary resources of the human body, but by also growing and

aiding in the production of the food that is required to provide for an ever-growing world population. The importance of this natural resource has led individuals to look at current uses of water the effect of the human population on this resource. The recent depletion along with the recent resolution of the Kansas v. Nebraska Supreme Court Case provides evidence magnifying the problem of high water consumption within the Midwest and beyond. This study will serve as a comparative analysis of water conflict resolution in the United States and around the world. It will specifically investigate and deliberate the conflict and resolution that helps to guide peaceful resolution of territorial conflict. This poster will help to establish the importance of resource management in the United States, show data of current and past resource use, and illustrate the importance of conflict resolution in natural resource and territorial disputes.

**Poster 27 – Jackson Porter**

Mentor: Dr. Peter Longo

Title: *School Consolidations: Comparing the Effects of Geography and Legislation on Consolidation and Academic Success*

School consolidations have caused mixed emotions throughout the United States in the modern era of school consolidations. Factors such as the effect on community wellness and potentially cost saving have been historically factored in when analyzing potential consolidations in the past. In this paper I look at some lesser discussed factors in consolidations and how they may influence the ultimate decision on whether or not to consolidate and the nature of the consolidation. To do

this, I compare four states that are located in rural areas in different regions of the United States. I aim to compare legislation in two state groupings, Kansas & Nebraska and Vermont & New Hampshire, to see how legislation and geography effect public opinion, enactment of consolidation and academic success in these regions.

**Poster 28 – Jessa Schultis**

Mentor: Dr. Peter Longo

Title: *Ecotourism In Costa Rica and the Great Plains*

Ecotourism is a popular way to bring in money into an area as well as protect and preserve threatened environments. Costa Rica is often considered the “poster child” of ecotourism, as it has rich biodiversity, a legal framework for environmental protection, and infrastructure for tourists. The Great Plains of the United States has also utilized ecotourism for such attractions such as rivers, waterfalls, and prairieland. This paper will compare the evolution of ecotourism in Costa Rica and the Great Plains to better explain why it was pursued and what have been the effects for both regions.

**Poster 29 – Elisabeth Tryselius**

Mentor: Dr. Satoshi Machida

Title: *Midwest preparedness for climate change*

Climate change and global warming are forecast to affect living conditions and basic economic foundations across the world. Some countries, and areas within countries, have already had to adapt to changes in their environment and others have seen new weather trends emerging. The issue is particularly significant for a

state like Nebraska which is so heavily dependent on agriculture and could be severely affected by climate change. This project looks at how states in the Midwest of the United States have assessed and responded to the challenges their states face due to global warming and changes to the climate. A well-researched analysis of different future scenarios, coupled with a supported action plan, can help mitigate the human and economic costs of climate change. By comparing the preparedness across states in the Midwest, the project helps to increase knowledge about ways to forecast the future impact of climate change, responses to confront the challenge, and strategies to garner local support.

### **Poster 30 – Caitlin Williams**

Mentor: Dr. Joan Blauwkamp

Title: *Election Results for Alternative Methods to the Electoral College*

Reform of the current Electoral College method of electing the President of the United States has been a topic of discussion among the public and scholars for quite some time. Last semester I presented on the criticisms of the Electoral College such as: normative failures for not representing the one person, one vote democratic principle and giving states more power based on their population size. But what would happen if we changed the current method of election to an alternative? Who would win and would the biases differ or be eliminated? I backtrace using voting data from government entities to find the potential outcomes of the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 elections using the direct popular vote,

district plan by popular vote, the proportional plan, and ways to bind electors to the popular vote. The results show strong third party potential to gain electoral votes under the first three methods. In addition, in the majority of elections no candidate would have received the electoral votes necessary to win the nomination (235 votes) and the election decision would be decided by the House of Representatives as outlined in the Twelfth Amendment to the United States Constitution.

## Psychology

### **Poster 31 – Jacob Andreasen**

Mentor: Dr. Evan Hill

Title: *Sulcata Tortoise (Centrochelys sulcata) T-Maze Trials*

This research will develop a procedure for testing the hearing of the Sulcata tortoise (*Centrochelys sulcata*). T-mazes have been a very useful way to train animals to respond to certain stimuli. Sulcata tortoises are being used due to a lack of previous research with this species. This species is of interest due to their evolutionary old lineage, and may shed insight on learning and sensory processes in reptiles. Noises will be presented randomly from one of two sides of the T-maze. The tortoise will respond to the sound by going to the side where noise was being played. This response will indicate whether Sulcata can detect the signal being presented. After making a correct decision, determined by the direction in which the tortoise indicates the sound was presented, a food reward will be made accessible. This test will help to determine the different capabilities

of hearing this species may have. These findings can then lead to an understanding of the origins of hearing.

### **Poster 32 – Miranda Cormaci**

#### **Co-Author – Shelby Study**

Mentor: Dr. Megan Strain

Title: *#masculinitysofragile: Effects of exposure to rape humor on men's responses to anti-masculinity social media posts*

After exposing men to either subversive or reinforcing rape humor, or neutral humor, we asked for their evaluations of social media posts that targeted masculinity. We hypothesized that men exposed to reinforcing rape jokes would provide more negative evaluations, and express more negative attitudes toward women who have been raped.

### **Poster 33 – Lauren Messbarger**

Mentor: Dr. Julie Lanz

Title: *Examining the Relationship between Fear of Missing Out and Social Media*

The goal of this study is to examine the relationships among screen time use, social media use, fear of missing out, personality, and loneliness in college students. Screen time has increased in the last decade (Sillence et al., 2007), this includes time spent on social media as well (Baker, Krieger, & LeRoy, 2016). Fear of missing out is defined as “a pervasive apprehension that others might be having rewarding experiences from which one is absent” (Przybylski, Murayama, DeHaan, Gladwell, 2014, p. 1841). Past research suggests that FoMO is related to an increase in social media use (see Baker et al., 2016). This study

predicts a positive relationship between time spent on social media, screen time, and FoMO. One study found that people who rank high on extraversion were more likely to spend time on social media compared to individuals who rank high on emotional stability (Correa, Hinsley, & Gil de Zuniga, 2010). This study predicts a positive relationship between extraversion, openness, agreeability, and conscientiousness and FoMO, and negative relationship between emotional stability and FoMO. This study also looks at loneliness as a possible factor of experiencing FoMO. Loneliness is defined as a self-perceived state in which a person's social network is smaller and/or less satisfying than anticipated (Jones, 1981). Past research suggests that an individual engages in social media to avoid experiencing loneliness (Przybylski et al., 2013). Given this relationship as well as the relationship between FoMO and social media (Baker et al., 2016), we predicted a negative relationship between FoMO and loneliness. This study will have a maximum of 100 University of Nebraska-Kearney students age 19 and above. The study will be conducted online through Qualtrics. We will examine correlations and independent samples t-tests to examine personality and gender differences in FoMO.

### **Poster 34 – Andrew Riesenber**

Mentor: Dr. William Wozniak

Title: *Effects of Pet Ownership on Empathy*

There have been numerous studies on the effects of pet ownership on empathy in children. For example, Vidovic, Štetic, and Bratko (1999) found that, for 4th, 6th and 8th graders, pet owners were

significantly more empathic and prosocially oriented. The purpose of this research was to investigate how a college student's attachment and commitment to pets they owned as a child influence their level of empathy toward animals and human beings. Scores for attachment and commitment to pets, as well as empathy toward animals and humans were assessed using survey questionnaires administered to 63 Psychology students. I also collected demographic information, including a description of their childhood pets. Pearson correlations were used to examine the relationships between 7 scores: self-reported attachment, self-reported commitment, combined self-reported attachment and commitment, the Miller-Rada (Staats, Miller, Carnot, Rada, and Turnes 1996) pet attachment scale, the Miller-Rada (Staats, Miller, Carnot, Rada, and Turnes 1996) pet commitment scale, the Paul (2000) empathy toward animals scale, and the Mehrabian and Epstein (1972) empathy toward humans scale. Analysis showed statistically significant correlations among most of the measures. However, there were no significant correlations between the measures of pet attachment and empathy toward humans. The lack of relationship between pet attachment and human empathy may be that college students tend to be more attached to animals than they are empathetic to humans because animals are perceived to not have as much responsibility for their unfavorable situations as humans. However, the strong correlation between animal empathy and human empathy needs further investigation. Further analyses will investigate the difference between the measures of animal empathy and animal attachment and why they are differentially

related to human empathy. This research has important applications for understanding the interactions and relationships between people, and how to improve empathy and reduce antisocial behaviors.

### **Poster 35 – Sarah Strawn**

Mentor: Dr. Evan Hill

Title: *An investigation of the auditory abilities of the common quail (Coturnix coturnix)*

The purpose of this study is to determine the hearing range of the common quail. Previous research yielded an unusual audibility curve that did not identify the organisms entire hearing range (Niemiec, Raphael, & Moody, 1994). The animals were trained using a standard psychophysical procedure; they pressed a button for access to food then withheld this response in the presence of a tone. The tone was then systematically varied in frequency and intensity until a hearing limit was determined. The resulting audiogram is similar to that of other birds tested using the same procedure.

### **Poster 36 – Shelby Study**

Mentors: Dr. Megan Strain & Dr. Chris Waples

Title: *Beyond purity: conceptualizing feminine honor by examining women's success in other domains*

We conducted a confirmatory factor analysis to examine the underlying structure of items developed in our previous phase of research in feminine honor scale development. Two subscales emerged showing strong model fit, which assess attitudes toward the success of

women in communal and agentic domains.

### **Poster 37 – Mark C Veale**

Mentor: Dr. Robert Rycek

Title: *The Well-being of Persons With Dementia During Various Activities*

Dementia is a debilitating disorder with no cure and few treatment options. The number of Persons With Dementia (PWDs) is estimated to double every twenty years for the foreseeable future (Prince, et al., 2013). With limited resources to accommodate the large and growing number of PWDs, knowledge of which activities are the most beneficial becomes valuable. In the present study, the well-being of PWDs was observed and measured during various activities (devotions, exercises, bingo, manicures, and unstructured time). It was hypothesized that there would be a difference between the well-being displayed by PWDs during each activity and that during unstructured time would display the least well-being. Twenty-four participants (2 male, 22 female) at a long-term care facility specializing in dementia care were video recorded during activities already being offered by the facility. Participants were then measured using the Positive Response Schedule for Severe Dementia (PRS), which measures well-being based on seven behaviors and three emotions (Perrin, 1997). The hypothesis that there would be a difference in the well-being displayed between activities was not supported when looking for amounts well-being produced, as seen in overall scores. However, when looking at individual behaviors, it appears there are differential patterns of responding across activities.

For example, Bingo and Exercises showed significantly more Deliberate Body Movement as compared to Manicures and Devotions. Manicures had higher levels of Vocalization and Initiation of Interaction than the other activities. The hypothesis that PWDs would show the least well-being during Unstructured Time was partially supported. During Unstructured Time and Devotions, participants scored similarly low on the PRS. The low score during Unstructured Time is harmonious with an established body of research (Brooker, & Duce, 2000; Schreiner, Yamamoto, & Shiotani, 2005), but the low score during Devotions, a structured activity, was unexpected.

## Social Work

### **Poster 38 – Kato Craig**

Mentor: Dr. Benjamin Malczyk

Title: *Competency-Based Education and Waiver Exams: A Look at Social Work Education*

Social work education has shown a commitment to competency based education (CBE) since 2008. One iteration of CBE is the use of waiver exams. Little research has been done to analyze the use of waiver exams in social work education. This research sought to answer two questions. How many accredited programs allow for testing out in any social work courses? If so, which courses can students test out of? All accredited social work programs listed on the CSWE website were contacted by email, and asked the two questions above. Out of the 777 programs emailed, including both BSW and MSW, 496 responded. Out of the 496 respondents,

47 said they did allow testing out in some course. The study finds that 10% of accredited social work programs allow for testing out. However, the benefits of CBE seem to be negated by the practices of these organizations. It was found that the programs that allowed testing out, required students to take a course in lieu of the one tested out of. This policy suggests that there is no benefit to the tests and may affect turnout. The implications found suggest that the use of waiver exams may be infringed by the tendency to force the student to take other courses as an unnecessary replacement. Requiring students to take additional electives does not reduce the financial burden or recognize student competence. Rather than discouraging testing out, social work education should embrace it. Allowing testing out potentially benefits nontraditional students, particularly those who are older and completing school with an abundance of life and work experience. Utilizing testing out in social work education could lead to a more diverse and representative group of social work professionals.

**Poster 39 – Sherah Dickinson**

Mentor: Dr. Benjamin Malczyk

Title: *Police Assisting Addicts Towards Recovery*

The War on Drugs has resulted in the mass incarceration of millions of nonviolent drug offenders. The tolls of this war have resulted in broken families and futures and in the disparate treatment of minority and disadvantaged groups.

These issues have been further aggravated by the push of prescription opioids such as OxyContin and hydrocodone by pharmaceutical

companies and medical practitioners; this is causing catastrophic substance abuse addictions that influence individuals and families across all socioeconomic, cultural, and geographic lines. The rise in opiate addiction has spread across the United States and has acted as an impetus for new discussions on alternate approaches to drug use and abuse. This research project explored alternative approaches to mass incarceration and overly-punitive War on Drugs policies. Specifically, the research examined an innovative approach in Gloucester, Massachusetts which provides treatment based alternatives to incarceration for individuals addicted to opiates. The analysis examines both the substance of this program as well as the factors and actors that led to the adoption of the program. While it is still too early to examine outcomes of the program, the research discusses the potential benefits of the program, especially in comparison to alternate approaches to substance abuse and addiction similar to those found in Portugal. The research posits that decriminalization of drug use in conjunction with evidenced based practices such as rehabilitative programs will help reduce stigma, decrease government costs and strengthen families that have been affected by substance abuse disorders.

# Natural & Physical Sciences

## Biology

### **Poster 40 – Katelin Arndt**

Mentor: Dr. Rachel Hellmann Whitaker

Title: *Discovery of Antimicrobials that are Targeted Against Leucyl-tRNA synthetases*

Antibiotics are essential to modern medicine. However, with an increasing prevalence of antibiotic-resistant strains of bacteria, there is a need to find an alternative to broad-spectrum antibiotics. One possibility is to create an antimicrobial that targets proteins unique to specific organisms. This antimicrobial would more efficiently eradicate pathogenic bacteria while preserving the natural flora of the human body and avoid emerging resistances. This project's aim is to inhibit the enzyme Leucyl-tRNA synthetase (LeuRS). LeuRS belongs to a family of enzymes which checks and corrects mistakes after the process of protein translation in cells. Without LeuRS and its related enzymes, cells quickly become damaged and die. This project aims to improve upon previous studies on broad LeuRS inhibitors in order to target the enzyme in specific bacterial species. Various inhibitors will be tested to determine their effectiveness when exposed to different organisms. My section of the project focuses on the

bacterium that causes diphtheria, *Corynebacterium diphtheriae*, which affects underdeveloped countries that do not have as widespread vaccinations. The objective is to determine an inhibitor that works specifically against this bacterium. The structure will then be analyzed with X-ray crystallography to determine how the inhibitor docks to the diphtheria variation of LeuRS. The research in this area could potentially lead to the development of a treatment for a disease that still affects many people around the world.

### **Poster 41 – Tyan Boyer**

**Co-Author – Brittney Adams**

Mentor: Dr. Nate Bickford

Title: *Heated vs. Non-heated Water in an Aquaponics System*

Attention must be brought to the current agricultural tactics being used and the food crisis and how to solve these problems. Aquaponics can help solve some of the food crisis that's impacting our world. Aquaponics is the combination of aquaculture and hydroponics, two well-known farming techniques. Aquaculture is the farming of fish, shellfish, and different types of aquatic plants, and hydroponics is a farming technique that grows plants without soil. However, each technique presents us with problems. Some problems outweigh others. Aquaculture's main problem is the high amounts of ammonia, nitrates, and nitrites that are in the water from the wastes the fish give off; there is no filter to remove the wastes from the water and often that nutrient rich water is released into river systems polluting them. Hydroponics takes a large amount of fresh water due to the nutrient loading of the water. The



nutrient loading is due to the use of the industrial fertilizer. Aquaponics alleviates these problems by using plants to remove the nitrates out of the water, cleaning the water before it returns to the fish.

The variable tested was production effects of room temperature tanks vs. heated tanks. The heated tanks were kept at roughly 82 degrees Fahrenheit. The idea behind the variable being tested is that fish will perform better in warmer water. Ideally, better fish performance will yield in better plant production.

Data showed no noticeable difference in the nutrient reading and fish survival rate. Heated and non-heated tanks both yielded poor results with tomatoes; only three out of the 20 possible tomato plants survived to harvest ability. The heated tanks resulted in more favorable conditions, producing more pepper plants. Nine of the pepper plants in the heated tanks produced fruit while only 6 pepper plants in the non-heated tanks produced fruit.

#### **Poster 42 – Mikalah Brown**

Mentor: Dr. Keith Geluso

Title: *Effects of Cover-Object Size and Material in Detecting Herpetofauna in Southern Nebraska: Searching for Glass Lizard*

To examine community dynamics of reptiles and amphibians, researchers require a robust and standardized method for documenting the biodiversity of all species in a designated area or habitat. One such method involves using artificial cover objects that individuals hide under for safety from predators or weather. Cover object can consist of different types of materials such as plywood, tar paper, and metal sheets. In this study, we

examined the use of large wooden, small wooden and metal cover objects in Harlan County in south-central Nebraska. Our objectives were to examine which species occur in the area and which cover object is the best for documenting the most species. We also wanted to examine if this methods would detect a rare species of lizard known from the area. Studies were conducted at the Alma Municipal Airport and near Harlan County Reservoir from April 2016 to October 2016. We concluded that cover object type affects the total animals observed as well as encounter rates, with the most species and greatest abundance of individuals observed under large wooden cover objects. Thus far, we observed ?? species of reptiles, but we have yet to observe slender glass lizard (*Ophisaurus attenuatus*), which is a species of interest in the area.

