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April 23, 2019

The Student Union

9:00 a.m.-1:20 p.m.

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# SCHEDULE OF ORAL PRESENTATIONS – page 1

	Room 3314	Room 3105
<b>9:00 to 9:25</b>	<b>O.F.1</b> Namyun Kil (F), Emily Simmerman (U), & Emily Bartig (U) <i>Rec Mgmt &amp; Therapeutic Rec</i> Examining the Influences of Innovative Nature and Forest Therapy Walks on Nature Connection and Well-Being Outcomes	<b>O.G.2</b> Brandon VanGalen & Makayla Heim (G) <i>Clinical Exercise Physiology</i> The Talk Test as a Measurement of Exercise Intensity in Children: Replication Study
<b>9:30 to 9:55</b>	<b>O.F.6</b> Beth Boser (F) <i>Communication Studies</i> "Overcoming Postpartum Depression": Constructing Individual and Social Gendered Pathology in Self-Help Discourse	<b>O.G.7</b> Jessica Nagel & Christopher Martinson (G) <i>Clinical Exercise Physiology</i> The Effects of Short-Term L-Citrulline Supplementation on Arterial Stiffness in Prediabetic and Healthy Adults
<b>10:00 to 10:25</b>	<b>O.F.11</b> Eric Kraemer (F) Philosophy Open-Mindedness and Closed-Mindedness: Virtue or Vice?	<b>O.G.12</b> Christopher Martinson & Jessica Nagel (G) <i>Clinical Exercise Physiology</i> Effects of L-Citrulline on Microvascular Function, Skeletal Muscle Oxygenation, and Lipolysis in Healthy and Prediabetic Older Adults
<b>10:30 to 10:55</b>	<b>O.U.15</b> Mary Franitza (U) Spanish Gender Identity in the Language Classroom: The Central Role of Salient Identities in Multicultural Education and Mentorship	<b>O.G.16</b> Logan Lasack & Blaire Thielen (G) <i>Clinical Exercise Physiology</i> Vascular Health and Physical Performance in Older Normal and Pre-Diabetic Adults Following a Diabetes Prevention Program

## SCHEDULE OF ORAL PRESENTATIONS – page 2

	Room 3314	Room 3105
<b>11:00 to 11:25</b>	<b>O.U.19</b> <b>Mari Sweetman (U)</b> <i>English</i> Transcorporeality and Eco-Theory: A New Understanding of the Body	<b>O.G.20</b> <b>Blaire Thielen &amp; Logan Lasack (G)</b> <i>Clinical Exercise Physiology</i> Effects of Twelve Weeks of Diabetes Prevention Program on Cardiovascular Risk Factors
<b>11:30 to 11:55</b>	<b>O.F.24</b> <b>Samuel Cocks (F)</b> <i>Philosophy</i> The Fragile Nature of Harmony in Confucian and Neo-Confucian Philosophy	<b>O.F.25</b> <b>Melissa Bingham (F)</b> <i>Mathematics &amp; Statistics</i> Nonparametric Statistical Inference for Comparing Multiple Measures of Center in 3-Dimensional Rotation Data
<b>12:00 to 12:25</b>	<b>O.U.27</b> <b>Leah Williams (U)</b> <i>Theatre Arts</i> The Ethics of Drama: Making Meaningful Theatre That Addresses Trauma and Motivates Action	<b>O.U.28</b> <b>Kean Fallon &amp; Simon Wagner (U)</b> <i>Mathematics &amp; Statistics</i> Rainbow Sums
<b>12:30 to 12:55</b>	<b>O.U.30</b> <b>Brady Grapentine (U)</b> <i>Philosophy</i> Radical Interpretation and the Underdetermination of Epistemic Entrenchment	<b>O.U.31</b> <b>Christian Stohlmann (U)</b> <i>Mathematics &amp; Statistics</i> Relevancy and Impact of Convolutional Neural Networks

## SCHEDULE OF ORAL PRESENTATIONS – page 3

	Room 3110	Room 3120	Room 3130
<b>9:00 to 9:25</b>	<p>O.G.3 Jason Yang &amp; Mai Nue Lor (G) <i>Public Health, MPH</i> Assessing the Perceptions of Academic Success in Students of Color: A Phenomenological Hermeneutics Study</p>	<p>O.F.4 Sierra Colavito (F) <i>Biology</i> The Role of AXL Signaling in Breast Cancer Stem-Like Cells</p>	<p>O.F.5 Marco Vriens (F) <i>Marketing</i> What I See Is What I Want: Top-Down Attention Biasing Choice Behavior</p>
<b>9:30 to 9:55</b>	<p>O.F.8 Kasi Periyasamy (F) <i>Computer Science</i> Implementation of Security and Privacy Aspects of a Healthcare Social Network</p>	<p>O.U.9 Mattie Krause (U) <i>Biology</i> The Utilization and Impacts of Warm-Hand-Offs, Shared Care, and Phone Consultations during Integrated Behavioral Health Care Visits</p>	
<b>10:00 to 10:25</b>		<p>O.F.13 Barrett Klein (F) <i>Biology</i> Where Do Honey Bees Sleep?</p>	<p>O.U.14 Nathaniel Conley (U) <i>Sociology &amp; Criminal Justice</i> At Home Genetic Tests and Their Psychosocial Effects</p>
<b>10:30 to 10:55</b>		<p>O.U.17 Erynn McNeill (U) <i>Biology</i> Predator-Predator Interactions? Are Gray Wolves (<i>Canis lupus</i>) Affecting the Spatial Distribution of Mesopredators in Central Wisconsin?</p>	<p>O.F.18 Yeonka Kim (F) <i>Management</i> Using "Pence Rule" to Avoid #MeToo: Another Excuse for Gender Discrimination</p>

## SCHEDULE OF ORAL PRESENTATIONS – page 4

	Room 3110	Room 3120	Room 3130
11:00 to 11:25	<p>O.G.21 Charlend Howard (G) <i>Human Performance</i> Effects of Attentional Focus on Dynamic Whole-Body Movements as a Function of Skill Level</p>	<p>O.G.22 Grant Broeckel (G) <i>Biology: Physiology</i> Analysis of Seasonal Differences in Brain Anatomy in Hibernating Thirteen-Lined Ground Squirrels (<i>Ictidomys tridecemlineatus</i>)</p>	<p>O.U.23 Haley Maus (U) <i>Economics</i> Can Women Combat Corruption? An Economic Case Study of Cameroon</p>
11:30 to 11:55			<p>O.U.26 Natalie Sims (U) <i>Communication Studies</i> Arranged Marriages in India: An Analysis of Generational Perceptions and Family Communication</p>
12:00 to 12:25		<p>O.U.29 Emily Seib (U) <i>Nuclear Medicine Technology</i> Establishing the Need for a Nuclear Medicine and Molecular Imaging Pediatric Specialty, Based on Quality Image Acquisition and Patient Care Atmosphere</p>	
12:30 to 12:55		<p>O.U.32 Alex Galbraith (U) <i>Chemistry and Biology</i> Assessing the Efficacy of EarthTec QZ for Controlling <i>Bithynia tentaculata</i> Populations in the Upper Mississippi River</p>	<p>O.U.33 Melissa Clement (U) <i>Economics</i> The Impact of Job Stability on Health Outcomes</p>

# **UNDERGRADUATE STUDENT ABSTRACTS**

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Poster Session A  
The Bluffs: 9:00 am-10:20 am

**A.U.1 Preschool Blues (and Pinks!): The Relationship between Time Spent in Child Care Arrangements, Social-Emotional Behaviors, and Gender Role Development**

Ellie Miller  
Mentor: Tracie Blumentritt, Psychology

As dual-earner families have become the norm in the U.S., children spending considerable time in non-parental care has also become more accepted. Past research has suggested both positive and negative outcomes from spending time in both center-based child care and parental care. An online survey of parents of preschool-aged children will examine the link between time spent in care arrangements and social-emotional behaviors and gender role development. By gaining information on whether certain care arrangements can be associated with gendered or negative behaviors, we can aim to educate parents and caretakers on how to foster positive social-emotional skills and gender role development. Given the current political and social climate in which gender equality is hotly contested, it is important to study the origin of prejudiced gender-based beliefs and learn how to combat them, as well as teaching positive, effective behavior. Results showed no effect of type of care and time spent in care arrangements on social-emotional behavior scores or gender role development scores. Children in higher quality care arrangements showed fewer negative social-emotional behaviors.