#### **Poster 43 – Breana Dobesh**

Mentor: Dr. Nate Bickford

Title: *Diet Selection and Hunting Territory of Red-Tailed Hawks in South-Central Nebraska*

We are trapping small mammals in habitats such as ditches and pastures of a farm in south-central Nebraska. We are trying to correlate the location and habitat of these prey with the effect of hunting availability for local predatory birds. Our objective is to identify the ideal hunting territory for these birds, mainly local Red-tailed Hawks (*Buteo jamaicensis*). We are setting 100 Sherman traps in 4 rows, each row being in a different location within the property. Every row will contain 25 Sherman traps, each baited with bird seed and oatmeal. The traps will be placed ten paces apart, totaling around

250 ft. of distance for a single row. Trapping trials will be 3 days long 5 weeks each season. Traps will be baited and set on Tuesday mornings, checked and reset on Wednesday afternoons, checked and reset on Thursday mornings, and then checked and collected on Friday afternoons. When the traps are being checked, the trapped prey is first transferred to a plastic bag to be scuffed and marked on the back of the neck with a blue marker. This will allow us to perform mark and recapture to estimate population numbers. The species and size of prey is recorded, along with the trap number. The marked prey is then released and the traps are re-baited and set. We will develop maps and analysis of where certain small mammals are located and how it correlates to habitat type.

#### **Poster 44 – Marcus Fox**

Mentors: Dr. Nate Bickford, Dr. Marc Albrecht & Dr. Dustin Ranglack  
Title: *Methods of Bioremediation*

We are trying identify the best methods for using plants and fungus as a bioremediation agent on nutrient polluted water systems. The long-term goal is to observe different species of fungi in water with nutrients and organic pollutants to identify the best fungus for bioremediation. We will also work with plants to identify whether terrestrial plants or aquatic plants are more capable of removing nutrient pollution. This semester we will use lettuce and duckweed. The chemical levels will be tested in the water so we can see the rate of uptake by the lettuce and the duckweed.

#### **Poster 45 – Kayla Francis**

Mentor: Dr. Keith Geluso  
Title: *Blanding's Turtles (Emydoidea blandingii) near Ravenna, Nebraska: Road Mortalities and Captures*

Blanding's turtles (*Emydoidea blandingii*) have been affected by habitat fragmentation and road mortalities to the point that they are being considered to be listed under the Endangered Species Act. In Nebraska, the largest known population of the species occurs throughout the Sandhill Region of the state associated with shallow lakes and marshes. However, the current status of most Blanding's turtle populations in Nebraska is unknown as most records are decades old. We examined the population status of Blanding's turtles near Ravenna, Nebraska, in Buffalo County. Summer road surveys and trapping surveys did not show any evidence of an extant population near Ravenna in 2016. Due to a lack of observations, we amassed and compiled a literature review of natural history for the species since 1973, when the last comprehensive literature review was published. More surveys are warranted across Nebraska to delineate its current distribution and population status.

#### **Poster 46 – Isabella Gomez**

**Co-Authors – Nicole Pauley & Sitong Liu**

Mentor: Dr. Bryan Drew  
Title: *Is Agastache cusickii (Lamiaceae) a distinct species?*

Agastache is a genus in the Lamiaceae (mint family) consisting of 22 perennial species. Lamiaceae are used worldwide

for aromatic and medicinal purposes. Species of *Agastache* are separated into two sections: *Brittonastrum* and *Chiastandra*. The number of recognized *Agastache* species has fluctuated widely, and many have moved taxonomically, resulting in contradicting information about the delimitations of many species within the genus. The purpose of this research project is to determine if *Agastache cusickii* (Lamiaceae) is a distinct species, or whether it is just an ecological variant of the widespread *A. urticifolia*. *Agastache cusickii* is known by the common name of Cusick's giant hyssop and is found only on isolated mountain peaks scattered across Idaho, Oregon, Montana, and Nevada. Specimens of *Agastache urticifolia*, *A. cusickii*, *A. parvifolia*, *A. occidentalis*, *A. foeniculum* were collected and obtained from herbariums. Subsequently, DNA was extracted, sequenced, and sent away to be further analyzed in a lab. After analyzing the DNA of the *Agastache* species, we were able to determine if each species is truly genetically different or similar. Studying species that are not well known is important because new uses may be discovered and these efforts can also inform conservation efforts; *Agastache cusickii* is currently listed as threatened in Montana, Idaho, and Oregon.

**Poster 47 – Luke Hamilton**

**Co-Authors – Emma Keele & Marika Van Brocklin**

Mentor: Dr. Letitia Reichart

Title: *Variation of Plasma Levels of Two Lipid Metabolites in Orchard Orioles*

Orchard Orioles are songbirds that breed throughout the eastern and central

portions of the United States and winter in Central America. They both migrate through and breed in Nebraska. The purpose of this project was to help wildlife managers who oversee land that is used by populations of Orchard Orioles and other migratory songbirds to make decisions that maximize the health of those populations while minimizing cost. More specifically, our goal was to facilitate accurate assessment of habitat quality. Past studies have demonstrated that the blood plasma concentrations of two molecules that are involved in fat metabolism—namely triglycerides and  $\beta$ -hydroxybutyrate—serve as reliable indicators of whether a bird is adequately nourished or not. By extension, the levels of these molecules are indicators of the quality of the habitat in which the bird has recently been feeding. Useful as this metabolite technique has proven to be, it must be applied carefully. Multiple variables that have little to do with habitat quality—including the age of the bird and the time of day—can have significant effects on the metabolite levels. Moreover, there can be significant differences in metabolite profiles between species, even those within the same genus. Bearing the above in mind, we captured 51 Orchard Orioles during the spring migration season of 2016. A triglyceride assay was run on samples from 26 individuals, and a  $\beta$ -hydroxybutyrate assay was run on samples from 8 individuals. Both chemical assays were run on samples from 6 individuals that provided sufficient volumes of plasma. Our hope is that the results of this study will be useful to future research on metabolism in orioles by clarifying which confounding variables have significant effects on metabolite

levels and how those effects should be taken into account during data analysis.

**Poster 48 – Megan Hunke**

**Co-Author – Alaini Priebe**

Mentor: Dr. Surabhi Chandra

Title: *Synthesis and characterization of antinociceptive properties of novel derivatives of the active compound, Incarvillateine, from the Chinese herb (Incarvillateine sinensis)*

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 cavitation-mediated photodimerization (CMP) method, which utilizes a macromolecule ( $\gamma$ -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 49 – Dawson Johnson**

**Co-Authors – Audrey Codina, Derek Kleier**

Mentor: Dr. Dawn Simon

Title: *Intron degeneration in the lichen fungi *Teloschistes chrysophthalmus**

Introns are ubiquitous in eukaryotes and can have serious deleterious effects for the host organism. For example, improper splicing of introns in humans has been implicated in an estimated 1/3 of all genetic disease. While they can have a variety of functions in modern eukaryotes, they likely initially arose as purely selfish elements. We are interested in understanding this process. In particular, we are focused on spliceosomal introns that are found in nuclear ribosomal RNA (nrRNA). These introns are largely restricted to lichen-forming fungi, suggesting a recent origin which makes their evolutionary history much more

tractable than most spliceosomal introns. We specifically hypothesize that nrRNA spliceosomal introns arise from degeneration of group I ribozymes, which are also common in nrRNA genes in lichen-forming fungi. Here we focus on one position in the small subunit (SSU) in the lichen-forming fungi *Teloschistes chrysophthalmus*. This position has introns of varying lengths, all of which contain sequences typical of spliceosomal introns and many also have potential secondary structures typical of group I ribozymes. The overall objective of the study is to discover additional introns that represent intermediate steps in the transition from group I ribozymes to spliceosomal introns. Here, we use an expanded set of introns, collected from samples across much of the North American geographic range of *T. chrysophthalmus* to provide evidence of degeneration both in secondary structure and in vivo splicing. 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 50 – Emma Keele**

Mentor: Dr. Letitia Reichart

Title: *Measurement of Triglyceride and Beta-Hydroxybutyrate in Baltimore Orioles (Icterus galbula), a Migratory Songbird in South Central Nebraska.*

South central Nebraska is an important migratory stopover site because birds use it for resting and refueling their fat stores. Acquiring lipids on stopover sites is especially important to allow birds to

complete the remaining portion of their migration. Birds able to maintain lipids throughout migration are more likely to breed successfully following migration. We developed an assay to detect Triglyceride (TRIG) and Beta-Hydroxybutyrate (BUTY) concentrations in blood plasma for Baltimore Orioles (*Icterus galbula*) (BAOR) captured during the spring migration of May - June 2015 and 2016. Lipid metabolism in each species is variable, thus baseline information must be collected for each species captured. We captured BAOR using mist nets outside of Gibbon, NE to collect blood samples within ten minutes of capture from the brachial vein. We collected 101 plasma samples in 2015 and 157 in 2016. From 2015, we used a subset of 36 samples to analyze TRIG and BUTY. Mean TRIG Serum was 0.048 (mM)  $\pm$  0.039 (SD). Mean BUTY was 0.213 (mM)  $\pm$  0.129 (SD). We are currently running assays from the summer of 2016 and will analyze the data. Results from this study will be used to formulate new testable hypotheses regarding lipid metabolism for BAOR that use south central Nebraska as a migratory stopover site.

**Poster 51 – Sierra Kline**

**Co-Author – Amber Menard**

Mentor: Dr. Austin Nuxoll

Title: *Identifying the Mechanism of Staphylococcus epidermidis Persister Formation Through EMS Mutagenesis*

*Staphylococcus epidermidis* is a gram-positive, coagulase-negative staphylococci that is typically found on human skin and is one of the most common infections found in implants and

catheters. Antibiotic treatment of these robust infections often fails leading to chronic relapsing infections. This is thought to be mediated through persister cells. Persisters are dormant variants of regular cells that form in microbial populations and are highly tolerant to antibiotics. Antibiotic tolerance in *Staphylococcus epidermidis* remains unstudied despite important implications for human health. To identify the mechanism of persister formation we performed random mutagenesis by treating cultures with ethyl methanesulfonate (EMS). Following EMS mutagenesis, we enriched the culture for persister cells. Specifically, we challenged cultures with two antibiotics, ciprofloxacin and vancomycin to select for mutations with increased antibiotic tolerance.. Following several rounds of selecting mutants with increased tolerance, we will send genomic DNA for whole genome sequencing. We also will measure ATP in enriched cells to determine whether the mechanism of persister formation is energy dependent similar to what has been observed in *S. aureus*. These experiments will identify underlying genetic changes responsible for the increased persister phenotype.

### **Poster 52 – Morgan Lee**

Mentor: Dr. Austin Nuxoll

Title: *Examination of Staphylococcus aureus persister mechanisms in C. elegans*

*Staphylococcus aureus* causes a multitude of diseases in humans such as skin infections, toxic shock syndrome, endocarditis, and bacteremia. It has been previously shown *S. aureus* is tolerant to antibiotics through decreased TCA cycle

activity. Antimicrobial peptides (AMPs) are part of the innate immune system and have a similar mechanism to antibiotics. Human  $\beta$ -defensin 3 (hBD-3) and the cathelicidin, LL-37, have been shown to have strong antimicrobial activity against *S. aureus*. While both have strong antimicrobial activity, the method of killing differs between the two classes of AMPs. hBD-3 targets lipid II in cell wall biosynthesis in a similar mechanism as the antibiotic vancomycin. LL-37 resembles the mechanism generally associated with AMPs by forming a pore in the bacterial membrane. Recent work has shown that decreased TCA cycle activity confers tolerance to vancomycin. Furthermore, a decrease in TCA cycle activity leads to reduced membrane potential. Membrane potential is required for LL-37 mediated pore formation. Based on these observations, we hypothesize *S. aureus* confers antimicrobial peptide tolerance via decreased TCA cycle activity. To address this hypothesis we infected *C. elegans* with wild type *S. aureus* and a TCA cycle mutant. Specifically, *C. elegans* was monitored for survival over a 15-day period. In addition, surviving *S. aureus* wild type and the TCA cycle mutant were enumerated in live *C. elegans* following the 15-day infection. We will analyze and present the results of the *C. elegans* infection.

### **Poster 53 – Sitong Liu**

Mentor: Dr. Bryn Drew

Title: *Phylogenetics and Divergence Times within Monardella (Lamiaceae)*

*Monardella* is an aromatic flowering plant genus within the plant family Lamiaceae (mints) that contains about 40 species

and has a center of distribution in the California Floristic Province. The genus is taxonomically complex, and many species within the genus possess narrow and or relictual distributions. In addition, several taxa are threatened by urban development. This project will investigate relationships within *Monardella* and also assess how the genus has radiated within and from California. Furthermore, a phylogenetic framework of *Monardella* will be instrumental in other ongoing studies regarding the timing and origin of California Floristic Province Madrean lineages.

**Poster 54 – Amanda McCown**

**Co-Author – Abby Benz**

Mentor: Dr. Kimberly Carlson

Title: *Relationship Between Locomotor Function and Nora Virus Infection in Drosophila Melanogaster*

Nora virus is a member of the picornavirus family that infects *Drosophila melanogaster* with no known pathogenic effects. One possible pathogenic effect of Nora virus that has not been studied is locomotor ability. In a previous small study, geotaxis assays and longevity curves demonstrated a significant decrease in geotaxis when the *D. melanogaster* were infected with Nora virus. In this study, Nora virus infected/uninfected flies were tested, as well as *Drosophila C Virus* (DCV) infected flies and the number of cages, flies, and treatment groups expanded. Four cages per treatment group were marked with a line two thirds from the bottom of the cage and 60 virgin female flies were placed in each of the cages. Every third day since cage establishment, the flies were tapped to the bottom and given one minute to

reach the top. The number of flies crossing the threshold line were recorded as were the dead flies. Longevity curves were created and examined using Student's paired t-tests with  $p < 0.05$ . The data demonstrate that Nora virus infected flies are slower than uninfected flies, supporting a relationship between geotaxis and locomotor dysfunction in infected flies. Also, the viral load was determined via qRT-PCR. The data demonstrate a bimodal curve for viral RNA infection with Nora virus has not been previously determined. Overall, a better understanding of Nora virus may give us insight into other viruses in the picornavirus family. 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 55 – Amber Menard**

Mentor: Dr. Austin Nuxoll

Title: *Persister Formation in Staphylococcus epidermidis Clinical Isolates*

*Staphylococcus epidermidis* is a gram-positive bacterium that colonizes human skin. Most people have a benign relationship with it. However, a few demographics including immunocompromised and elderly individuals are at risk as it can lead to more serious complications such as sepsis and endocarditis. Infections are commonly seen on internal devices such as joint replacements, catheters, and prosthetic heart valves. Antibiotic treatment is often unsuccessful, leading to chronic, relapsing infections with a poor

patient prognosis. Furthermore, these infections are often mediated by antibiotic susceptible strains. A likely explanation for these observations is persister cells are causing treatment failure. High persister isolates have been shown to occur in other microbial pathogens such as *Pseudomonas aeruginosa* and *Candida albicans*. Recent work in the related pathogen, *S. aureus*, demonstrates persister formation is dependent on energy depletion. Therefore, we hypothesize that persister formation is dependent on decreased energy production through the tricarboxylic acid (TCA) cycle. We examined whether high persister isolates could commonly be found among strains isolated from human infections and indeed is the case. High persister isolates are commonly found among *S. epidermidis* clinical isolates. We then measured ATP concentrations in these isolates to determine whether the observed phenotype was dependent on decreased energy levels. We will analyze these data and present the findings of the ATP assay.

**Poster 56 – M. Jane Morwitzer**

Mentor: Dr. Surahbi Chandra

Title: *Rapid progression of breast cancer cell proliferation in diabetes: Role of polyamines*

Diabetes and cancer are comorbid conditions with a heavy toll on human life worldwide. Several cancer subtypes (pancreatic, breast, liver, and colorectal) rapidly advance to higher stages and even metastasize in diabetic states. Though high blood glucose levels have been considered as fuel for growth of cancer cells, pathways leading to this

condition are still under investigation. Cellular polyamines can modulate normal and cancer cell growth, and can be synthesized from multiple sources including endogenous amino acid precursors, diet and through degradation. Inhibition of polyamines can provide protection against diabetes in mouse models. It is not known however whether elevation of polyamines in diabetes is linked to cancer advancement. Thus, we hypothesized that high glucose stimulated polyamine production causes increased proliferation of breast cancer cells. Proliferation studies were performed with varying concentrations of glucose (5mM-25mM) treatment on MCF-7 (early stage) and MDA-MB-231 cells (advanced stage) breast cancer cells. Though there was a significant increase in cell proliferation with HG (25mM) in both cell lines, MDA-MB-231 cells showed this effect at 72hr compared to longer incubation time with MCF7 cells (96-120hr). Inhibitor of polyamine synthesis (difluoromethylornithine, DFMO, 5mM) significantly suppressed cell proliferation observed with HG (25 mM). Protein levels of ornithine decarboxylase (ODC), the enzyme required for polyamine synthesis, was also elevated with HG treatment but the levels were restored to normal glucose (5mM) conditions upon treatment with DFMO. Our findings indicate that advanced stage breast cancer cells proliferate rapidly in hyperglycemic states compared to early stage breast cancer cells, and that polyamines are involved in the transition to advance stage of cancer.



**Poster 57 – Makayla Nemecek  
Co-Authors – Rebecca Best, Shelby  
Peters, Carlie Prosocki & Lesley  
Towery**

Mentors: Dr. Kimberly Carlson, Dr. Brad  
L. Ericson & Darby J. Carlson

Title: *Pathogenicity of Nora Virus in  
Germ-Free Drosophila  
Melanogaster*

Microbiota in mammalian species plays a key role in the presence of gastrointestinal viruses. This is also true for invertebrate species. One such invertebrate virus that replicates in the gut and may have a connection with healthy microbiota is *Drosophila melanogaster* Nora virus. Nora virus is a picornavirus that exhibits fecal-oral transmission, and demonstrates persistent infection without any characterized pathogenicity. These characteristics, along with data that demonstrates the microbiota of the gut of both vertebrate and invertebrate species may be dependent upon persistent viral infection, led us to hypothesize that Nora virus may be important in maintaining a healthy gut microbiota in *D. melanogaster* allowing them to live longer. Germ free *Drosophila* were generated with the use of antibiotics and divided into four separate treatment groups: Nora virus positive/bacteria positive, Nora virus negative/bacteria positive, Nora virus negative/bacteria negative, and Nora virus negative/bacteria negative. The presence of Nora virus was determined via RT-PCR. The presence of microbiota was determined by homogenizing *D. melanogaster* in Luria broth and plating on LB agar plates. After all treatment groups were tested, a longevity study was conducted on each of the conditions. The longevity study on the *Drosophila* that

possessed their normal microbiota suggests that Nora virus does not enhance longevity, but microbiota is needed when virus is present to live. However, data suggested that when no virus is present, microbiota can actually hinder the longevity of *D. melanogaster*. This suggests that Nora virus may not be needed to maintain a healthy gut microbiota and microbiota may only be beneficial when Nora virus is present, but further testing is needed. 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 58 – Bryan O'Connor**

Mentor: Dr. Dustin Ranglack

Title: *Effects of Environmental and  
Anthropogenic Landscape Features  
on Harvest of Mule Deer in  
Nebraska*

Understanding the habitat selection of wildlife species is important for wildlife management. The state of Nebraska has many different habitat types, though the majority is covered by rangeland and cropland. Additionally, human factors such as urbanization and road density can influence habitat selection. These are some of the factors that influence the habitat selection of mule deer (*Odocoileus hemionus*) in Nebraska. We modeled which environmental and human factors are influencing mule deer harvest rates in Nebraska at the county level from 2014-2016. Spatial analysis in GIS was used to measure potentially influential factors by county. We used a generalized linear model in R to determine which

human and environmental factors influence mule deer harvest rates. The top model included forest habitat, riparian habitat, road density, time integrated NDVI, and terrain roughness. Mule deer harvest rates are significantly higher in less forested and more rugged terrain (often rangeland) that has fewer roads. Consequently, this showed that harvest rates are expected to be higher in the northwestern portion of the state, which consists of more intensely rugged terrain. Understanding the influence of these factors on harvest rates of mule deer can be beneficial for wildlife managers, as we can assume that areas with higher estimated harvest support larger mule deer populations and generally correspond to mule deer habitat preference in Nebraska. This allows for efficient allocation of efforts and expenses by managers for mule deer population management.