**A.U.2 DANGER! NO HIKING! Impact of Social Influence and Warning Signs on Risky Hiking Decisions**

Sophie Pitney, Ellie Miller, and Katy Kortenkamp  
Co-author: Colleen Moore  
Mentors: Katy Kortenkamp, Psychology, and Colleen Moore, Psychology Departments, Montana State University and University of Wisconsin-Madison

Natural resource managers are often dismayed that visitors disobey warning signs. We varied warning signs and information about the social context related to hiking dangers. 244 college students rated likelihood to hike and get hurt if they did hike, answered self-justification scales and risk scales. Likelihood to hike varied depending on warning sign content and behavior of friends, family, and strangers. Results suggest that visitor safety might be enhanced by modifying warning messages and considering the social context of risky hiking decisions.

**A.U.3 The Effect of Urocortins on Intestinal Permeability**

Sita Agterberg  
Mentor: Sumei Liu, Biology

The intestinal epithelium forms a semipermeable fence that protects the body from antigens and pathogens to get into the body. Stress disrupts the intestinal epithelial barrier and causes increased permeability, which leads to a variety of health issues. A neuropeptide known as corticotropin releasing factor (CRF) initiates a series of stress responses in the body, including the gut. CRF has been implicated in mediating stress-induced increase of intestinal permeability. The CRF peptide family includes urocortin (UCN) 1, 2, and 3. The effects of urocortins on intestinal permeability have not been investigated. The purpose of this study is to determine the effects of UCN 1, 2, and 3 on intestinal epithelial permeability. We hypothesize that an increase in UCN 1, UCN 2, or UCN 3 concentration during stress will cause an increase in intestinal epithelial permeability and make the gut leaky.

#### **A.U.4 Correlations between Perfectionistic Tendencies and Mental Health Outcomes**

Tyler Bennett

Mentor: Alexander O'Brien, Psychology

Over the past few decades it has become increasingly common for individuals to develop excessively high personal standards that are accompanied by overly self-critical, neurotic thoughts and perceptions relating to their performance. This pattern of behavior represents an expression of perfectionistic tendencies. Past research has suggested that different aspects of perfectionism are linked to an array of mental health outcomes that can be either beneficial or unhealthy for an individual. The current study employs the Big Three Perfectionism Scale, recently developed by Smith et al. (2016) in an attempt to provide a more in-depth examination of ten specific and important tendencies defining perfectionism. These ten tendencies are grouped into three major factors: rigid perfectionism, self-critical perfectionism, and narcissistic perfectionism. The MOS Mental Health Inventory, developed by Veit & Ware (1983) is also utilized to measure individual differences in mental health outcomes such as psychological distress and well-being. Preliminary results have suggested that both rigid and self-critical perfectionistic tendencies are positively correlated with psychological distress and negatively correlated with well-being, while narcissistic perfectionism is not related to either mental health measures. These findings have implications for the development of more effective treatment approaches for maladaptive tendencies within clinical mental health settings.

#### **A.U.5 DcrB's Role in Salmonella's Resistance to Divalent Metals**

Nick Berg

Co-author: John May

Mentor: John May, Chemistry & Biochemistry

The CDC estimated that Salmonella causes about 1.2 million illnesses, 23,000 hospitalizations, and 450 deaths in the United States every year. Using molecular biology techniques, we had previously found that the DcrB protein a protein found in Salmonella and *E. Coli* is affecting the ability of Salmonella to grow in the presence of divalent copper cations such as  $Cu^{2+}$  and  $Zn^{2+}$ . In order to further our understanding of how the DcrB protein is permitting Salmonella to grow in the presence of otherwise toxic divalent cation concentrations, mutagenesis experiments were conducted to create several mutant strains of Salmonella that each expressed variable forms of the DcrB protein. After successful mutagenesis, further experimentation was conducted where the different dcrB mutants were tested against toxic concentrations of divalent Zinc and Copper. From these experiments, we observed various different growth phenotypes between specific mutant strains when grown in copper and zinc environments. These experiments have both revealed which sites of the DcrB protein are vital for this copper-resistance function as well as provided insight to the mechanisms of how these pathogenic bacteria are surviving these stress-induced conditions. Understanding this mechanism could advance techniques used in treating both human and environmental contaminations of Salmonella.