### **Poster 59 – Olubusola Oladeji**

Mentor: Dr. Letitia Reichart

Title: *Inter-individual Variation of Corticosterone in Spring Migratory Baltimore Orioles*

Migration is an energetically costly behavior in birds and each spring many migrants move north from overwintering grounds. Understanding how physiology changes prior to migration and during migration can help identify potential resources that are lacking on wintering grounds or along the migratory path. One example of a physiological change that occurs in preparation for and during migration is increased production of Corticosterone (CORT). CORT is known as the avian stress hormone; however, most often it plays an important role

maintaining homeostasis in birds. During migration, birds naturally elevate levels of CORT to deal with demands of migration, but variation in levels of CORT for individual migratory species is unknown. Understanding inter-individual variation in CORT can provide information about habitat use and nutrient acquisition for individuals on wintering grounds and stopover sites.

In this study, we measured CORT metabolites in feather samples collected from Baltimore Orioles (BAOR), *Icterus galbula* (n=141), during May-June, 2016. We validated an extraction procedure and an enzyme immunoassay useful for measuring CORT in BAOR. Next the concentration of CORT was measured for a subset (n=8) of individuals, four ASY males and four ASY females. Mean CORT for males was 307.46pg/mL  $\pm$  297.5pg/mL ( $\pm$  standard deviation) and mean CORT for females was 253.98pg/mL  $\pm$  96.5pg/mL. Additional samples will be analyzed to better understand potential variation in observed feather CORT in contour feathers of spring migratory BAOR. Results from this study will be used to formulate new testable hypotheses regarding differences in CORT levels for spring migratory BAOR.

### **Poster 60 – Kaitlyn Oppliger**

Mentor: Dr. Austin Nuxoll

Title: *Staphylococcus aureus Persister Formation during Antimicrobial Peptide Challenge*

*Staphylococcus aureus* causes a number of different infections, ranging from minor tissue and skin infections to more complex infections. Antibiotic therapy is often unsuccessful against chronic

infections, which results in the chronic, relapsing infections. Antibiotic treatments often fail because of two reasons - resistance and tolerance. While antimicrobial peptide resistance to *S. aureus* has been studied, the mechanism behind tolerance remains elusive. Tolerance is mediated by persister cells - a dormant subpopulation that survives antibiotic challenge. Not much is known about how the immune system interacts with persisters and whether they can be killed by innate immune compounds. Antimicrobial peptides (AMPs) often target bacterial cells in a similar way to antibiotics. We have begun to measure the tolerance of AMPs to *S. aureus* by enumerating surviving cells over the course of 48 hours. Also, we have begun investigating the mechanism of persister cell formation in the presence of AMPs. We have found out that *S. aureus* strains with less ATP (less energy) have survived AMPs better than wild type *S. aureus*. These results suggest that not only do persisters survive antibiotic treatment but also may evade the immune system.

#### **Poster 61 – Alexis Page**

Mentors: Dr. Kimberly Carlson, Dr. Brad L. Ericson & Darby J. Carlson  
Title: *Characterization of a possible IRES site in the Nora virus genome*

Nora virus is a picorna-like virus that has four open reading frames (ORFs). This is in contrast to other picornaviruses that have one long ORF. The coding potentials of the ORFs are reasonably well characterized. ORF3 and 4 are known to code for the capsid proteins and ORF1 codes for an RNAi inhibitor. Between ORF3 and ORF4 there are 85 nucleotides of non-coding RNA,

which may act as an internal ribosome entry site (IRES) for the translation of ORF4. However, this region is not obviously related to any known IRES sequences. To test this hypothesis, we designed multiple RT-PCR primers that flank ORF3 and ORF4, and the IRES region. The results suggest that subgenomic RNAs are not being produced, but studies are underway to further characterize this region. GFP constructs designed to test the IRES potential of the non-coding region between ORF3 and ORF4 are currently being evaluated. RT-PCR reactions indicate that subgenomic RNAs are not being produced. Currently, plasmid constructs containing ORF3, the putative IRES sequence, and GFP immediately downstream of the IRES are being evaluated in S2 cells to further characterize this region. Preliminary results indicate internal ribosome initiation at the IRES.

#### **Poster 62 – Jazmin Sanchez Co-Author – Brittney Adams**

Mentor: Dr. Nate Bickford

Title: *A Comparative Study between Polyculture of Brussels Sprouts and Sweet Peppers with Monocultures in an Aquaponics System*

Aquaponics is the hybrid system of hydroponics and aquaculture. In this system, one can grow and feed fish, and in turn, they feed the plants. Aquaponics has many advantages over these other two systems, because it will conserve water and recycle nutrients. The objective of this experiment was to determine the nutrient dynamic differences between a monoculture of sweet peppers and a polyculture of Brussels sprouts and sweet

peppers in an aquaponics system. Ten aquaponics systems were set up with five units containing the monoculture of sweet peppers and another five units that had both Brussels sprouts and sweet peppers. Each aquaponics system include tanks containing 15 tilapia and tubes to help recirculate the water. The ammonium and nitrate readings were recorded with a LabQuest 2 using the nitrate and ammonium ion-selective electrodes. We found that there was a significant difference between the ammonium and nitrate levels between the polycultures of sweet peppers and Brussels sprouts and monocultures of sweet peppers.

### **Poster 63 – Tyler Schnitzler**

Mentor: Dr. Nate Bickford

Title: *Bioremediation of agricultural wastewater*

The build-up of agricultural waste within Nebraska's water table has shown the need of an organic way to extract it from contaminated water. These nutrients produce large algae blooms that create deadly conditions for reservoirs and humans. The focus of this work is the study of bioremediation of excess nutrients in agricultural wastewater with tomatoes and spinach. Nitrogen (N) and Ammonia (NH<sub>3</sub>) are both essential elements for the growth and development of plants. This study uses the natural processes of plants to extract nitrogen and Ammonia for nutrients in a green and low maintenance system. These two species were planted together in all substrates, and water was pumped into the substrate for nutrient extraction. Ammonia and Nitrogen readings were checked periodically to get accurate and linear data. Tank 4(sand/wood substrate)

showed the largest decreases in nutrients: 93% (N) and 95% (NH<sub>3</sub>). Tank 3 had the same substrate as tank 4 and had decreases in nutrients of 95% (N) and 60% (NH<sub>3</sub>). Tank 1 and 2 both had gravel substrates. Tank 1 had decreases in nutrients of 87% (N) and 49% (NH<sub>3</sub>). Tank 2 had decreases of 91% (N) and 20% (NH<sub>3</sub>). This data shows that it is possible to decrease (N) and (P) within controlled conditions using bioremediation. Future experiments will begin to look at replicating our results in natural environments.

### **Poster 64 – Elizabeth Thorn**

Mentor: Dr. Rachel Hellmann Whitaker

Title: *Antimicrobial analysis of E. Coli with LeuRS enzyme*

Antibiotic resistance remains an urgent public health concern including the over-usage of broad-spectrum antibiotics in the clinical setting as well as in agriculture. Through improved processes of education for health care providers as well as continued research aimed at the discovery of novel antibiotics, researchers have been working on understanding and improving the systematic approach to combat the spiked occurrence rates of resistance. Through our gained knowledge concerning potential mechanisms to inhibit these effects, analysis and data have shown that the leucyl-tRNA synthetase (LeuRS) enzyme is an excellent antibiotic/antimicrobial target in consideration of extraction of the enzyme, Escherichia coli. LeuRS is an essential enzyme structurally distinct and diverged through a speciation process. For the human LeuRS enzyme to remain unaffected, a small molecule inhibitor will target specifically the bacterial LeuRS

enzyme. Furthermore, through our research findings, we have observed that the structural divergence of LeuRS within the bacterial domain of life is significant and can be manipulated to develop species-specific antibiotics. Antibiotics that are targeted against specific-species are superior to broad-spectrum antibiotics because they have the potential to reduce antibiotic resistance within bacterial communities as well as to reduce the side-effects associated with antibiotic consumption. Therefore, we have identified leucine analogs of the *E. coli* species that have the potential to bind to LeuRS and inhibit its function, which would otherwise result in rapid cellular dysfunction and death. Analysis of LeuRS:inhibitor binding will be initially analyzed through computational modeling, virtual screening of potential inhibitors followed by biochemical and NMR analysis. When a successful LeuRS:inhibitor complex is identified, structural analysis will be done through X-ray crystallography to characterize inhibitor docking to LeuRS. This multi-disciplinary approach to antibiotic analysis and development of the selected *E. coli* species has the potential to yield results to positively impact the medical community.

**Poster 65 – Katelyn Unvert**

Mentor: Dr. Rachel Hellmann Whitaker

Title: *Discovery of Novel Antimicrobials that are Targeted Against Staphylococcus aureus Leucyl-tRNA synthetases*

Over the last several decades, the over-usage of broad-spectrum antibiotics in the clinical setting as well as in agriculture has led to bacterial resistance to common

antibiotics such as staphylococcus aureus or ‘Staph’ infection. Thus, antibiotic resistance is an urgent public health problem. To fight this, improved education for health care providers as well as continued research aimed to discover novel antibiotics is urgently needed. The leucyl-tRNA synthetase (LeuRS) enzymes is an excellent antibiotic/antimicrobial target. This essential enzyme has structurally diverged through the speciation process such that the bacterial LeuRS enzyme can be targeted with a small molecule inhibitor while the human LeuRS enzyme remains unaffected (proof-of-concept data is available in proposal). I have chosen to look specifically at the bacteria staphylococcus aureus. Furthermore, through my research findings, I have observed that structural divergence of LeuRs within the bacterial domain of life is significant and can be exploited to develop species-specific antibiotics. Antibiotics that are targeted against specific-species are superior to broad-spectrum antibiotics because they have the potential to reduce antibiotic resistance within bacterial communities as well as to reduce the side-effects associated with consuming antibiotics. Therefore, I have identified leucine analogs that have the potential to bind to LeuRS and inhibit its function, which would result in rapid cellular dysfunction and death. Analysis of LeuRS: inhibitor binding will be initially analyzed through computational modeling. Virtual screening of potential inhibitors will decrease the time needed to conduct wet-lab synthesis and testing. The virtual screening process will be followed by biochemical and NMR analysis. When a successful LeuRs: inhibitor complex has been identified,

structural analysis will be done through X-ray crystallography to characterize inhibitor docking to LeuRS. This multi-disciplinary approach to antibiotic discovery has the potential to yield powerful results that will positively impact the scientific community.

**Poster 66 – Marika Van Brocklin**

Mentor: Dr. Letitia Reichart

Title: *Creatine Kinase Levels for Baltimore Orioles (Icterus galbula) During Spring Migration in South Central Nebraska*

Migratory birds travel long distances each year and use of energy stores likely differs between parts of the avian annual cycle. Our research aims to gain a better understanding of energy use for migratory Baltimore Orioles, *Icterus galbula*. We measured the amount of muscle damage and muscle repair for migratory Baltimore Orioles (BAOR) in South Central Nebraska. To measure muscle damage and repair, we collected blood samples from individual BAOR to determine the amount of creatine kinase (CK) in the blood plasma. Creatine kinase is a plasma metabolite and variation in the amount of creatine kinase is linked to differences in resource use and innate genetic variation. Muscle damage is common in migratory birds that participate in long-distance flights and the rate at which muscle repair occurs differs among individuals. We optimized an assay to measure creatine kinase concentrations in blood plasma for Baltimore Orioles during spring migration 2016. For this project, we analyzed blood samples collected from BAOR. We collected blood samples within five minutes of capture from the brachial vein and then samples

were stored on ice. Plasma was removed from the remaining blood components and stored at  $-80^{\circ}\text{C}$  until analysis. We collected 141 plasma samples from BAOR, but used a subset of 30 samples to analyze for creatine kinase concentrations. We analyzed blood plasma samples for creatine kinase using kinetic assays. Mean CK level for BAOR was 4583.48 U/L before outliers were removed. We found no significant difference between male and female BAOR CK concentration ( $t=0.120$ ,  $df=26$ ,  $P=0.905$ ). Results from this study will be used to formulate new testable hypotheses regarding muscle damage and repair for BAOR during their annual cycle.

**Poster 67 – Kaitlynn Zitek**

**Co-Author – Brittney Adams**

Mentor: Dr. Nate Bickford

Title: *Gravel and fish production: An aquaponics story*

Aquaponics is a combination of aquaculture and hydroponics (Ayer & Tyedmers 2009). Aquaculture is growing aquatic organisms, breeding fish, and growing aquatic plants. Hydroponics is cultivating plants without soil, which receives added nutrients. Aquaponics uses an aquatic animal's waste to provide nutrients for the plant. In this study we have ten micro aquaponics systems. Five of the systems contained gravel in the bottom of the aquarium, and the other five systems had no gravel in the bottom of the aquarium. The purpose of this test was to identify whether or not gravel made a difference in either fish production, plant growth, aquarium maintenance or nutrient cycling. This study's results and data will contribute to

the developing field of research. The results of the experiment concluded that there was a significant difference in plant production, fish growth, and nutrient cycling between aquariums with gravel and those without gravel.

## Chemistry

### **Poster 68 – Abby Anthony**

**Co-Author – Andrew Flint**

Mentor: Dr. Allen Thomas

Title: *Pursuit of Heterocyclic Analogs of Histidine Via Palladium-Catalyzed Cross Coupling*

LAT1 is a membrane transporter protein highly expressed in the blood-brain barrier (BBB) as well as in various types of cancer. LAT1 substrates have shown to have applications as targeted drug delivery agents, potentially allowing pharmaceuticals to cross the BBB. Computer-simulated models of the transporter binding site predict that heterocyclic analogs of L-histidine could potentially be used as LAT1 substrates. To map out the structure-activity relationship (SAR) around L-histidine, we explored various substitutions and replacements of the imidazole ring (e.g. pyrazole, pyridine). Palladium-catalyzed cross coupling is a powerful synthetic method that has the potential to allow for a wide scope of amino acid analogs to be prepared; however, few have reported use of this strategy for making heterocyclic amino acids. Attempted synthesis of these compounds involved testing of various palladium-catalyzed carbon-carbon bond forming reactions (e.g. Negishi, Suzuki, and Heck coupling). The preparation of halogen-substituted

heterocycles, and results for their cross coupling reactions will be presented.

### **Poster 69 – Megan Bejot**

Mentor: Dr. Frank Kovacs

Title: *Hem C Micro-plate Assay and Lysine Mutagenesis*

Hemoglobin is a protein composed of four smaller, globular proteins that reside in the human red blood cell and functions to carry oxygen from the lungs to the tissues. The critical component of hemoglobin is heme, which is made from eight primary proteins, one of which is an enzyme called porphobilinogen deaminase or Hem C. Hem C is the third enzyme used in the biosynthesis of heme, and uses the substrate porphobilinogen to create a porphyrin ring made up of four pyrrolic groups, which is the base ring structure for the formation of heme. For our study we had three major concepts and are as follows: create a Hem C assay based off of known literature that can be done directly on a micro-plate, compare enzymatic activity between histidine tagged-Hem C and Hem C, and to perform a lysine mutagenesis on our Hem C enzyme and compare enzymatic activity with our wild type Hem C. To compare the two different enzyme activities we will use a Michaelis Menten plot, which will compare enzymatic activity versus concentration of substrate present. Overall the focus of the entire experiment is to test the flexibility of the Hem C enzyme, and to better understand how it individually works in the biosynthesis of heme.

**Poster 70 – Karissa Finke**  
**Co-Authors – Laura Stoner, Justine Bauer & Abby Anthony**

Mentor: Dr. Allen Thomas

Title: *Synthesis of phenylalanine analogs containing polar substituents using the Negishi coupling reaction*

The LAT1 protein transports large neutral amino acids (e.g. phenylalanine) across the blood-brain barrier (BBB) and has been used as a drug delivery mechanism. Manipulating the meta-position of phenylalanine has been shown to be a viable strategy for improving LAT1 substrate activity. We developed computer models of the binding site to help predict which functional groups at the meta-position would be optimal. Our hypothesis is that polar functional groups (e.g. amide, ketone, alcohol, etc.) may promote substrate activity through hydrogen bonding. We have synthesized phenylalanine analogs using the highly convergent Negishi coupling reaction to join substituted aromatic rings with a protected amino acid moiety, as depicted below. It was found that polar functional groups can interfere with the reaction, resulting in decreased yield. Our progress on optimizing the Negishi reaction to prepare substituted phenylalanine analogs will be presented.

**Poster 71 – Chris Hernandez**  
**Co-Authors – Karissa Finke & Logan Hansen**

Mentor: Dr. Allen Thomas

Title: *Synthesis of Tenofovir Prodrugs for LAT1 Mediated Drug Delivery*

The human immunodeficiency virus (HIV) is a retrovirus capable of causing a number of diseases and replicating

silently within the brain. A layer of cells known as the blood brain barrier (BBB) covers the surface of the brain and blocks the passage of most drugs, including ones for treating HIV. However, the BBB allows the entry of very specific solutes such as certain amino acids or hormones by means of transporter proteins. One of these proteins, the large-neutral amino acid transporter 1 (LAT1), may serve as a mechanism for importing prodrugs composed of a drug molecule linked to an amino acid. Tenofovir is an acyclic nucleoside reverse transcriptase inhibitor (NRTI), capable of disrupting the reverse transcription process employed by HIV. We hypothesized that tenofovir may be able to gain access to the brain by conjugation with an amino acid enabling LAT1 transport. We have taken multiple approaches to joining amino acid fragments with the phosphonate group of tenofovir. Chemistry to activate the phosphonate toward nucleophilic substitution as well as using the phosphonate hydroxy groups as nucleophiles was tested. Additionally, the synthesis of amino acid fragments customized for linking with tenofovir's phosphonate will be presented.

**Poster 72 – April Maschmann**  
**Co-Authors – Jocelyn Dolphin & Matthew Moore**

Mentor: Dr. Kristy Kounovsky-Shafer

Title: *Development of a 3D printed device to concentrate electrophoretically eluted DNA molecules*

The high-throughput analysis of individual DNA molecules is altering the pace and scope of biomedical investigation. Personal genomics will require large ensembles of individual genomes to



develop a database of genomic variations. Within the human genome, more base pairs are altered as a result of structural variation than point mutations. In order to ascertain larger variations or large complex variations in human cancer genome, longer molecules (average molecule size > 700 kb) are necessary. In this regard, the Optical Mapping System and Nanocoding were developed as a single molecule platform for construction of physical maps that span entire genomes. However, even these platforms—which assemble restriction maps of individual DNA molecules (average molecules size ~500 kb for Optical Mapping, or Nanocoding)—find it difficult to span across large (>400 kb) complex genomic regions. One of the main goals of our research is to develop devices to concentrate extremely long DNA molecules (>700 kb).

Therefore, we are leveraging 3D printing to fabricate meso-fluidic devices to concentrate lambda DNA molecules eluted from a gel matrix using an electric field. For these devices, the dimensions of the concentration area are varied, as well as the shape; whereas, the height of the device remains constant. In order to ascertain the device that concentrates the highest concentration of lambda DNA, we are using a multi-prong approach: measuring the fluorescence intensity of the YOYO-1 stained DNA molecules that are eluted into the solution in the concentration area, as well as the fluorescence intensity of the YOYO-1 stained DNA molecules that are within the gel matrix during the experiment. Finally, the device that concentrates the most DNA will be further modified in subsequent experiments.

## Geography & Earth Sciences

### **Poster 73 – Nicole Pauley**

Mentors: Dr. Paul Burger, Dr. Keith Geluso, Dr. Mary Harner

Title: *A GIScience Assessment of Land-Use Changes Along the Big Bend Region of the Central Platte River Floodplain from 1957-2016*

Water resources in Nebraska have been widely studied due to the presence of the Ogallala Aquifer and the Platte River Valley. Man-made disturbances, such as the construction of Interstate 80, have greatly impacted the river systems and the presence of water throughout the state, specifically in the Platte River Valley and floodplain. The pumping and dredging of sand and gravel for materials used in interstate construction during the 1960s has created many pit-borrow lakes. This study examines the creation and distribution of these lakes in the Big Bend Region between the villages of Overton and Chapman, NE. Orthorectified aerial imagery was obtained for 1957 and 2016 at a resolution of 10 and 6 inches respectively. These years represent the largest time scale before and after interstate construction. The FEMA floodplain for the Platte River was digitized as a polygon in ArcMap and used to define the study area between the two villages. Pit-borrow lakes located within the floodplain were manually digitized as vectorized polygons from the imagery for both years. Total surface area and perimeters of the pits were calculated, enabling temporal comparisons between the two years. The

results of this research project will be of particular interest to conservation groups in the region, specifically those focused on watershed and migratory and shorebird habitat management. This project will serve as a baseline for continued research examining land-use and watershed changes in the Platte River Basin.

## Mathematics

### **Poster 74 – Madison Mickey**

**Co-Author – Jianbai Xu**

Mentor: Dr. Jia Huang

Title: *Non-Associativity of the Double Minus Operation*

We examine the non-associativity of the double minus operation. Specifically, we analyze the results from consecutive applications of the double minus operation and count the number of them using complex roots of unity and the binomial theorem. This number turns out to be related to sequence A000975 in the Online Encyclopedia of Integer Sequences (OEIS), which satisfies nice recurrence relations and closed formulas and counts many other interesting objects.

## Physics & Physical Science

### **Poster 75 – Austin Ryan**

Mentor: Dr. Adam Jensen

Title: *The O'Connell Effect in Binary Stars*

In binary star systems, two eclipses occur while the two stars orbit around their

common center of mass. Each eclipse is expected to have equal value in brightness. Some stars brightness at their two eclipse are different - this is known as the O'Connell Effect. This effect is not expected – but could be due to starspots, transferring masses of gas from contact systems, or even exoplanets. To explore this effect, photometric observations of poorly studied binary stars that exhibit the O'Connell effect were taken using the 30" telescope at the McDonald Observatory in Fort Davis, Texas for a total of 10 nights in July and August of 2015. More observations were taken in late 2015, January of 2016, and June of 2016 using the same telescope at McDonald by accessing it remotely from UNK. These observations were taken in the Johnson B and V filters. IRAF and Mira Pro were used to reduce this data, which allowed us to produce B and V lightcurves and calculate the period of each system. These lightcurves were used to examine both the parameters of each system (such as the masses and temperatures of the stars) and its exhibited O'Connell Effect. Binary Maker 3 was used to find these parameters by fitting a light curve to match the data set for each star. For W UMa type stars specifically, a numerical method was used involving their period to calculate the mass ratio, which could then be compared to the Binary Maker 3 results. The mass ratio is especially important because it gives us an insight on the stellar evolution between various masses of stars. Future work will involve taking more observations at the McDonald Observatory to further study the long term changes of the O'Connell Effect in these stars to pinpoint its origin.

**Poster 76 – Elisa Strobe**

Mentor: Dr. Kenneth W. Trantham

Title: *Acoustic Characterization Using RT60*

We have reviewed different methods for measuring the acoustic characterization of a room, and have discovered that finding RT60 is the most common. We have developed a new way of analyzing the acoustic data for RT60 and are applying that method in three different rooms on campus. We plan to document the acoustic hot spots of the planetarium, creating a heat-map to show the results.

# Professional & Applied Studies

## Communication Disorders

**Poster 77 – Jamie Bigley**  
**Co-Authors – Caitlin M. Imgrund & Steven M. Barlow**

Mentor: Dr. Diane Loeb

Title: *Early Developmental Milestones of Children Born Preterm*

There is ample evidence that children born preterm have a wide range of neurodevelopmental difficulties, including motor, cognitive, and language delays (Aylward, 2014). Children born preterm have been reported to display expressive and receptive delays as early as 12 months of age and continue to score lower than their age-matched peers into the elementary school years (cf. Vohr, 2014). In this study, we examined the early communicative milestones, based on parental report, in the first two years of life for 108 children born preterm. The children were born at 24-36 weeks. Parents were asked to complete a developmental questionnaire when their children were 30 months of age. We analyzed answers to seven of the questions that addressed early communication development. These included: (1) the presence of babbling and cooing during the first 6 months; (2)

use of request gestures; (3) use of showing gestures; (4) presence of sound and word imitations; (5) age of first word production; (6) number of words produced and understood; and (7) number of words combined to make sentences. Our research question is: Do the early language milestones, as reported by parents, differ between children born preterm and children born full term? The data are currently being analyzed and once completed will be compared to the normative literature associated with language development.

**Poster 78 – Amanda A. Evert**  
**Co-Authors – Caitlin M Imgrund & Steven M Barlow**

Mentor: Dr. Diane Loeb

Title: *Parental Speech and Language Concerns of Children Born Preterm*

Comorbidity of language, speech, and attention development has not been studied extensively in children born preterm. Children born preterm are susceptible to negative neurodevelopmental outcomes (Aylward, 2014). Delayed expressive and receptive language abilities are sometimes present as determined by standardized assessment and parent report word inventories when these children are between 12 and 24 months of age (Sansavani et al., 2010). Children born preterm also have been reported to have higher levels of attention deficit hyperactivity disorder compared to children born full-term (Bhutta et al., 2002; Booth, 2016). A total of 136 children born preterm between 24 and 36 weeks gestational age (GA) participated. The parents completed a questionnaire developed by Restrepo (1998), which

contained 28 questions pertaining to language, speech, and attention concerns. Parents responded “yes” or “no” to the questions, and the total number of responses indicating concerns were tabulated for each child and also were calculated separately for: (1) language (2) speech and (3) attention items. Ninety-five percent of the total sample (129/136) rated at least one of the 28 questions as “yes” indicating concern. Regarding language, ninety-four percent (128/136) of parents reported at least one question as a “yes” indicating concern. For speech, forty-seven percent (64/136) of parents reported at least one question as a “yes” indicating concern. With respect to attention, thirty-one percent (42/136) of parents reported one, two, or three questions as a “yes” indicating concern. Ten percent (13/136) reported “yes” to all three attention questions. Twenty-one percent (28/136) of the sample reported concerns in ALL areas (i.e., language, speech, and attention). Language was most commonly reported as a concern, followed by speech, and lastly, by attention. Future studies to compare parental concern of children born full-term with the existing dataset will be conducted to determine the normative relevance of the data.

#### **Poster 79 – Emily Koski**

Mentors: Dr. Miechelle McKelvey, Dr. Whitney Schneider-Cline, Dr. Bryce Abbey & Dr. Julie Lanz

Title: *The Impact of Wellness Training on Graduate Students’ Academic Success*

The purpose of this research was to assess student’s wellness throughout the course of their graduate program. Graduate school is stressful for most

students. This project sought to provide a way for students to examine their wellness and identify personal strengths to build upon and facilitate a healthy lifestyle which may in turn have a positive impact on their success in graduate school. The wellness education offered in this research study was designed to introduce students to information about nutrition, time management, stress management, healthy sleep habits, and wellness opportunities within the university and community. Research questions included: How do first year graduate students rate their level of wellness at the beginning and end of their graduate program? What were participants’ reactions to wellness education sessions? What, if any changes did the participants make in their wellness routines as a direct result of the wellness education?

#### **Poster 80 – Megan Naylor**

Mentor: Dr. Diane Loeb

Title: *Color Word Naming and Identification of Adults*

Several studies suggest that both children and adults display a bias for color knowledge that is related to gender. Specifically, some studies report that females have a more expansive color vocabulary than males, when naming tasks are used to determine color knowledge. For example, a female may use the color term “teal” to describe a given color; however, a male may call the same color “blue”, “green” or “blue-green.” Surprisingly, no studies have evaluated both color naming and color identification within the same individual in adults and children.

In this study, we evaluated the color

naming and identification skills of 20 adults, 10 males and 10 females, ranging from 19 to 25 years of age. We developed a naming and an identification task that consisted of 11 basic colors (orange, blue, yellow, pink, white, purple, gray, brown, green, red, and black) and 11 non-basic colors (rust, teal, mustard, salmon, beige, lavender, slate, peach, jade, burgundy, and turquoise). We found no significant differences between the males and females for the naming and identification of basic color words. Further, we found no statistically significant group differences between identification of non-basic color words; however, there was a statistically significant difference between males and females for naming the non-basic color words. Females named more non-basic color terms; however, both groups displayed low rates of naming accuracy. Together the data expand our understanding of color word knowledge in adults, indicating that although naming differences are present between males and females for non-basic color terms, these same differences are not apparent in comprehension of non-basic color terms. Alternative color naming provided by the adults, as well as further directions for with children will be described.

**Poster 81 – Kathrin Roberts**

Mentor: Dr. Whitney Schneider-Cline

Title: *The Use of Electropalatography and Traditional Articulation Therapy in Remediating Persistent Speech Sound Errors*

Some children with persistent speech errors may have difficulty mastering sounds like /s, r, & l/, which are produced in such a manner that is often difficult for

clinicians to model during therapy sessions. In the field of speech-language pathology, an emerging technique known as electropalatography has been beneficial in some cases to help remediate the aforementioned speech sounds. The purpose of this study is to examine the use of electropalatography paired with traditional speech therapy in remediating persistent speech sound errors. Electropalatography utilizes an artificial palate (containing tiny sensors) that fits into the client's mouth, similar to a retainer. Audio output in the form of a spectrogram, as well as the tongue-to-palate contact reflected by the sensors, is processed by a small microchip and then displayed onto an attached computer screen. The unique nature of electropalatography is that it provides visual feedback in real time as opposed to simply perceptual feedback. The ability to visualize tongue-to-palate contact can potentially improve production of difficult speech sound errors in less time than traditional speech therapy alone. This poster presentation will include a literature review of the limited research available on this innovative approach to articulation therapy, as well as a description of the methodology used to analyze the progress of a case study of a school-aged client. The client used electropalatography in conjunction with traditional speech therapy services provided by a graduate clinician at the UNK Speech, Hearing, and Language Clinic.

## **Poster 82 – Shelby Stultz**

Mentor: Dr. Diane Loeb

Title: *For the /r/ Sound*

There is little research available to guide SLPs in their use of print and e-book selections for intervention. Based on the existing data, print books have been reported to be more beneficial for development of plot understanding and knowledge about print (Kozminsky, 2013). In contrast, it was reported that e-books were more effective than print books for promoting vocabulary growth (Shamir, Korat, & Fella, 2010). The purpose of our study is to examine the feasibility of e-books versus print books in speech sound remediation.

In phase I of this research study, we developed a survey that allowed us to compare SLPs' use and preferences associated with e-books and print-books for speech and language intervention practices. Our specific research questions are: (1) Do SLPs differ in their use of print books compared to e-books for speech-language intervention? And (2) Do SLPs differ in their preferences associated with print books compared to e-books for speech-language intervention? The results of our survey showed that a majority of the SLPs used print books over e-books.

For phase II of this study, we are developing an e-book that is structured around the auditory bombardment/minimal pairs approach to improve the production of /r/ sounds. We are also taking into consideration the feedback from Phase I. Once the e-book is complete, we will also have a print form of the story printed. Both of these books will be tested on a child currently participating in speech sound remediation

for /r/ sounds. The researcher will engage in shared reading with the child using both media forms and provide feedback on the feasibility of both books. Our specific research questions are: (1) Which e-book features kept children engaged during speech sound remediation? (2) How feasible were our books? (3) Are print or e-books more feasible during speech sound remediation?

## **Poster 83 – Brooke Thorell**

**Co-Author – Katherine Schneider**

Mentor: Dr. Diane Loeb

Title: *Critical Appraisal of Language Intervention Studies of Children Born Preterm*

Approximately 20-40% of children born preterm are diagnosed with a language delay before kindergarten (Foster-Cohen et al., 2007). Given the several studies that have been conducted which suggest that children born preterm display language delays (cf. Vohr, 2014), it is surprising that there has not been a systematic review and critical appraisal of the language intervention studies of children born preterm. Such a review would assist speech-language pathologists working with children born preterm to provide them with the best evidence-based practice tools. The goal of this study was threefold: (1) to search several databases for intervention studies that have targeted language improvement in children born preterm; (2) to determine the level of quality of the articles reviewed; and (3) to describe the language intervention outcomes of children born preterm as reported in the studies reviewed.

# Industrial Technology

## **Poster 84 – Emma Lee**

Mentor D. Sonja Bickford

Title: *Benefits of Aquaponics*

Aquaponics is the combination of horticulture and aquaculture. This study is endeavoring to identify some of the health benefits of aquaponics as well as developing a marketing plan aquaponics systems. The main question of this study is to identify the benefits and variation of the benefits of aquaponic systems for the three different target audiences and create a custom marketing plan for the system for each intended target audience based on the findings.

To better understand the mental and physical benefits of aquaponic systems, specifically identifying the most beneficial impacts of color and sound choices on people's emotions is at the core of this project. In addition, the project will assess the health and educational benefits of aquaponic systems and the growth of plants and fish within them. Testing of the hypothesis in regards to the choice of system colors and sound levels along with the health, wellbeing, and educational benefits in k-12 school setting, a nursing home and hospital doctor's office. In these locations, we will go through the process of observing behaviors with each piece of the system as we build the full system in the location over time. We will conduct 20 hours of observation per section and will conclude the research with interviews of the involved parties.

The deliverable of the project will be the understanding and match of the benefits

with the target markets for a marketing plan.

## **Poster 85 – Courtney Leitner**

**Co-Author – B. Adams**

Mentor: Dr. Sonja Bickford & Dr. Nate Bickford

Title: *Cost Benefit Analysis of Small- and Medium-Scale Aquaponics Systems*

Aquaponics is the process of removing fish waste through a filtration system. This filtration system converts the waste into nutrients that are beneficial to both plants and fish. The process is completed through the continuous recirculation of water from a flood tank into a grow bed, then into a fish tank. The purpose of this project is to analyze the costs and benefits that an aquaponics system can provide. Two sizes of aquaponics systems will be used in the analysis, which includes a small-scale system and a medium-scale system. The small-scale system uses a 10 gallon tank whereas the medium-scale uses a 250 gallon tank. The questions that will be taken into consideration regarding this research project include: Are the small and medium scale systems economically feasible? In comparison, is one scale more beneficial than the other? Research will include the review of literature available on the economic feasibility of the systems.



# Kinesiology & Sports Sciences

## **Poster 86 – Claire Dull**

Mentor: Dr. Kazuma Akehi

Title: *Aging negatively influences muscle force production and muscle morphological characteristics*

Context: Muscle strength and morphological characteristics tend to decline due to aging, causing multiple falls and severe musculoskeletal injuries among the elderly population. There is limited research investigating muscle force production and architectural characteristics together in different age groups. Objective: To examine the difference between the young and elderly population in muscle strength, muscle size, and the muscle quality of the thigh muscles. Participants: Twelve elderly individuals (male n= 6, female n=6, age= 80.09±3.12 years) and thirteen college-aged students (male n=8, female n=5, age=20.58±1.04 years) participated in this study. None of the participants had any known neuromuscular condition or surgery in the past 12 months. Intervention: Participants reported to the laboratory once and completed an informed consent and health history questionnaire, followed by ultrasound images taken of the thigh muscles. Participants then performed two hip flexion and extension maximal isometric voluntary contractions in functional standing position, at 15° of hip flexion position, with a 30-second break between trials. Ultrasound imaging and muscle strength assessments were performed on both loaves. Main Outcome Measures:

Peak hip flexion and extension torque (ft-lbs), muscle thicknesses (cm), and muscle quality of the rectus femoris, vastus intermedius, vastus lateralis and vastus medialis muscles. Results: We observed significant gender and age interactions in muscle sizes and quality (Tukey-Kramer, P<.01). There are age and gender main effect differences in peak hip flexion and extension torque (P<.001). Young males were much stronger and had better muscle quality than females and the elderly population. Conclusion: It is clear that age and gender influenced muscle force productions and thigh muscle sizes and quality (i.e. female < male; elderly < young). Females are weaker and have poorer muscle quality when both young and old, so females especially must take precautions to stay fit and strong as they age to avoid musculoskeletal injuries.