#### **A.U.6 Comparing Migration Rates Inside and Outside the Tohono O'odham Reservation**

Katherine Berglund

Mentor: John Kelly, Geography & Earth Science

On the border of Arizona and Mexico lies the Tohono-O'odham Native American reservation. Recent disputes have emerged due to new presidencies, stricter laws, and a proposed border wall ultimately increasing international havoc. International migration through indigenous territories increases during periods of crisis compared to borders that extend beyond these reserved areas. By comparing similarities and differences in national migration rates, recorded deaths along the border in the U.S., and recent news sources, I will explore how the indigenous control of their land, or lack thereof, influence an advantage to those migrating during a time of crisis.



#### **A.U.7 Engineering One-pot Synthesis for Vitamin C**

Monica Bertucci

Mentor: Paul Schweiger, Microbiology

Acetic acid bacteria are well known for their ability to incompletely oxidize their carbon sources under normal growth conditions. The products of these oxidations are released directly into the medium. This characteristic is exploited industrially to produce many important industrial and consumer products, including vinegar, antidiabetic drugs (i.e. miglitol), and vitamin C. Vitamin C is produced in large volumes industrially (over 200,000 tons annually) in a two-step fermentation process. First, D-sorbitol is oxidized by a sorbitol dehydrogenase (SldBA) of *Gluconobacter oxydans* into L-sorbose. L-Sorbose is further oxidized in a separate fermenter by the sorbose dehydrogenases and sorbosone dehydrogenases of *Ketogulonicigenium vulgare* into 2-keto-gulonic acid, which is simply and cheaply chemically converted to vitamin C. While this is effective, a one-step process would be much more efficient industrially. To this end, the sorbitol dehydrogenase encoded by *sldBA* was cloned from *G. oxydans*. Expression of *sldBA* in *K. vulgare* is expected to eliminate the need for a two-step fermentation system for the production of vitamin C. This one-pot synthesis of vitamin C is expected to save both production time and expense. This work will have important implications industrially since vitamin C is used in the pharmaceutical, nutritional, and foodstuff industries.

#### **A.U.8 Key Role of *dcrB* in Bacterial Copper Resistance**

Elenor Brown

Co-author: John May

Mentor: John May, Chemistry & Biochemistry

Copper is a vital element for numerous biological processes in many aerobic organisms, but can cause toxicity if not maintained within homeostatic levels. One of our body's defenses against foreign invaders is lowering the pH and increasing copper levels in the area in an attempt to kill invading bacteria. However, certain pathogenic bacteria, such as *Salmonella enterica*, can resist this naturally induced copper defense mechanism. We tested the role of a novel copper resistance gene, *dcrB*, in various genetic backgrounds and conditions to gain a better understanding of the resistance pathway. Removal of *dcrB* decreased the strain's fitness when introduced to high concentrations of copper, especially in more alkaline pH levels, but not in more acidic pH conditions. These results suggest that 1) *dcrB* is required for copper resistance in alkaline pH and 2) acidic pH activates a copper stress response that bypasses the need for *dcrB*. These results were obtained by plating serial dilutions of different strains onto varying copper and pH conditions. These experiments helped to provide an idea on the role of the *dcrB* gene in the copper resistance pathway.

#### **A.U.9 Pool 18 Mississippi River Land Cover/Land Use Comparison**

Matt Brown and Gavyn Ver Hage

Mentor: Cynthia Berlin, Geography & Earth Science

The goal of this project is to produce land cover/land use maps using different images for Pool 18. Our study area consists of the south end of pool 18 on the Mississippi River. Pool 18 is south of Wisconsin, bordering Iowa to the west and Illinois to the east. Our data includes a true color photograph from 2006 with a 1 meter pixel resolution and also a color infrared photograph from 2002 with 1 meter resolution. We are using Feature Analyst to make land cover/land use maps by training certain parts of the map and performing a supervised classification. Feature Analyst is an automated extraction software that runs through ArcGIS. Land cover is based on the USGS vegetation classification system. We will then compare our results and look for any differences between them. A problem we could run into could be that the photographs were taken 4 years apart and from different times of the year. The results will likely be slightly different but not significantly.