## **Poster 87 – Rachael Ernest**

**Co-Author – Stephanie Paulsen**

Mentor: Dr. Gregory Brown

Title: *Comparing the effects of coffee to a pre-workout on resting and exercise metabolic rates*

INTRODUCTION: Caffeine is a powerful and widely used stimulant known to improve mental focus, reaction time, muscular power, and delay fatigue. Many athletes use caffeine containing pre-workout drinks before competition and training for the ergogenic benefits of caffeine. Coffee is a very popular beverage due to its caffeine content. Research suggests that coffee may provide ergogenic benefits that are greater than can be accounted for based solely on the caffeine content.

PURPOSE: The purpose of this project is

to evaluate the influence of coffee versus a common pre-workout supplement (Advocare Spark), on resting metabolic rate and metabolism during moderate intensity aerobic exercise. **METHODS:** A sample of 10 male and 10 female physically active college students will be recruited as participants. Preliminary testing includes a measurement of body composition via DXA and VO<sub>2</sub>max testing on a treadmill. On four later visits, separated by at least 48 hours, the participants will have their resting metabolic rate in a fasting state measured. The participants will then consume (in a randomized, blinded, crossover manner) caffeinated coffee, decaffeinated coffee, spark, or a sugar and caffeine free placebo (Crystal Light). The participants will wait one hour, and then undergo a second measurement of resting metabolic rate. The participants will then exercise on a treadmill at 50% of their VO<sub>2</sub>max for fifteen minutes. Heart rate, oxygen consumption, and respiratory exchange ratio will be measured at rest and during exercise for data analysis via an ANOVA. Data collection is currently underway.

**Poster 88 – Marco A. Escalera  
Co-Author – Aleesha Olena**

Mentor: Dr. Gregory Brown

Title: *Determining Factors Necessary for Men to Have Well Defined Abdominal Muscles*

**INTRODUCTION:** Physically fit individuals often desire to have well defined abdominal muscles which are also known as “6 Pack Abs”. They seek to obtain 6 Pack Abs through numerous exercises that strengthen and tone the abdominal muscles. It has also been

purported that to have 6 Pack Abs an individual must have low amounts of total body fat. However, there has been little to no research to determine the amount of body fatness or abdominal muscle strength necessary to have 6 Pack Abs. **PURPOSE:** The aim of this study is to evaluate the relationship between total and regional body fatness, abdominal muscle strength, and the aesthetic quality of an individual’s 6 Pack Abs.

**METHODS:** Male subjects between the ages of 19 and 35 year old are being recruited from the campus and Kearney communities. After screening, males that meet the inclusion criteria will report to the UNK Physical Activity and Wellness Laboratory for measurement of body composition via dual-energy x-ray absorptiometry (DXA), abdominal skinfold measurement, abdominal muscle strength assessment through a 60 second crunch/sit up test, and a photograph of the subject’s bare abdomens. The pictures are then scored on a 10 point scale for overall quality of 6 Pack Abs based on visual appearance for symmetry, muscle mass, and definition (total possible score of 30 points). Regression analysis will be used to determine what factors are most related to 6 Pack Abs.

**RESULTS:** data collection is currently underway.

**Poster 89 – Collin Fleecs**

Mentors: Dr. Matthew Bice & Dr. Gregory Brown

Title: *Sleep Deprivation: Effects on Peak Power (Anaerobic Capacity)*

Often times, college is the first time that young individuals are living by themselves acquiring many new responsibilities.

Many college students are enduring an increase in stress due to the increased responsibility of becoming an independent adult, and this stress may influence the sleeping patterns of these individuals. The effect of sleep deprivation on cardiovascular function during aerobic exercise has been reviewed extensively. The effect of lack of sleep on short-term bouts of anaerobic exercise, however, is less documented. Physical performance is not only important for student athletes, but also for individuals looking to gain muscle, lose weight, or for those recovering from injury. The purpose of the proposed study is to determine the effect of sleep deprivation on (a) peak power output, (b) mean power output, and (c) the fatigue index, measured as the percent decrease in power over the course of the Wingate bicycle test. Data acquired from the present experiment will determine how sleep deprivation effects the physical body of young adults, which may ultimately lead to changes in mental, social, and academic performance.

### **Poster 90 – Bailey Flores**

Mentor: Dr. Kazuma Akehi

Title: *Ulnar Collateral Ligament (UCL) morphological characteristic changes in collegiate baseball pitchers during preseason and in-season competition.*

Background: Overhead activity athletes such as collegiate baseball pitchers exert immense forces through the medial elbow joint throughout the throwing motion. Repetitive near-tensile failure loads applied to the anterior band of the ulnar collateral ligament (UCL) during the acceleration phase of throwing results in microtrauma and may eventually lead to

ligament failure. Injury to the UCL can be a career ending injury for collegiate baseball pitchers. Purpose: The purpose of the study is to determine the effects of competitive collegiate baseball participation on UCL morphological characteristics adaptation and its relationship between pitch counts and injury risks on the medial elbow. Methods: Twenty college-age pitchers will participate (age 19-30 years). All participants need to be on the active baseball roster. The inclusion criteria will be no known upper extremity injuries and neurological issues six months prior to the initial testing. The participants will be assessed UCL morphological characteristics using diagnostic ultrasound and pitch count records during practice and games. Data collection will occur during preseason and in-season. Hypothesis: We hypothesize that all pitchers will positively adapt their UCL morphological characteristics continually from preseason to in-season. However, maladaptation of UCL morphological characteristics would increase risks of elbow injuries in collegiate male baseball pitchers. Clinical applications: The findings in the current proposed study will help clinicians and practitioners understand how the UCL morphological characteristics change during preseason and in-season competition. Understanding the changes of the UCL morphological characteristics will allow for enhanced preventative injury care.

**Poster 91 – Bailee J Jensen**

Mentor: Dr. Bryce Abbey

Title: *Eliminating Sedentary Behaviors in the Work Force*

Background: As sedentary behaviors increase, so does the chance of developing a chronic diseases. Either too much standing or too much sitting may have individual risks in desk-based job settings. Efforts have been made to find ways to balance the two in hopes of lower the health risks associated with sedentary behavior. Light physical activity in between periods of sitting created benefits to metabolism and cardiovascular health but is not possible with some work requirements (1). More energy is expended when standing time is increased allowing employees to be more active at work. While , sitting for extended periods of time increases employees chances of developing chronic diseases such as heart disease and hypertension,standing for prolonged periods may be hard on the muscles and bones in the body. Other methods to increase physical activity at workstations, such as treadmill desks and pedaling desks have been tested and often removed due to the impairment of fine motor skills when working (2).

Purpose: The purpose of the current project is to collect and analyze the present research on sedentary behavior in the workplace. The information collected will be utilized in a future research project to fill the gaps and limitations on the topic.

Methods: The project will include the gathering scholarly, peer reviewed articles on sedentary behavior in the workplace through various research databases. Each article will be analyzed

to find gaps, limitations, and future research plans. The components that will be analyzed include study design, study population, measures of physical activity, health risks, analyses, limitations and results.

Results: Articles are currently being collected.

References available upon request. They did not fit into the character limit.

**Poster 92 – Kylie Kenedy**

**Co-Author – Jillian Rocheford**

Mentor: Dr. Matthew Bice

Title: *Perception of Body Weight*

BACKGROUND. Health is a broad term commonly associated with components of physical activity and nutrition. Perception of how a person maintains, sustains, and even ignores health can be derived from individual and social influences.

Individuals are sometimes blinded by reality and have trouble distinguishing between perception and reality as it relates to health, specifically body composition. The purpose of the study was to (a) compare perceived body weight to actual body weight and (b) examine differences in wellness constructs among body composition categories. METHOD. Students at a midsized university were recruited to participate at various locations on campus with high traffic. Students were asked to categorize their body composition (underweight, normal weight, or overweight), complete the Perceived Wellness Survey, followed by a direct measure of height and weight to establish BMI. RESULTS. Preliminary data reveals that there were significant differences between how participants rated their BMI compared to the direct measure of BMI (p

< 0.05). Further, significant correlations were present among the measured wellness constructs of Psychological, Emotional, Social, Physical, Spiritual and Intellectual. An ANOVA analysis revealed the wellness construct of Social was significantly different among individuals of different BMI categories [ $F(2, 82) = 3.553, p = 0.033$ ]. DISCUSSION. Preliminary data suggests that student wellness is significantly affected by body composition. Perception can be misleading and ignoring personal health can have detrimental consequences on wellness. Preliminary data has been collected, analyzed, and data collection will continue through Spring 2017.

**Poster 93 – Elenna R. Leininger**

Mentor: Dr. Matthew Bice

Title: *Exercise Motivation, BMI, and Physical Activity Levels Among Intramural Participants*

Students that participate in recreational sports and regular exercise while in college are more likely to continue to be physically active after graduation. The purpose of this study was to examine the differentiating motives among intramural participants and examine how motivational constructs relate to students' body compositions. The Exercise Motivation Inventory was used to measure participants' motivation, and the International Physical Activity Questionnaire was completed to measure activity levels. Standardized coefficients indicate that Appearance ( $\beta = -0.242, p = 0.001$ ), Health Pressures ( $\beta = 0.208, p = 0.05$ ), and Weight Management ( $\beta = 0.332, p = 0.001$ ) have a statistically significant influence on intramural participants' BMIs. The information in this

study could be useful if taken into account when promoting, designing, and implementing future intramural and campus recreation programs. Creating diversity in activities may encourage additional populations of students on campuses to participate in physical activity opportunities, thus improving overall health and well-being far beyond the college experience.

**Poster 94 – Aleesha Olena**

**Co-Author – Marco A. Escalera**

Mentor: Dr. Gregory A. Brown

Title: *Determining Factors Necessary for Women to Have Well Defined Abdominal Muscles*

Introduction. Physically active individuals often seek to have well defined abdominal muscles, which are also known as "6 Pack Abs". These individuals strive to obtain 6 Pack Abs through multiple exercises to strengthen and tone the abdominal muscles. It is also thought that to have well-defined 6 Pack Abs a person must have low amounts of total body fat. However, there has been little to no research determining what factors are necessary to have 6 Pack Abs. Purpose. The aim of this study is to evaluate the relationship between total and regional body fatness, abdominal muscle strength, and muscular definition of an individual's 6 Pack Abs. Methods. Female subjects between the ages of 19 and 35 years of age are being recruited from the student body of the University of Nebraska at Kearney and the surrounding community. Females report to the UNK Physical Activity and Wellness Laboratory for a measurement of body composition via DXA, abdominal skinfold measurement, an assessment of abdominal strength

through performance of a 60 second crunch/sit up test, and a photograph of the subject's bare abdomen. The photographs are then scored using bodybuilding judging criteria, which is a 10 point scale (total possible score of 30 points). It includes visual appearance for symmetry, muscle mass, and definition. Regression analysis will be used to determine what factors are most related to 6 Pack Abs. Results. Data collection is currently underway.

**Poster 95 – Jillian Rocheford**

Mentor: Dr. Matthew Bice

Title: *Environmental Effects on Patient Satisfaction*

Rehabilitation environments have been densely researched; however, an evaluation between a physical therapy clinic environment and patient satisfaction presents a gap within the literature. The purpose of the current study is to analyze the association between the environment of a health professional clinic and patient satisfaction. The proposed poster will discuss (a) the need for the current study and (b) the approved protocol for data collection starting in Spring 2017. Patients at New West Orthopaedic and Sports Rehabilitation will be asked to complete two surveys during their final discharge visit. The Post Occupancy Evaluation (POE) will be used to assess the environment based on the POE constructs, which include accessibility, cleanliness, temperature, noise, and light. A standardized patient satisfaction survey will be used to assess patient satisfaction. Both research tools have been proved to be valid and reliable. We hypothesize that the environment is significantly associated with patient satisfaction.

Results from the current study will benefit health professional clinics with knowledge of aspects that could be enhanced to increase patient satisfaction from a patient's point of view.

**Poster 96 – Amanda Skalka**

Mentor: Dr. Bryce Abbey

Title: *High School Students' Perception of School Foodservice*

School foodservice programs are influential in providing nutrition to our future leaders. Today, high school students are exposed to a variety of dining experiences, which influence how students evaluate school foodservice (Meyer and Conklin, 1998).

**PURPOSE:** The purpose of this research is to determine if high school students' perception of school foodservice is directly related to the participation in foodservice. **METHODS:** Sandy Creek High School students, 135 potential participants, grades freshman year through senior year will receive an email solicitation from school administration for participation and a link to direct participants to the survey. The survey utilizes the National Food Service Management Institute high school foodservice survey, this survey will determine factors that influence the participation of school foodservice (Meyer 2000). The survey consist of 32 questions regarding the student's demographics, frequency that eat school lunch, and their perception of the school foodservice at their school. Descriptive statistics, chi-square, and general linear models will be used for analysis **RESULTS:** Data collection is currently underway. Meyer, M.K. (2000) Top predictors of middle/junior high school students'

satisfaction with school foodservice and nutrition programs. Journal of the American Dietetic Association. 100(1). Meyer, M.K., Conklin, M.T. (1998) Variables affecting high school students' perceptions of school foodservice. Journal of the American Dietetic Association. 98(12).

**Poster 97 – Danielle Tilley**

Advisor: Dr. Megan Adkins-Bollwit

Title: *Validation of Adidas Spirit Interactive Health Technology (IHT)<sup>TM</sup> Accelerometer for use with Elementary Children*

Wearable technologies such as FitBit<sup>TM</sup>, Garmin<sup>TM</sup>, and Apple<sup>TM</sup> watches have become more prevalent among adults and adolescents to help motivate and monitor daily physical activity (PA) time (Thompson, 2015). Childhood obesity rates have escalated, and the amount of children who do not meet the recommended amount of 60 minutes of moderate to vigorous (MVPA) time continues to increase (Fearnback 2016). Research indicates that children wearing technology is a popular way to ignite their interest to become more active (Partridge, King, & Bian, 2011). Physical Educators have taken the initiative to incorporate wearable PA trackers into their classrooms to increase interest and to track student's PA. However, the cost of reliable and accurate wearable PA devices is expensive. Many schools cannot afford them, resulting in PhysEd teachers using low-grade, inaccurate pedometers. This past year an accelerometer/heart rate wearable watch was developed by the Adidas Spirit Interactive Health Technology<sup>TM</sup> (Spirit IHT) cooperation. The Spirit IHT<sup>TM</sup>

wearable was made specifically for Physical Education participants to track MVPA and heart rate levels. To date, there have been no studies completed on accuracy of MVPA when children wear the Spirit IHT<sup>TM</sup> watch. The purpose of this research was to compare the validated MTI ActiGraph GT3X<sup>TM</sup> Accelerometer (Carr & Mahar, 2012; Rowlands & Stiles, 2012), to the Spirit IHT<sup>TM</sup> wearable, to determine the accuracy in MVPA time. The MVPA level is defined as movement  $\geq 4$  METs for children (Troiano et al., 2008). Fifty children, ages seven to twelve that participate in the UNK homeschool Physical Education teaching lab will wear both monitors to track MVPA time while participating in class. The results of this study will provide evidence on the reliability of the Spirit IHT<sup>TM</sup> watch to estimate MVPA minutes and could serve as a useful alternative for Physical Educators to track accelerometry of their students.

**Poster 98 – Carrie A. Watson**

Mentor: Dr. Todd Bartee

Title: *Nutrition Education in Dentistry*

Introduction: Proper nutrition is important in preventing chronic diseases including heart disease, diabetes, and obesity. General nutrition education in dental clinics has been proposed as an important source of health promotion and disease prevention. The purposes of this study are to 1) describe current nutritional education practices of general dentists in south central Nebraska; and 2) examine factors related to their nutrition education practices. Methods: Practitioners of general dentistry were identified through phone books and websites. An

informational letter and survey link were sent via email to dental offices representing approximately 65 dentists. Descriptive statistics were used to describe the relationship between nutrition education behaviors and influencing factors. Results: There were a total of 7 respondents (10% response rate). Participants were mostly male (n=4), had >10 years' experience (n=6), and practiced in micropolitan areas (n=5). All respondents reported providing caries-related nutrition education to patients frequently or very frequently. Conversely, all respondents reported not frequently providing nutrition education beyond caries-related issues. The number of hours of nutrition information received in dental school ranged from 1 hour to greater than 10 hours including both caries-related and non-caries related nutrition education. All respondents with >10 years in practice (n=6) reported being somewhat qualified and sometimes comfortable in providing general nutrition education for patients. Nearly all respondents (n=6) were interested in continuing education on topics related to general nutrition and indicated basic nutrition principles in dental education requirements as important. The main indicated barriers included lack of time, personal lack of nutritional knowledge, and lack of trained or qualified staff members. Conclusion: Many dentists are aware of the importance of implementing non-caries related nutrition education into practice. However, results from this small sample indicate that there are several barriers prohibiting implementation of non-caries related nutritional education in the dental setting.

### **Poster 99 – Paige Wuebben**

Mentor: Dr. Todd Bartee & Dr. Kate Heelan

Title: *The Reach of an Efficacious Pediatric Obesity Treatment Program: An Important Consideration to Determine Public Health Impact*

Background: To address the public health problem of childhood obesity, family-based efficacious pediatric treatment programs have been developed. Building Healthy Families (BHF) is a 12-week intensive intervention that has been implemented with 9 cohorts since 2009. BHF has led to meaningful changes in health outcomes among child participants aged 6 to 11 years, including decreased BMI z-score, fat mass, systolic blood pressure, and AST liver enzymes and increased fat-free mass and HDL cholesterol. It has been argued that the public health impact of an intervention should be measured by its efficacy and its reach. The purpose of this study was to determine the reach of BHF. Methods: Reach was defined as the number of children aged 6 to 11 years eligible for the program divided by the number who initiated the program. Existing data related to childhood obesity rates of Kearney Public Schools students, and BHF participation were analyzed to determine reach. Results: For each of 9 cohorts, between the years 2009 and 2016, an average of 358 children met the eligibility requirements for a total number of 3,226 that were subsequently recruited. A total of 83 children initiated the program for a reach of 2.57%. Reach ranged from 0.89% in cohort 9 to 4.20% in cohort 3. There was an overall downward trend in reach over time. Conclusions: The notion



of reaching as many eligible children as possible with an efficacious intervention is important in combatting childhood obesity. To better understand reach, future research should investigate recruitment alternatives. However, the optimal total number of participants must also be considered. For example, while 2.57% reach may seem very low, the maximum optimal number of participants for the BHF program is 12 per cohort. This would suggest an optimal reach of 3.56% using the last cohort's eligibility data (n=337).