#### **A.U.10 Examining the Potential of Unmanned Aerial System (UAS) Imagery for Genus Level Mapping of Native Prairie Vegetation in Wisconsin**

Aaron Christensen

Mentor: Niti Mishra, Geography & Earth Science

Examining vegetation species composition and its temporal dynamics in prairie habitats is of important concern for biodiversity conservation and requires monitoring of prairies over suitable spatial and temporal scales. Since biodiversity monitoring using satellite remote sensing is challenged by the lack of pixel detail, this study examined the suitability of Unmanned Aerial System (UAS) derived imagery to map vegetation types at the genus level within the Holland Sand Prairie near Holmen, WI. A vertical take-off and landing (VTOL) FireFly6 Pro UAS fitted with a MicaSense RedEdge M multispectral camera was used to collect very high resolution imagery over the study area. Images were pre-processed following Structure from Motion principle to generate two dimensional ortomosaics (imagery map free of terrain and camera lens distortions). Mapping of vegetation types was conducted using a hierarchical object based methodology where in the first step a bottom up segmentation algorithm was applied to merge spectrally similar pixels into objects (or ecological patches). Segmentation was followed by object classification where vegetated objects were separated from non-vegetated area using the thresholding of normalized difference vegetation index values. The vegetated objects were later classified as woody versus non-woody objects. In the last stage of the hierarchical classification the woody and non-woody vegetation types were classified at genus level.

#### **A.U.11 Phenotypic and Genotypic Analysis of Influenza A Virus Subjected to Serial Bottleneck Events**

Zachary Cigich and Matthew Gottlieb

Mentor: Peter Wilker, Microbiology

Each year the influenza (flu) virus infects approximately 21 to 66 million people in the United States and causes a total economic burden of about \$87 billion. This stems from influenza viruses having a high mutation rate. This mutation rate generates diversity within the viral population of an infected host and is an important driver of viral evolution. During transmission, only a small proportion of the viral population will infect a new host. Therefore, much of the diversity is lost from the original viral population during the transmission event. This is called a genetic bottleneck. This process continues as the flu spreads among more hosts. The overarching objective of this project is to see how the flu virus population is affected by repeated genetic bottleneck events. Virus was put through serial bottlenecks at differing concentrations. Resultant and original viruses were compared genetically, as well as for their ability to grow in a host. This work will inform our understanding of how transmission-associated bottlenecks promote or hinder influenza virus evolution.

#### **A.U.12 Battle of the Titans: Can Aggressive Natives Hold Their Own against Reed Canary Grass (*Phalaris arundinacea*)?**

Olivia Clark

Co-authors: Meredith Thomsen and William Kiser

Mentor: Meredith Thomsen, Biology

Reed canary grass (*Phalaris arundinacea*) is an intruder to the Upper Mississippi River floodplain that dominates native vegetation under disturbed conditions. Plant diversity and ecosystem quality decrease when reed canary grass (RCG) is present due in part to its competitive advantage of early spring emergence. We compared fall mowing to fall mowing plus a spring herbicide application of water-safe glyphosate, in terms of their effects on the performance of resident RCG and native plants. Furthermore, we evaluated the survival and growth of competitive native species planted as plugs in treated plots: prairie cordgrass (*Spartina pectinata*), fox sedge (*Carex vulpinoidea*), and sawtooth sunflower (*Helianthus grosseserratus*). Compared to mowing alone, mowing plus herbicide application significantly reduced RCG and preexisting graminoid cover, but increased resident angiosperm abundance. Community richness was significantly increased in mowed plus herbicide plots compared to mowed plots (10 vs. 5.4 species detected per plot, respectively). The mowing plus herbicide treatment increased sunflower plug survival and average heights for all plug species. Comprehensively, prairie cordgrass and fox sedge had higher average survival rates of 56% and 42% as compared to sawtooth sunflower at 13%. Our results suggest that managers can lessen RCG dominance in areas with co-existing native species with the use of mowing plus spring glyphosate, although graminoids may be initially reduced.

### **A.U.13 Impact of Relationships on Contraceptive Use amongst American and Ghanaian Students**

Olivia Dorscheid

Mentor: Carol Miller, Sociology & Criminal Justice

College-aged students experience a higher rate of unintended pregnancy and sexually transmitted infections (STI's) when they are limited in their use of contraceptives. To mitigate these problems, the variables impacting contraceptive use were examined. While the impact of religion and education on contraceptive use has been studied, there is limited research on how relationships influence contraceptive use. The impact of relationships with parents and peers on contraceptive use was explored within and between samples from the two countries by administering an internet survey. A sample of approximately 300 students at a Midwestern regional university was achieved as well as a sample of approximately 50 students enrolled at a university in Ghana. The survey asked respondents about their sexual histories, use of contraception, where they obtained information about preventing unwanted pregnancies and STI's and about their relationships with parents and friends. Logistic regression analyses were used to test for the effects of relationships in likelihood of using contraception and for differences between samples.

### **A.U.14 Effects of Mindfulness Meditation on Exam Performance**

Ben Dumont

Co-authors: Alexander O'Brien, Elise Powers, and Jessica Zwiars

Mentor: Alexander O'Brien, Psychology

The current study measured the effects of mindfulness meditation on exam performance, and levels of anxiety and stress. Participants were randomly split into three groups; one group that practiced around 5 minutes of meditation per day for 2 weeks prior to an exam, one group that engaged in a single 5-minute meditation the morning of the exam, and a final group that engaged in no meditation at any time. Measures of stress, anxiety, and aggression were all taken from all three groups to test for any differences. Meditation practice was administered through a mobile device application (3rdi). Results may provide insight on the utility of mindfulness meditation as a method for exam preparation or focus.

### **A.U.15 Co-Evolutionary Algorithm for Airline Passenger Denied Boarding**

Kaelan Engholdt

Co-authors: Isaac Lock and Jacob McAllister

Mentor: David Mathias, Computer Science

To airlines, an empty seat represents lost revenue. Even when flights sell out, there can be empty seats due to passengers not showing up for their flight. To mitigate this effect, airlines carefully track no show rates for their flights, using this information to sell tickets beyond the capacity of the plane, a practice known as overbooking. One consequence of overbooking is sometimes there are more checked in passengers than seats. Airlines will then offer compensation to entice passengers to relinquish their seats with offers typically starting around 200 dollars and increasing until a sufficient number of volunteers are found. Of course, the airline and passengers have competing goals. The airline's goals are to avoid denied boarding incidents and minimize the payout. A passenger's goals are to maximize the compensation received and their chances of receiving an offer despite competition from other passengers. In this work, we use multi objective genetic algorithms to evolve strategies for both parties in the event of an overbooked flight. Passengers evolve to decide when to accept an offer based on the number of volunteers needed and the offer amount. The airline evolves an effective sequence of offer amounts. Once passenger and airline strategies evolve independently, we use a co-evolutionary genetic algorithm to evolve passenger and airline strategies against each other. Finally, we run experiments to demonstrate the effectiveness of the strategies for both parties.

#### **A.U.16 Contribution of Beta Circuit Completion towards Virulence Factor Stability and Function**

Julian Grosskopf

Co-authors: Todd Weaver and Daniel Grilley

Mentor: Todd Weaver and Daniel Grilley, Chemistry & Biochemistry

The secretion of virulence factors is often imperative to bacterial pathogenesis within the human body and is becoming a larger target for antibiotic treatment. The two-partner secretion (TPS) pathway, utilizing A (TpsA) and B-components (TpsB), is the most commonly used gram-negative virulence factor secretion system currently known, used in whooping cough, meningitis, and UTIs. TpsA members are activated concomitant with TpsB-dependent secretion eliciting a variety of functions, allowing the pathogen to invade and proliferate within the host. Structurally, TpsA members can be divided into the TPS and functional (virulent) domains. All TPS domains are constructed from a ~300-residue right-handed, parallel,  $\beta$ -helix, and recognize their cognate TpsB membrane-bound partner during secretion. TpsA  $\beta$ -helix structures are built from consecutive  $\beta$ -circuits, where each  $\beta$ -circuit is constructed from three parallel  $\beta$ -strands. To further understand the relationship between complete TpsA  $\beta$ -circuit establishment and function we have implemented truncated forms of hemolysin A (HpmA265-279) from *Proteus mirabilis*. Structurally, the carboxy-terminal subdomain harbors a partial, two-stranded  $\beta$ -circuit. Interestingly, template-assisted activity has been interrelated to  $\beta$ -circuit structural destabilization within the carboxy-terminal subdomain. The structural and functional effects of final  $\beta$ -circuit completion will be ascertained using protein unfolding and hemolytic functional measurements.