## Management

### **Poster 100 – Stephanie Duennerman**

Mentor: Dr. Michelle Fleig-Palmer

Title: *Understanding Employee*

*Perceptions of Commitment and  
Motivation in the Workplace*

Recent studies have found that engaged employees provide better customer service and work performance along with lower turnover, which results in better financial returns (Attridge, 2009; Macy & Schneider, 2008; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). A number of antecedents (i.e. feedback, regular check-ins, work conditions, etc.) of employee engagement have been identified; however, researchers have not considered perceived supervisors' affect. Supervisor affect can be classified as either positive affect (i.e. attentive, interested, enthusiastic, etc.) or negative affect (distressed, irritable, hostile, etc.). Supervisors' moods and emotions, especially negative ones, are very salient to their employees and could impact employee engagement. Another

influencing element of employee engagement to consider is psychological ownership, which is employees' perception that they possess some intangible aspect of the organization without legal entitlement. Psychological ownership could influence the strength of the impact of supervisor affect on employee engagement. This study examined the moderating effect of psychological ownership on the relationship between supervisor affect and employee engagement. A comprehensive literature review examined past studies of psychological ownership, employee engagement and supervisor affect. A survey, utilizing validated scales, was administered at one location of a large chain grocery store to explore employees' perceptions of their supervisors' affect, to measure the employees' concomitant engagement, and to evaluate the effect of their dispositional psychological ownership. The results of this study highlight the importance of recognizing that supervisor affect is an antecedent of employee engagement and that psychological ownership influences the strength of that relationship. The practical implications of this study can guide managers in recognizing the impact of their emotions and the need to filter their displayed emotions to promote employee engagement, which will result in positive work outcomes.

### **Poster 101 – Bailee J Jensen**

Mentor: Dr. Michelle Fleig-Palmer

Title: *Effects of Parental Involvement on Patient Adherence in Pediatric Occupational Therapy*

The purpose of this experiment was to see the degree of parental involvement that leads to the highest patient adherence in pediatric therapy. Patient Adherence is the act of a patient correctly following their medical plan of care. In order to improve patient quality of life, an occupational therapist will make a plan of care to help a patient achieve certain goals. Once the patient leaves the facility, it is their responsibility to follow their plan of care at home. In Pediatric Occupational Therapy, parents have to help keep their children focused on following the therapist's orders at home. The present experiment involved three Occupational Therapists (OT) in pediatric therapy centers such as Family Physical Therapy and Pediatric Therapy Center. An OT school professor was interviewed as well. Each therapist was interviewed for an hour on parental involvement and patient adherence. Results will help parents understand how to aid their children to achieve therapy objectives most efficiently.

## **Marketing & MIS**

### **Poster 102 – Maria Gutierrez**

Mentor: Dr. Greg Benson

Title: *Gap between consumer's ethical standards, and their behavior*

During last year's research, called "The Impact of Having an Ethical Behavior on the Performance of a Company", I found

out that the quest for profit that the market demands can have a negative impact on society and the environment. In order for a company to stay in the market, it must minimize the cost of production and maximize profit, and this requirement can lead to unethical behaviors. I was able to collect information that evidenced the fact that companies with a higher ethical standard regarding its employees, had a better employee performance and as a result, a higher customer retention. Even though, I was able to prove that a high ethical standard had a positive impact on a company, I also found evidence that proved that customers do not always choose their purchases based on their ethical parameters but rather based on monetary aspects. This research was done in order to collect information from previous researches regarding this topic.

## **Teacher Education**

### **Poster 103 – Madi Casper**

Mentor: Dr. Jane Ziebarth-Bovill

Title: *Establishing A Growth Mindset in Early Learners*

The purpose of this presentation is to share information about how to establish a growth mindset in early learners. The presenter will describe Carol Dweck's foundational work on mindset and explain the difference between fixed and growth mindsets. In addition, the presenter will offer practical strategies to encourage a growth mindset in early learners. The strategies will focus specifically on trigger words, phrases, and questions that promote a growth mindset in early learners.

## **Poster 104 – Elaina Eddy**

Mentor: Dr. Carrie Kracl

Title: *Teacher Perceptions and Effects of Sustained Silent Reading on Measures of Academic Progress Scores*

Sustained Silent Reading is reading silently for an amount of time in a distraction free environment. Sustained silent reading is an important attribute for literacy development. If students read daily, and learn to enjoy it, they will become lifelong readers, which leads to improvement in many skills. However, reading instruction varies in schools. Many schools use incentive based approaches to reading. This teaches children to read for a prize, instead of reading to read. Many struggling students are assigned to read in isolation or assigned to finish homework during reading time. This method leaves struggling readers with little time to improve, but while in comparison good readers often have more time to practice their reading. Studies have shown that an effective sustained silent reading focuses on routine, environment, access to materials, teacher roles, accountability, and time. This research analyzes survey results of teacher perceptions of sustained silent reading. First, a survey regarding teacher perceptions and methods was taken by twelve third grade teachers from various schools in one midsized midwestern school district. Results from phase one of this study show that teacher perceptions and methods of reading instruction vary. Preliminary results showed that the keyword “time” was used when asked what the biggest struggle of daily uninterrupted reading is. Results showed

that teachers in the study took time for reading, but did not always implement a distraction free environment or other factors that contribute greatly to successful sustained silent reading. Clearly, research shows that sustained silent reading is an important factor for development of students. This study will be continued with comparison of MAP test scores of students and the results of the survey taken by their teachers. The complete study will increase understanding of the possible benefits of sustained silent reading and a possible relationship to MAP test scores.

# Graduate Studies

## Biology

### **Poster 105 – Wilfredo Lopez**

Mentor: Dr. Kimberly Carlson

Title: *Production and detection of Vago and virus induced RNA-1 (vir-1) in Drosophila melanogaster using monospecific antisera during Nora virus infection*

Monospecific antisera production is used to detect and characterize proteins of interest for functional annotation. In *D. melanogaster*, the genes Vago and virus induced RNA-1 (vir-1) are implicated in innate immunity during Nora virus infection. However, the antiviral mechanism that Vago is involved in is not fully understood and the role of vir-1 within this mechanism has not been determined. Vago and vir-1 were produced from codon optimized synthetic genes were expressed for monospecific antisera production. Western Blot analysis showed that the antisera reacted specifically with Vago and vir-1. These same antisera were used to successfully detect Vago and vir-1 during Nora virus and *Drosophila C virus* (DCV) infection in approximately thirty day old flies. DCV was used as a control for Nora virus to determine if DCV could stimulate Vago and vir-1 production. To evaluate detection of Vago, flies were aged over twenty-seven days and examined at three day intervals. Vago antiserum was able to

successfully detect Vago at all three day intervals in the twenty-seven-day time span. In the time course experiment, monomeric Vago protein was detected in the early portion of the trial, but subsequently was found only in oligomerized forms. These results indicate that Vago may oligomerize throughout the course of Nora virus infection to become active and function in an unknown antiviral mechanism. Ultimately, producing monospecific antisera for Vago and vir-1 proteins will allow for continued work in determining these proteins antiviral mechanisms. 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.

## Counseling & School Psychology

### **Poster 106 – Carter Blauvelt**

Mentor: Dr. Tammi Ohmstede

Title: *Outcomes of Academic Coaching in At-Risk College Students at a Mid-West Regional University*

Can we help academically at-risk students succeed in college? This presentation reports the results of the outcomes of academic coaching on student's learning strategies and academic achievement. It was hypothesized that coaching would improve learning strategies of college students and that at-risk college students who received coaching would have

similar academic achievement and retention rates as students who were not at risk and did not receive coaching. Results of the study demonstrated that academic achievement of students who received coaching and university data did not differ significantly in the Fall semester but did significantly differ in the Spring semester. It was also discovered that retention rates did not significantly differ between those students receiving coaching and university data. Results indicated that the learning and study skills of students involved with coaching significantly improved over the course of the intervention.

**Poster 107 – Jason J. Dillard**  
**Co-Authors – Peggy Deaver, Ryan Kawata, Chuanyao Zheng, & Shaun Mewes**

Mentor: Dr. Doug Tillman

Title: *Mentorship at the graduate level: a student led model*

Retention in graduate counseling and related programs grows ever more difficult as the landscape of education changes. More classes are offered online making it difficult to engage students in extra curricular honors groups and research opportunities. The student makeup at the graduate level is comprised of more nontraditional students than at the undergraduate level, which comes with its own challenges of working around a full time job, families, and children. Being a part of mentorship within a graduate program can help retain students (Buchanan 2005), help them feel welcomed, and help the program as a whole as the mentored students become more involved. The purpose of this mentorship program is to show how a

student organized model can succeed in all of these areas while placing little to no extra requirements on the counseling educators, volunteer mentors, or the students organizing the program. The presenters have not discovered a counseling specific model in the research to utilize in mentorship. However, ACA is currently working on an effective mentorship program (ACA 2016).

**Poster 108 – Calvin D. Frey**

Mentor: Dr. Tammi Ohmstede

Title: *A Follow-Up Evaluation of the University of Nebraska at Kearney School Psychology Program*

Due to the evolving roles and functions of school psychologists, it is important for training programs to be responsive and able to meet the needs of future school psychologists' competencies and skills. These training programs are held accountable and have to ensure that the school psychology students are meeting the standards or competencies set forth by the National Association of School Psychologists (NASP). Periodically, NASP reviews and accredits training programs in school psychology based on professional standards and competencies. By ensuring high-quality graduate programs in school psychology through accreditation, NASP make certain that the graduates have the competencies needed to be effective in their field. The school psychology program at the University of Nebraska at Kearney (UNK) has been assessed not only by NASP, but also by its graduate students. In the past, graduates have assessed UNK's school psychology program by conducting research which assessed the program's effectiveness. It is important to ensure

that students are satisfied with the training curriculum, job preparedness, and expertise developed within the program. This poster presentation aims to discuss how previous graduates from UNK's school psychology program viewed how the program prepared them for a career as a school psychologist based on NASP standards .

**Poster 109 – Rachel Lee**

Mentor: Dr. Tammi Ohmstede

Title: *Evaluating School's Crisis Prevention and Intervention Plans*

Children today are exposed to a variety of crisis and traumatic events throughout the course of a school year. Those traumatic events can include situations involving anything from natural disasters and death to child neglect and abuse. Crisis and traumatic events are going to happen in schools, there is little that can be done to prevent all crisis situations, however schools having a set crisis plan can help to minimize the trauma. The National Association of School Psychologists has developed a curriculum to help schools develop and implement crisis prevention and intervention plans. The purpose of this study was to develop a matrix for schools to compare their current crisis prevention and intervention plans with NASP's PREPaRE model. Based on the information found in this study while most schools have crisis prevention and intervention plan, there are still elements each school is missing

**Poster 110 – Lindsey Lewis**

Mentor: Dr. Tammi Ohmstede

Title: *Long-Term Predictive Validity of Kindergarten Academic Measures on Reading Achievement*

This study aims to examine the long-term predictive validity of kindergarten academic measures on first, second, and third grade reading achievement when controlling for socioeconomic status and English language proficiency. The early measures being considered as predictors of Measures of Academic Progress (MAP) reading scores are the Bracken School Readiness Assessment (BRSA), the Peabody Picture Vocabulary Test (PPVT), and the AIMSweb reading curriculum-based measurements. The BRSA and MAP reading measures in kindergarten proved to have predictive power on the MAP reading scores of students at all three grade levels.

**Poster 111 – Elizabeth Lopez**

Mentor: Dr. Tammi Ohmstede

Title: *Cross-Language Relationship Between Spanish and English Oral Reading Fluency Among Spanish-Speaking English Learners and English-Speaking Spanish Learners*

The purpose of this research was to evaluate the relationship of results of typical assessments used to predict Reading achievement ( i.e. the English assessment DIBELS and the Spanish assessment IDEL) between students of English speaking backgrounds and students of Spanish speaking. All assessments together accounted for more than 50% of the variance in MAP

scores. Implications for the continued use of these assessments are discussed.

**Poster 112 – Emily R. McDonald**

Mentor: Dr. Tammi Ohmstede

Title: *Examining Academics and Resilience in Middle School Students Within a Dual Factor Mental Health Model*

Identifying the mental health needs of students is important, for mental health does affect academic success. While it is common to connect mental health to academic success, limited research is available on the affect resiliency has on this relationship. This research examines the applicability of the Dual-Factor Model (Greenspoon & Sakflopske, 2001) in describing mental health typologies of 5th through 8th grade students in a rural Midwestern school district. It also will further describe whether academic achievement and resilience of students vary by mental health typologies.

**Poster 113 – Keri Messersmith**

Mentor: Dr. Tammi Ohmstede

Title: *Using Computer-Based Measure to Assess Reading Growth of Young Children*

This study examined the reading growth of students from first through third grades and how reading growth was influenced by socio-demographic factors. The socio-demographic factors examined as potential influences of reading growth included socioeconomic status, English language status, and gender. Results compared how different socio-demographic factors influenced reading growth in students during the early grades. Reading growth was comparable

among students of different socioeconomic status, English language status, and gender.

**Poster 114 – Jacqueline Rodriguez-Paar**

Mentor: Dr. Tammi Ohmstede

Title: *The Relationship Between Highly Mobile Students and Academic Performance as Measured by the Nebraska State Accountability Test*

Many factors influence a student's learning including socioeconomic status and mobility. The state of Nebraska has distinct factors that play a role in the academic achievement of mobile and highly mobile students. This study analyzes whether these highly mobile students seem to be achieving the same as or lower than their non-mobile peers and if being a student of a minority group along with being a mobile student shows a significant effect on state accountability test scores. It is hypothesized that being a highly mobile student will result in a significant difference in accountability test scores in at least one subject area (math or reading). It is also hypothesized that being a highly mobile minority student will also result in at least one significantly different accountability test score. It is also hypothesized that highly mobile 6th grade students would score lower than 7th and 8th grades, and minority 6th graders would perform lower than other middle school students. Archival data were gathered from 55,619 Nebraska middle school students who took both the NeSA-R and the NeSA-M in the 2013-2014 academic year and used to complete a between-subjects ANOVA. Data supported the hypothesis that being a highly mobile student results in

significantly lower NeSA math and reading scores. The data also supported the hypothesis that being a highly mobile minority student would also result in at least one significantly different NeSA test scores. The data did not support the hypothesis that highly mobile 6th grade students would score lower than highly mobile 7th and 8th grade students, and mobile, minority 6th graders would perform lower than their other middle school counterparts. The data did not support the hypothesis that students of different racial backgrounds while being in different grades may have significantly lower NeSA scores. Further analysis needs to be completed.

**Poster 115 – Halli Thurlow**

**Co-Author – Meghan Gregg**

Advisor: Dr. Tammi Ohmstede

Title: *Assessing Impact of an Evidenced-Based Universal SEL Curriculum*

Social-emotional learning (SEL) in the classroom has been reported to improve mental health well-being of students (Merrell, 2008). SEL incorporates a broad range of strategies and techniques to enhance resilience, improve social-emotional and life skills, and prevent negative life outcomes through effective classroom instruction. Through this poster presentation, participants will gain knowledge on the implementation of an evidence-based Tier 1 SEL curriculum. In addition, participants will know the impact of SEL program on students' social-emotional functioning.

## Educational Administration

**Poster 116 – Jackie Griffiths**

**Co-Author – Melissa Dobish**

Mentor: Dr. Richard Meyer

Title: *Improving Teaching and Learning Using the Keeping Learning on Track Professional Development Program and Strategies*

This study examines the impact of implementing the professional development program, Keeping Learning on Track (KLT), on teaching and learning in a rural school in a Midwestern state. KLT was a program developed by Dylan William and his colleagues at the Educational Training Service and published by the Northwest Evaluation Association (NWEA). Teachers and administrators in the district were surveyed after using the KLT model for one to two years to determine the effectiveness of the program on teaching and learning. Survey results indicated that teachers felt that KLT improved their instructional practice and that KLT has improved student learning for students in their classrooms. In addition, teachers agreed that formative assessment is valuable for improving teaching and learning.



# Kinesiology & Sports Sciences

## **Poster 117 – Ava Coughlin**

Mentors: Dr. Kate Heelan & Dr. Todd Bartee

Title: *Self-Monitoring as a Predictor for Weight Loss in a Family -Based Pediatric Obesity Treatment Program*

Pediatric obesity treatment programs intend to reduce body mass and establish healthy lifestyle characteristics to prevent obesity in adulthood. Programs for children in the 95th-99th BMI percentile are suggested to be comprehensive and multidisciplinary to change behaviors and decrease weight. Self-monitoring (SM) has shown to be an effective strategy in child weight loss. **PURPOSE:** To determine if child and parent SM of weekly nutrition (NUTR), physical activity (PA), and body mass (BM) predict weight loss during a 12-week pediatric obesity treatment program. **METHODS:** 51 children (age:  $9.8 \pm 2.3$  years, BMI percentile:  $98.0 \pm 1.3$ ), 45 mothers (age:  $41.5 \pm 6.2$  years), and 37 fathers (age:  $41.5 \pm 6.2$  years) participated in 12 weekly healthy living education sessions. SM scores were determined as the number of weeks participants logged energy intake (SM-NUTR), monitored steps per day (SM-PA), and weighed-in (SM-BM) over 12 weeks. A sum score (SM-SUM) of the three SM components was created. Stepwise multiple regression models were used to predict weight loss from SM scores. **RESULTS:** In 12 weeks, children lost  $5.1 \pm 4.4\%$  of BM, mothers lost  $5.3 \pm 8.0\%$  of BM, and

fathers lost  $8.2 \pm 4.7\%$  of BM. SM-SUM was 79% for fathers, 81% for children, and 88% for mothers. Stepwise multiple regression models suggested that Child's SM-SUM accounted for 19% of the variance in Child's % BM loss after 12 weeks ( $R^2=0.19$ ,  $p<0.05$ ). Mother's SM-NUTR score ( $R^2=0.47$ ,  $p<0.05$ ) and Child's SM-SUM score ( $R^2=0.08$ ,  $p<0.05$ ) accounted for 55% of the variance in Mother's % BM loss ( $p<0.05$ ). Father's SM-NUTR score accounted for 29% of the variance ( $R^2=0.29$ ,  $p<0.05$ ) in Father's % BM loss. **CONCLUSION:** SM-NUTR, SM-PA, and SM-BM all appear to play a role with family weight loss, with SM-NUTR being most influential. Continuance of self-monitoring post-intervention and its influence on weight loss should occur.

## **Poster 118 – Alexis Malmkar**

Mentor: Dr. Kate Heelan

Title: *Change in Body Mass from Kindergarten to 5th Grade as a Predictor for Body Mass in 5th Grade*

Childhood obesity impacts approximately 12.7 million children in the US (Ogden, et.al., 2015). Prevalence of obesity among 6-11 year (17.5%) is more than double of toddler-aged children 2-5 year olds (8.9%). **PURPOSE:** The purpose of this study was to evaluate changes in body mass (BM) from K through 5th grade and determine its impact on BM in 5th grade. **METHODS:** BM and stature were measured on a single population of 199 elementary school children in 2010 (K) and again in 2015 (5th grade). BMI was calculated by ( $\text{kg}/\text{m}^2$ ). Stepwise multiple regression analysis was computed to determine if

change in BM from K to 5th grade, BM, or BMI in K predicted BM in 5th grade.

RESULTS: 64.77% of students remained in the normal weight classification from K to 5th grade and gained  $36.58 \pm 10.67$  lbs. 18.13% of students moved into or remained in the overweight classification between K and 5th grade and gained  $50.55 \pm 7.49$  lbs. 13.47% of students moved into or remained in the obese weight classification and gained  $73.98 \pm 14.71$  lbs. Change in BM from K-5th grade ( $R^2=0.82$ ,  $p<0.05$ ), K BM ( $R^2=0.02$ ,  $p<0.05$ ), and K BMI ( $R^2=0.12$ ,  $p<0.05$ ) significantly predicted 5th grade BM accounting for 95% the variance ( $p<0.05$ ). CONCLUSION: Those that remained in an unhealthy weight classification from K to 5th grade gained 50.55% more weight in 5 years, an average of approximately 7.5 more lbs per year compared to a normal weight gain. Programs that focus on prevention of excessive weight gain are warranted to assist student in elementary school to avoid unnecessary weight gain and assist obese children to grow into their body mass over time.

# Performance Schedule



## Sandhills Room

1:30 pm ..... So-Young Chun: *Girl Crush* (Mentor – Dr. Sharon Campbell)

2:00 pm ..... Elaine Christensen: *The Gothic Tradition: A Theatrical Revival* (Mentor – Dr. Sharon Campbell)



## Performance Abstracts

### Music & Performing Arts

**Elaine Christensen**

Mentor: Dr. Sharon Campbell

Title: *The Gothic Tradition: A Theatrical Revival*

This project will be presented in two parts- a research portion and a performance portion. The main objective of my project is to be able to analyze common themes found in classic Gothic literature and apply them to contemporary Gothic theatre. To further support this thesis, I will then provide examples of said analysis in a theatrically creative format. This analysis comes from a curiosity of the endurance, or lack thereof, of Gothic novels in today's society. If there is a decline in the popularity of these stories, then transforming these novels into works of live theatre may be essential to their survival. However, if Gothic literature has endured, then perhaps it is their adaptation into theatrical works that has guaranteed their timelessness. I believe that a set of common themes found within Gothic works is what has allowed them to remain relevant to today's audiences. Using live theatre to portray these themes in a more

relational way only secures the fate of Gothic as an ageless genre. In order to better convey this idea to listeners, I would like to present a poster with a summary of my research, as well as a brief theatrical performance that will showcase the idea of theatrical performances as relational works. In this way, I can not only present my research in a formal setting, but also be able to give examples from specific theatrical repertoire that I will choose to support my thesis.

**So-Young Chun**

Mentor: Dr. Sharon Campbell

Title: *Girl Crush*

“Girl Crush” was performed in the Fine Arts Recital Hall on March 9th. It is focused on women’s roles and life problems as presented in musicals. The idea came from researching musicals that have had a big success in South Korea or have had South Korean financial backing. Through this research, I perceived that the role of female characters is very limited. Mostly, they perform about their love, lovers, heartbreak and betrayal by men. It was hard to find female characters who have independent lives in the musicals which were highlighted by my research. Therefore, I wanted to make a 3 act performance introducing women’s role in musicals in the theme of “Girl Crush”. Even though each musical is frame different period and place, I put them in one world for this performance, so the characters from various musicals talk and interact with each other. Act 1 is “Girls have Crushes”, performing the musical numbers from various musicals singing about girls who fall in love with men. Act 2 is “Crush the Crush”, and it features musical numbers about hating men. Lastly, Act 3 “Girl Crush” features musical numbers celebrating the independent life of the characters, and having a “girl crush” other girls a matured admiration for other women’s power. In this oral presentation for Student Research Day, a few selections will be performed within an oral presentation about the project.

# Oral Presentation Schedule



## Room: Ponderosa C

- 1:30 pm ---- **Tessa Burford:** *The Implications of Screen Adaptation* (Mentor – Dr. Maria O’Malley)
- 1:45 pm ---- **Anna Wagemann:** *Revisiting the “Woman Question”: A Qualitative and Quantitative Analysis of the Norton Anthology of English Literature (NAEL)* (Mentor – Dr. Michelle Beissel Heath)
- 2:00 pm ---- **John Umland:** *Bears That Dance, Bears That Don't: The Cormac McCarthy Villain* (Mentor – Dr. Seth Long)
- 2:15 pm ---- **Erica Wood:** *The Reinvention of the Female Hero in Contemporary Arthurian Legend* (Mentor – Dr. Rebecca Umland)
- 2:30 pm ---- **Sherah Dickinson:** *Police Assisting Addicts Towards Recovery* (Mentor – Dr. Benjamin Malczyk)
- 2:45 pm ---- **Megan Humlicek:** *Marked for Life: The Far Reaching Impact of Parental Military Deployment on Young Adults* (Mentor – Dr. Maha Younes)
- 3:00 pm ---- **Selena Beard:** *Will saying "I do" help you in college? Examining the influence of marital status on academic performance* (Mentor – Dr. Mickey Langlais)
- 3:15 pm ---- **Jordyn Randall:** *Can Pornography Consumption Be Beneficial For Romantic Relationships?* (Mentor – Dr. Mickey Langlais)

# Oral Presentation Schedule



## Room: Ponderosa D

- 1:30 pm ---- **Larissa Attema:** *Drosophila Melanogaster Nora Virus ORF1 Protein is Localized to the Nucleus* (Mentors – Dr. Brad Ericson & Dr. Kimberly Carlson)
- 2:00 pm ---- **Sam Stoltenberg:** *Candida albicans' Influence on Persister Cell Formation in Staphylococcus aureus Biofilms* (Mentor – Dr. Austin Nuxoll)
- 2:15 pm ---- **Ryan Clark:** *Graph Theory and Zombies* (Mentor – Dr. James Carraher)
- 2:30 pm ---- **Stephanie Slayden:** *The Binomial Transform of p-recursive Sequences* (Mentor – Dr. Barton Willis)
- 2:45 pm ---- **Jianbai Xu:** *Parity of Leaf Depths in Binary Trees* (Mentor – Dr. Jia Huang)

# Oral Presentation Schedule



## Room: NSU 310

- 1:30 pm ---- **Aatiya Ahmad:** *Detection of Hydrogen Sulfide using Gold Nanoparticles* (Mentor – Dr. Haishi Cao)
- 1:45 pm ---- **Seth Springer:** *Synthesis of oxazolidinone-protected amino acids for use in Negishi Coupling reactions* (Mentor – Dr. Allen Thomas)
- 2:00 pm ---- **Kati Frankenberg:** *Measuring Binding Interactions Between HSA and Hydroxyatrazine Using High Performance Affinity Chromatography* (Mentor – Dr. Annette Moser)
- 2:15 pm ---- **Andrew Flint:** *Hydroxamic Acids as LAT1 Substrates* (Mentor – Dr. Allen Thomas)
- 2:30 pm ---- **Laura Stoner:** *Challenges of the Negishi Coupling Reaction to Prepare Amino Acids Containing Polar Functional Groups* (Mentor – Dr. Allen Thomas)
- 2:45 pm ---- **Sidney Trenhaile:** *Development of a Multi-Technique Lab for Analytical Chemistry for the Analysis of Ca<sup>2+</sup> in Limestone* (Mentor – Dr. Annette Moser)
- 3:00 pm ---- **Abby Anthony:** *Pursuit of Heterocyclic Analogs of Histidine Via Palladium-Catalyzed Cross Coupling* (Mentor – Dr. Allen Thomas)

# Oral Presentation Schedule



## Room: NSU 312

- 1:30 pm ---- **Brittany Hanzlik:** *Patient-Provider Communication in Pediatrics* (Mentor – Dr. Richard MocarSKI)
- 2:00 pm ---- **Trevor Lee:** *An Analysis of the Academic Knowledge of Terrorism and Our Understanding of ISIS* (Mentor – Dr. Chuck Rowling)
- 2:15 pm ---- **Carly Brown:** *The Second Amendment and its Evolution* (Mentor – Dr. Lorna Bracewell)
- 2:30 pm ---- **Jessa Schultis:** *Ecotourism In Costa Rica and the Great Plains* (Mentor – Dr. Peter Longo)
- 2:45 pm ---- **Andrew RiesenberG:** *Effects of Pet Ownership on Empathy* (Mentor – Dr. William Wozniak)
- 3:00 pm ---- **Mark Veale:** *The Well-being of Persons With Dementia During Varuious Activities* (Mentor – Dr. Robert Rycek)



# Oral Presentation Abstracts

## Biology

### **Larissa Attema**

Mentors: Dr. Brad Ericson & Dr. Kimberly Carlson

Title: *Drosophila Melanogaster Nora Virus ORF1 Protein is Localized to the Nucleus*

Nora virus is a novel RNA picorna-like virus that has positive-sense, single-stranded RNA. Its mode of transmission is horizontal via the fecal-oral route. The viral genome consists of four open reading frames, two specify structural proteins (ORF3 and ORF4), one encodes a replicase cassette (ORF2) and the 5' most ORF encodes an RNAi inhibitor (ORF1). Nuclear localization signals (NLS) are sequences of amino acids that direct the transport of proteins into the nucleus of a cell. They can be monopartite or bipartite. Through a sequence analysis of the Nora virus gene ORF1, we discovered a putative bipartite nuclear localization signal. To verify that this NLS was transporting ORF1 protein into the nucleus, we constructed an ORF1-GFP fusion by isolating ORF1 and inserting it upstream of EGFP in the p-EGFP N3 plasmid, fusing ORF1 and GFP together. We then transfected this ORF1-GFP construct into S2 cells and observed the results by fluorescence microscopy. Our results suggested nuclear localization

as the ORF1-GFP fusion protein staining merged with DAPI staining in the nuclei of the transfected S2 cells. We subsequently created mutants of ORF1 to eliminate the NLS. We analyzed them by again transfecting these constructs into S2 cells and observing the results with fluorescence microscopy. Elimination of the NLS in our mutants resulted in GFP staining in the cytoplasm of the cell instead of in the nucleus. DAPI staining of the same cells failed to show a merging of the staining. To our knowledge, this is the first example of an RNA virus that specifies an RNAi inhibitor that translocates to the nucleus. 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.

### **Sam Stoltenberg**

#### **Co-Author – Justine Pitzer**

Mentor: Dr. Austin Nuxoll

Title: *Candida albicans' Influence on Persister Cell Formation in Staphylococcus aureus Biofilms*

*Candida albicans* is a fungus that forms biofilms on the surfaces of indwelling medical devices, such as catheters, shunts, and prosthetic implants. Elderly, immunocompromised patients make up a large portion of this population. Biofilms are notorious for being difficult to treat. Further complications arise when *C. albicans* forms polymicrobial biofilms with *Staphylococcus aureus*, a pathogenic bacterial species responsible for over one million infections a year. These infections result in increased mortality - the underlying mechanism for

this remains unclear. We examined the possibility that cells within a biofilm are dormant and not metabolically active – commonly known as persister cells. We also speculated that polymicrobial biofilms have a higher percentage of persister cells compared to biofilms formed with a single species. Early experiments show co-incubating *C. albicans* with *S. aureus* increases persister cell formation. We have performed polymicrobial biofilm assays with *S. aureus* and *C. albicans*. We will analyze these results and present our findings. These preliminary results may partially explain the increased nosocomial mortality in patients with polymicrobial biofilms.

## Chemistry

### **Aatiya Ahmad**

Mentor: Dr. Haishi Cao

Title: *Detection of Hydrogen Sulfide using Gold Nanoparticles*

Hydrogen sulfide is a molecule that is known to be present in trace amounts in the body. Abnormal hydrogen sulfide levels have been noted in people who have developed diseases such as diabetes, Down's syndrome, and Alzheimer's disease. Identifying hydrogen sulfide molecules using biosensors will allow us to be able to understand the role it plays in our bodies and how we can utilize it to treat these diseases. In Dr. Cao's laboratory we are trying to detect hydrogen Sulfide using fluorescence biosensors, anchored to gold nanoparticles. The gold nanoparticles play a key role in attracting hydrogen sulfide and concentrating it so that the

attached sensor will readily be reduced. The anticipated outcome of this study is to develop a selective method for detecting hydrogen sulfide.

### **Abby Anthony**

**Co-Author – Andrew Flint**

Mentor: Dr. Allen Thomas

Title: *Pursuit of Heterocyclic Analogs of Histidine Via Palladium-Catalyzed Cross Coupling*

LAT1 is a membrane transporter protein highly expressed in the blood-brain barrier (BBB) as well as in various types of cancer. LAT1 substrates have shown to have applications as targeted drug delivery agents, potentially allowing pharmaceuticals to cross the BBB. Computer-simulated models of the transporter binding site predict that heterocyclic analogs of L-histidine could potentially be used as LAT1 substrates. To map out the structure-activity relationship (SAR) around L-histidine, we explored various substitutions and replacements of the imidazole ring (e.g. pyrazole, pyridine). Palladium-catalyzed cross coupling is a powerful synthetic method that has the potential to allow for a wide scope of amino acid analogs to be prepared; however, few have reported use of this strategy for making heterocyclic amino acids. Attempted synthesis of these compounds involved testing of various palladium-catalyzed carbon-carbon bond forming reactions (e.g. Negishi, Suzuki, and Heck coupling). The preparation of halogen-substituted heterocycles, and results for their cross coupling reactions will be presented.

**Andrew Flint**

**Co-Authors – Karissa Finke, Arik A. Zur, Huan-Chieh Chien, Evan Augustyn, Nathan Heeren, Christopher Hernandez, Logan Hansen, Lawrence Lin, Kathleen M. Giacomini, Claire Colas & Avner Schlessinger**

Mentor: Dr. Allen Thomas

Title: *Hydroxamic Acids as LAT1 Substrates*

One of the most challenging aspects of neurotherapeutic drug delivery is the highly selective layer of endothelial cells which make up a network of capillaries known as the blood-brain barrier (BBB). However, metabolically-essential molecules are readily transported across the BBB by proteins that are expressed at these cells. LAT1 is a membrane transport protein that is highly expressed at the BBB and enables dietary amino acids to enter the brain. As well as this, it also transports drugs that mimic naturally occurring amino acids (e.g. gabapentin and L-DOPA). To successfully design drug molecules that might utilize LAT1, a deeper understanding of the structure-activity relationship (SAR) is needed. This will allow for further analysis of how transported molecules (substrates) interact with the LAT1 binding site. Despite some variability in the arrangement of the amine and carboxylic acid functional groups, it has been maintained in literature that both groups are required for a molecule to be a substrate. However, there is inconclusive evidence that a carboxylic acid must be present. Our hypothesis was that functional groups capable of expressing similar pKa's and/or hydrogen bonding of the carboxylic acid (i.e. bioisosteres) might be LAT1 substrates. Our research

group discovered that the carboxylic acid of L-leucine and other hydrophobic amino acids could be replaced with either a hydroxamic acid or ester functional group and still retain substrate activity. The SAR for these compounds was determined using cellular assays. This data indicates that LAT1 drug design and synthesis is no longer constrained to containing the previously proposed carboxylic acid as it once was. The synthesis and SAR of these novel LAT1 substrates will be presented.

**Kati Frankenberg**

Mentor: Dr. Annette Moser

Title: *Measuring Binding Interactions Between HSA and Hydroxyatrazine Using High Performance Affinity Chromatography*

Human Serum Albumin (HSA) is a transport protein abundant within the blood system. HSA is able to bind with a broad range of solutes including herbicides. A High Performance Affinity Chromatography (HPAC) machine is able to measure the binding constant between HSA and certain herbicide/herbicide metabolites. HSA has two main binding sites, Sudlow Site 1 and Sudlow Site 2, where interactions of itself and Atrazine and its metabolites can be measured. The HPAC was used to measure binding interactions of the two HAS binding sites for Atrazine and its metabolites with analytes, R-Warfarin and L-Tryptophan. Using the HPAC, and Zonal Elution method, it was found that the interactions between R-Warfarin were competitive and the interactions between L-Tryptophan were not competitive.

**Seth Springer****Co-Authors – Evan Augustyn, Karissa Finke & Logan Hansen**

Mentor: Dr. Allen Thomas

Title: *Synthesis of oxazolidinone-protected amino acids for use in Negishi Coupling reactions*

Recently our group has been pursuing phenylalanine and tyrosine analogs substituted on the aromatic ring. We evaluated the Negishi coupling reaction for synthesizing these analogs. A literature search revealed no examples of Negishi coupling reactions between iodo-substituted phenylalanine or tyrosine analogs and alkyl zinc reagents. Initially, Negishi reactions on Boc-protected amino esters gave poor yields ( $\leq 20\%$ ). We hypothesized that the desired coupling would work better if both the carbamate "N-H" and carboxylic acid functional groups were concealed, which prompted us to explore an oxazolidinone ring. This would allow for the simultaneous protection of both functional groups. Moreover, the oxazolidinone could be easily removed under mild acidic conditions to simultaneously deprotect the Boc group. To our knowledge, this is a new synthetic approach for obtaining substituted amino acid derivatives. We examined multiple routes toward the formation of oxazolidinones to optimize their synthesis. The solvent, base, and electrophile were varied to determine their effect on yield. Once generated, the oxazolidinone-protected amino acids were then tested alongside a traditional benzyl ester protecting group in the Negishi coupling reaction.