#### **A.U.17 Practicality of Residential Sustainability in the Midwest**

Chase Hackner

Mentor: Scott Cooper, Biology

The Midwest is known for its harsh weather conditions, many of which deter the thought of living suitably. Minimal hours of sunlight and freezing winters, along with hot humid summers, have framed sustainable living as out of the question. However, with the correct construction the potential for optimal sustainable living is practical. Three homes in the Midwest were analyzed using BEopt 2.8 software to determine the cost benefit ratios in regards to energy efficiency. Insulated walls and airtight interiors were the most cost effective way to increase energy efficiency followed by passive solar home design and photovoltaic solar panels. By utilizing all three of these features, achieving a net zero energy efficiency in the Midwest is plausible. On average, all three houses invested less than \$30,000 in these three features compared to the same home designed without optimal energy efficiency. The average annual utility expense in the United States is \$2,060 (Nationwide n.d.). By investing in energy efficiency to achieve net zero, it would take 15 years to see a return on investment. Future home builders can utilize these three factors to create sustainable cost effective homes in the Midwest.

#### **A.U.18 The Social Impact of a Community Garden on Bay Shore County Park Campground**

Ciara Herman

Mentor: Christine Hippert, Archaeology & Anthropology

This research aims to explore the social environments surrounding community gardens and how they can affect public parks. Previous research has shown how community gardens increase social interactions in public areas such as parks and increase the variety of programs offered (Flachs 2010, Middle et al. 2014). Most research has been done on urban community gardens that were created to relieve stresses of living in a food desert. There is a lack of research in examining how these gardens affect already established public parks. During the summer of 2018, I established and maintained a community garden at Bay Shore County Park, located outside of Green Bay in Brown County, Wisconsin. Data was collected over the course of four months in the form of surveys, semi-formal interviews, and participant observation. Results showed that these gardens provided a place for people to gather and meet other campers rather than just food production to relieve stresses of living in a food desert. They were also a source of information for the general public and added to the existing park amenities.

### **A.U.19 Agglutination and Protein A Presentation on *Staphylococcus aureus* Affected in Two-Component Regulatory System Mutants**

Adam Kain

Mentor: William Schwan, Microbiology

*Staphylococcus aureus* is the primary causative agent of skin and soft tissue infections as well as bloodstream infections. Previous work in the laboratory has identified a putative two-component regulatory system labeled MW2284/MW2285 involving a sensor kinase (MW2285) and a response regulator (MW2284) proteins. The MW2284/MW2285 system appears to regulate transcription of the *srtA* gene encoding sortase A, a protein which is involved in anchoring proteins to the surface of *S. aureus* bacterial cell walls, including the anchorage of protein A. Mutations to either the MW2284 or MW2285 genes have been previously shown to exhibit increased transcription of *srtA* compared to unmutated cells. We hypothesized that mutations to the MW2285 gene would lead to an increase in sortase A protein expression, which in turn would cause greater agglutination and deposition of protein A on the cell surface. To test our hypothesis, we performed an agglutination assay and an immunofluorescent antibody staining procedure on unmutated parent strain of *S. aureus* Newman and a MW2285 mutant strain. Through these procedures, we have demonstrated that a mutation to the MW2285 gene has caused an increase in agglutination as well as increased presentation of protein A on the surface of the cell as compared to the unmutated *S. aureus* cells. Our results indicate that a mutation in the sensor kinase gene responsible for regulation of *srtA*, increases sortase A production and surface proteins associated with it.