**Laura Stoner****Co-Authors – Justine Bauer, Karissa Finke, Abby Anthony, Andrew Flint & Seth Springer**

Mentor: Dr. Allen Thomas

Title: *Challenges of the Negishi Coupling Reaction to Prepare Amino Acids Containing Polar Functional Groups*

Negishi coupling reactions are an effective method for introducing carbon-carbon bonds within molecules and are particularly useful for our goal of preparing phenylalanine derivatives by joining substituted aromatic rings with a protected amino acid moiety. The variables we have been studying to advance the Negishi reaction include: solvents, catalysts, halide leaving group, and ester functional group of the organozinc reagent. We have applied the optimal conditions to perform synthesis on one gram scale. One problem we have encountered is loss of chirality during the Negishi coupling, which we hypothesize was due to the organozinc reagent reacting with the final product. We will present our results on optimizing this important reaction and avoiding loss of chirality.

**Sidney Trenhaile**

Mentor: Dr. Annette Moser

Title: *Development of a Multi-Technique Lab for Analytical Chemistry for the Analysis of Ca<sup>2+</sup> in Limestone*

A lab for analytical chemistry was designed which encompassed 4 different methods of analysis in which students compare four different methods of analysis to determine which one is the best for detecting calcium in limestone. The four methods include UV-Vis

absorption spectroscopy, EDTA titration, atomic emission spectroscopy (AES), and ion selective electrode (ISE). Two of the four methods, UV-Vis absorption and ISE, were tested in research to prove their validity. UV-Vis detection tested to be effective at determining the concentration of calcium in solution from concentrations of 1-10 ppm, even in the presence of significant amounts of magnesium (a common mineral found in limestone). ISE also showed reproducibility in the detection of calcium from 1-1000 ppm also in the presence of significant amounts of magnesium.

## Communication

### **Brittany Hanzlik**

Mentor: Dr. Richard MocarSKI

Title: *Patient-Provider Communication in Pediatrics*

Effective patient-provider communication is essential in creating an overall, positive healthcare experience for both patients and healthcare providers. Unfortunately, many healthcare professionals overestimate their ability to communicate effectively with patients. Over the years, a growing focus on the topic of patient-provider communication has been established with a large amount of literature being published on this principal idea. However, little research has been conducted on patient-provider communication in populations of children with chronic conditions. Thus, the research I have conducted on how healthcare providers can establish better communication and supply a better

overall experience for children with chronic conditions will be presented. eech sound remediation?

## English

### **Tessa Burford**

Mentor: Dr. Maria O'Malley

Title: *The Implications of Screen Adaptation*

This paper aims to study the representations of gender in screen adaptations of short stories. As the twenty-first-century entertainment industry seeks to remake, reinstall, and reassemble stories of the past, mining any profitable material for spin-offs, prequels, or "reboots," adaptations of prose fiction tap into the demands of an audience already familiar with a text. This paper is part of a research project involving an in-depth examination of the screen adaptations of works by F. Scott Fitzgerald, J.M. Barrie, Sherman Alexie, Jim Harrison, Annie Proulx, Stephen King, and Susan Orlean. In this paper, I focus on the screen adaptations of Stephen King, a writer whose work spans genres (horror, suspense, drama, coming-of-age, prison films) and whose vast commercial success as a writer converts authorship into a kind of "brand" for screen adaptations of his work. Working from feminist film theory and criticism, this paper looks closely at the changes in story between text and screen through the embodiment and visualization of King's female characters. In two specific works, "Children of the Corn" (1977), and *Misery* (1985), the female characters are dramatically influenced by the male gaze

and visual pleasure. With the distribution of several remakes of King's stories into movies in the coming year, what some deem a "Stephen King renaissance," this paper makes a much needed intervention to lay the groundwork for noting the changing representations of women in film.

### **John L. Umland**

Mentor: Dr. Seth Long

Title: *Bears That Dance, Bears That Don't: The Cormac McCarthy Villain*

In this project I will explore in great detail two of Cormac McCarthy's most popular villains, Judge Holden from *Blood Meridian* and Anton Chigurh from *No Country for Old Men*. They are often compared, and many literary critics such as even Harold Bloom have suggested that Chigurh is just a "lesser" version of Judge Holden, something I strongly disagree with. I will also explore various McCarthy themes and motifs in this paper, such as his use of fire, stone, and the struggle between good and evil. What I hope to ultimately provide in this paper is another perspective when it comes to interpreting some of the most intimidating villains in American literature.

### **Anna Xin Wagemann**

Mentor: Dr. Michelle Beissel Heath

Title: *Revisiting the "Woman Question": A Qualitative and Quantitative Analysis of the Norton Anthology of English Literature (NAEL)*

An anthology is like a sausage, Sean Shesgreen, author of the controversial "Canonizing the Canonizer: A Short History of The Norton Anthology of English Literature," claims, "We all love

sausages, but none of us wants to know precisely how they are made" (1086). Shesgreen's paper and its resultant impassioned correspondence reveals that the study of anthologies proves to be unavoidably and deeply political and personal. As Greenblatt excellently phrases it, "To stay vital, the anthology, therefore, would need to undergo a process of periodic revision, guided by advice from teachers, as well as students, who view the anthology with a loyal but critical eye" (xiv). To help with that vitality, I propose that we must scrutinize these revisions, combining both data and literature together in order to construct a fuller, richer illustration of the NAEL. In my paper, specifically examine the topic clusters solely dedicated to women and gender. In the 9th edition of the NAEL, three of the six volumes contain topic clusters. I question what are the women writing about? How are they portrayed? What are the authors' role in their society? Are male authors also included in the sections? Through examining both the quantitative and the qualitative findings, the paper unearths the multi-layered and rich complexity that the NAEL has the potential to offer—but does not yet.

### **Erica Wood**

Mentor: Dr. Rebecca Umland

Title: *The Reinvention of the Female Hero in Contemporary Arthurian Legend*

The Arthurian Legend has long enjoyed a lasting appeal, due in part to its mythopoeic nature. One way this adaptability becomes readily apparent is in the portrayal of the female hero as woman warrior in modern Arthurian films. The presence of a woman warrior has

become a recent trend, but the question arises as to whether this is an innovation of filmmakers attempting to accommodate contemporary audiences, or whether they are returning to earlier historical and legendary models. In researching this question, I found that in early historical accounts, women in Celtic society were known to have served as both warriors, trained to fight with weapons, and were occasionally rulers. Moreover, although women in medieval romance were not often cast as warriors, a close examination of the heroines in this literature shows that they are frequently more complexly drawn than the stereotype used to represent them, showing strength of character and wielding power over others. The Arthurian film adaptations discussed—*Excalibur* (1981), *First Knight* (1995), *King Arthur* (2004), and *The Last Legion* (2007)—help us to examine the less traditional role of the woman warrior as belonging to an earlier history and legend, rather than having been invented by modern filmmakers and inserted into an Arthurian story. The woman warrior is a vital part of both history and the Arthurian legend itself, not solely the invention of filmmakers who wish to meet audience expectations.

## Family Studies

### **Selena Beard**

Mentor: Dr. Mickey Langlais

Title: *Will saying "I do" help you in college? Examining the influence of marital status on academic performance*

Many studies have illustrated the benefits of being married (e.g., Kiecolt-Glaser et

al., 2003). However, these benefits may not be present in contexts where being married is not the norm. The traditional college student is typically about 18-22 years old, unmarried, and comes directly from high school (Steinberg, 2011). According to the Department of Education (2014), approximately 7% of undergraduate students are married. Given that being married as an undergraduate student is not the norm, the context of being married may have implications for academic performance. Although the number of married undergraduate students has been increasing throughout the United States (Negy, 2003; Steinberg, 2011), there have not been many studies examining how relationship status predicts academic performance. One study demonstrated a positive influence of marriage on the academic achievement of community college students (Yess, 1981). However, Negy (2003) found that some married college students face more day-to-day difficulties than non-married students, which could potentially impact their academic performance. Generally, relationship status appears to play a role in the academic performance of students, but the research is scarce, not up-to-date, and does not primarily focus on undergraduate students. Therefore, the goal of this study has two purposes. First, we examine how relationship status predicts academic performance. Second, we test relationship quality as a moderator for these two relationships. Data comes from 111 undergraduate students who completed an online questionnaire regarding their relationship status, relationship quality, and academic performance. Using multiple regression models, we did not find support for our

hypothesis that relationship status predicted academic performance. However, length of marriage was marginally significant with cumulative grade point average. Additionally, we did not find support for the moderating effects of relationship quality. Implications for the current study illustrate that relationship status may not alter the academic trajectories of undergraduate students.

### **Jordyn Randall**

Mentor: Dr. Mickey Langlais

Title: *Can Pornography Consumption Be Beneficial For Romantic Relationships?*

Several studies have described that pornography has negative impacts on sexual development, but few studies have examined the influence of porn consumption for premarital romantic relationships (Bridges et al., 2013; Wright, 2013). Additionally, individuals watch more pornography than Netflix, Amazon, and Twitter combined (Huffington Post, 2013). The goal of this study is to examine potential predictors of consuming pornography and the impact of consuming pornography on relationship quality. Quantitative and qualitative data for this study comes from 49 young adults (75.5% female) who completed surveys and one-on-one interviews regarding sexual behaviors and pornography consumption. Based on independent t-tests, there were no significant differences in pornography consumption between virgins and non-virgins. Additionally, based on hierarchical multiple regression analyses, engaging in anal intercourse was significantly predictive of higher consumption of pornography, both in terms of their perception of the amount of pornography

consumed on a monthly ( $B = .50, p < .01$ ) and weekly ( $B = .50, p < .01$ ) basis. Also, using hierarchical multiple regressions, monthly pornography consumption is positively associated with relationship satisfaction ( $B = .87, p < .05$ ) and commitment ( $B = .87, p < .01$ ).

Subsequently, consuming any amount of pornography was negatively associated with commitment ( $B = -.53, p < .05$ ). Last, the model predicting commitment from pornography use explained 48% of the variance from the control variables of the study. Pornography consumption plays a significant role in the quality of premarital romantic relationships. Based on these results, consuming porn may potentially provide more acceptance of sexual behaviors that could bring couples closer together. Implications regarding pornography consumption will be discussed.

## Mathematics & Statistics

### **Ryan Clark**

Mentor: Dr. James Carraher

Title: *Graph Theory and Zombies*

We use knowledge of graph theory in order to look at the probability of survival in a game of Zombies vs. Survivors on the Petersen graph. Through the study of graph properties and theorems, we were able to identify specific properties of the Petersen graph which lends it to being an ideal playing field for the game. Zombies vs. Survivors is derived from another game called Cops and Robbers. In Cops and Robbers, the cops are placed on random vertices, and can maneuver



around the graph in an attempt to get to the vertex that the robber is occupying. The robber is also free to move about the graph in order to avoid being caught. Zombies vs. Survivors is similar, with the only difference being that the zombies' may not implement a strategy, but must simply move toward the survivor via the shortest possible route. The survivor wins if there exists a strategy such that the survivor is never caught by the zombies. We show that we can calculate the winning percentage of the survivor for any number of zombies on the graph, as well as recognize the background research done to give us the tools in order to solve the problem.

### **Stephanie Slayden**

Mentor: Dr. Barton Willis

Title: *The Binomial Transform of p-recursive Sequences*

The goal for our research is to use the formula for the Fibonacci numbers to find its binomial transformation. We are going to do this by finding a recurrence relation for the binomial transformation of the Fibonacci numbers. The Fibonacci sequence is already recursive, and we have already found some identities for the binomial transformation. Our first step is to rewrite the Fibonacci sequence to make it look more like the binomial transformation. Once we get that done, we can use the previous identities to find the coefficients of terms for the new Fibonacci sequence. Once we do that, we can hopefully find a pattern between the coefficients and then be able to form a recurrence relation. This will help us generate more terms for the binomial transformation.

### **Jianbai Xu**

**Co-Author – Madison Mickey**

Mentor: Dr. Jia Huang

Title: *Parity of Leaf Depths in Binary Trees*

We study the non-associativity of a binary operation called the double minus operation using (full) binary trees. With the help of computations in the mathematics software **SageMath**, we discover an interesting periodic pattern for the distribution of the parity of leaf depths in binary trees. This lead to an interesting formula for the number of distinct results obtained from consecutive applications of the double minus operation, which coincides with Sequence A000975 in The On-Line Encyclopedia of Integer Sequences.

## **Political Science**

### **Carly C. Brown**

Mentor: Dr. Lorna Bracewell

Title: *The Second Amendment and its Evolution*

The focus of this presentation will be to take a look at how authors specializing in the Second Amendment view this controversial amendment's evolution. While the amendment's language has not much been affected by Supreme Court rulings, gun rights lobbyists have created a shift in public opinion regarding the seemingly harmless 27 words. It is important to not only focus on the contemporary debates surround gun rights and issues, but to look at the historical context in which the amendment was framed. This presentation, based on the research accumulated in the

semester-long exploration and creation of a bibliography, will be a shallow dive into a deep pool of history, as well as modern debate.

### **Jessa Schultis**

Mentor: Dr. Peter Longo

Title: *Ecotourism In Costa Rica and the Great Plains*

Ecotourism is a popular way to bring in money into an area as well as protect and preserve threatened environments. Costa Rica is often considered the “poster child” of ecotourism, as it has rich biodiversity, a legal framework for environmental protection, and infrastructure for tourists. The Great Plains of the United States has also utilized ecotourism for such attractions such as rivers, waterfalls, and prairieland. This paper will compare the evolution of ecotourism in Costa Rica and the Great Plains to better explain why it was pursued and what have been the effects for both regions.

## Psychology

### **Andrew Riesenber**

Mentor: Dr. William Wozniak

Title: *Effects of Pet Ownership on Empathy*

There have been numerous studies on the effects of pet ownership on empathy in children. For example, Vidovic, Štetic, and Bratko (1999) found that, for 4th, 6th and 8th graders, pet owners were significantly more empathic and prosocially oriented. The purpose of this research was to investigate how a college student’s attachment and commitment to pets they owned as a child influence their

level of empathy toward animals and human beings. Scores for attachment and commitment to pets, as well as empathy toward animals and humans were assessed using survey questionnaires administered to 63 Psychology students. I also collected demographic information, including a description of their childhood pets. Pearson correlations were used to examine the relationships between 7 scores: self-reported attachment, self-reported commitment, combined self-reported attachment and commitment, the Miller-Rada (Staats, Miller, Carnot, Rada, and Turnes 1996) pet attachment scale, the Miller-Rada (Staats, Miller, Carnot, Rada, and Turnes 1996) pet commitment scale, the Paul (2000) empathy toward animals scale, and the Mehrabian and Epstein (1972) empathy toward humans scale. Analysis showed statistically significant correlations among most of the measures. However, there were no significant correlations between the measures of pet attachment and empathy toward humans. The lack of relationship between pet attachment and human empathy may be that college students tend to be more attached to animals than they are empathetic to humans because animals are perceived to not have as much responsibility for their unfavorable situations as humans. However, the strong correlation between animal empathy and human empathy needs further investigation. Further analyses will investigate the difference between the measures of animal empathy and animal attachment and why they are differentially related to human empathy. This research has important applications for understanding the interactions and relationships between people, and how to

improve empathy and reduce antisocial behaviors.

### **Mark C Veale**

Mentor: Dr. Robert Rycek

Title: *The Well-being of Persons With Dementia During Various Activities*

Dementia is a debilitating disorder with no cure and few treatment options. The number of Persons With Dementia (PWDs) is estimated to double every twenty years for the foreseeable future (Prince, et al., 2013). With limited resources to accommodate the large and growing number of PWDs, knowledge of which activities are the most beneficial becomes valuable. In the present study, the well-being of PWDs was observed and measured during various activities (devotions, exercises, bingo, manicures, and unstructured time). It was hypothesized that there would be a difference between the well-being displayed by PWDs during each activity and that during unstructured time would display the least well-being. Twenty-four participants (2 male, 22 female) at a long-term care facility specializing in dementia care were video recorded during activities already being offered by the facility. Participants were then measured using the Positive Response Schedule for Severe Dementia (PRS), which measures well-being based on seven behaviors and three emotions (Perrin, 1997). The hypothesis that there would be a difference in the well-being displayed between activities was not supported when looking for amounts well-being produced, as seen in overall scores. However, when looking at individual behaviors, it appears there are differential patterns of responding across activities.

For example, Bingo and Exercises showed significantly more Deliberate Body Movement as compared to Manicures and Devotions. Manicures had higher levels of Vocalization and Initiation of Interaction than the other activities. The hypothesis that PWDs would show the least well-being during Unstructured Time was partially supported. During Unstructured Time and Devotions, participants scored similarly low on the PRS. The low score during Unstructured Time is harmonious with an established body of research (Brooker, & Duce, 2000; Schreiner, Yamamoto, & Shiotani, 2005), but the low score during Devotions, a structured activity, was unexpected.

## Social Work

### **Sherah Dickinson**

Mentor: Dr. Benjamin Malczyk

Title: *Police Assisting Addicts Towards Recovery*

The War on Drugs has resulted in the mass incarceration of millions of nonviolent drug offenders. The tolls of this war have resulted in broken families and futures and in the disparate treatment of minority and disadvantaged groups. These issues have been further aggravated by the push of prescription opioids such as OxyContin and hydrocodone by pharmaceutical companies and medical practitioners; this is causing catastrophic substance abuse addictions that influence individuals and families across all socioeconomic, cultural, and geographic lines. The rise in opiate addiction has spread across the United States and has acted as an impetus for new discussions on alternate

approaches to drug use and abuse. This research project explored alternative approaches to mass incarceration and overly-punitive War on Drugs policies. Specifically, the research examined an innovative approach in Gloucester, Massachusetts which provides treatment based alternatives to incarceration for individuals addicted to opiates. The analysis examines both the substance of this program as well as the factors and actors that led to the adoption of the program. While it is still too early to examine outcomes of the program, the research discusses the potential benefits of the program, especially in comparison to alternate approaches to substance abuse and addiction similar to those found in Portugal. The research posits that decriminalization of drug use in conjunction with evidenced based practices such as rehabilitative programs will help reduce stigma, decrease government costs and strengthen families that have been affected by substance abuse disorders.

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