### **A.U.20 From Isolated to Aggregated: Does Denser Nest Aggregation in Solitary Bees Result in Reduced Parasitism?**

Aidan Karlsson

Mentors: Barrett Klein and Todd Osmundson, Biology

Global declines of certain native and non-native pollinator populations in recent decades suggest that we are in the midst of a pollinator crisis. However, information vital to conservation efforts, including the natural history of many of the native pollinators among us, is alarmingly limited. Every spring, ground-nesting native pollinators known as plasterer bees explosively provision their nests in multiple locations on the UWL campus, attracting parasites and predators. Plasterer bees are known to be solitary, meaning one female resident resides in each nest and intraspecific social interaction is unexpected, yet these pollinators produce spatially predictable nest aggregations. Potential explanations for this aggregative behavior include limits in suitable nesting habitats, reuse of natal nesting areas, and protective benefits from the threats of parasitism and predation, but the ultimate cause of this behavior is poorly understood. Building upon prior observations of the plasterer bees and one of their parasites, the cuckoo bee, we sought to determine the relationship between within-site proximity of bee nests and rates of nest parasitism and provisioning. Observational and experimental data were collected via video observation, nest excavation, and genetic analysis of collected larval and pupal samples.

### **A.U.21 Slum Classification Map in Mumbai with OBIA and CNN**

Bo Kim

Co-author: Gargi Chaudhuri

Mentor: Gargi Chaudhuri, Geography & Earth Science

We are currently living in an urbanizing world. At present, 58% of the world population lives in the city (Cite UN Habitat's World Cities Report 2016). In India, 410 million people lived in urban areas in 2014 and by 2050 it's going to be 814 million (UN Habitat's World Cities Report 2016). Majority of the population increase will be due to rural to urban migration (IPCC report chapter 12 2012 by Seto). The most common destination of these poor rural migrants for housing are the slums. Increasing proportion of the slum is not only problem in the Mumbai but also in other developing nations of the world. A large portion of the city's land is taken up by the slums, which are called informal housing in city plans. These slums are often aggregated as urban area in a land use and land cover map and thus not visible separately. Thus, the main purpose of this project would be identifying the slum areas in the city of Mumbai, India. The project will use high-resolution satellite imagery to develop a detail land use map to identify slum areas in a highly urbanized city. Accurately classified map of the slum will be useful to identify socio-economically vulnerable populations of the city with poor urban amenities and will be helpful to fight urban poverty.

### **A.U.22 Intra- and Inter-rater Reliability of Ultrasound Measurements of Achilles Cross-Sectional Area**

Kendra Kreienbrink, Jessica Ahrens, Danielle Barmore, Erica Everson, and Thomas Kernozek  
Co-author: Robert Ragan  
Mentor: Thomas Kernozek, Health Professions, and Robert Ragan, Physics

Purpose: To examine the intra- and inter-rater reliability of Achilles tendon cross-sectional areas from ultrasound (US) measurements. Methods: The Achilles tendon cross-sectional images of thirty-nine healthy female participants were evaluated. One scan was obtained per subject. For each image, four raters performed five blinded cross-sectional area measurements. The cross-sectional Achilles area measurements were scaled and traced within the Image J software. Intra-rater reliability was assessed by examining the intraclass correlation coefficients of each examiner. Inter-rater reliability was examined by averaging the 5 measures of each rater and using intraclass correlation coefficient. Results: The intraclass values ranged from .745-.854 using single values. Inter-rater reliability based on the four examiners was .551. Conclusions: Our analysis indicates that Achilles tendon ultrasound measurements taken by a single rater has good to excellent reliability. The inter-rater reliability for our 4 examiners was moderate.

### **A.U.23 Land Cover Classification Upper Mississippi River Pool 5**

Paul Lee, Austin Golla, and Ryan Olson  
Mentor: Cynthia Berlin, Geography & Earth Science

This project involves creating a land cover/use map for a section of the Upper Mississippi River system. The project will be split into 3 parts (upper, middle, and lower). Cover types will be identified using Feature Analyst. The data includes a true color and a color infrared photograph of Pool 5 on the Upper Mississippi River, with most of the area as braided river and vegetated areas. The scale of the images is 1 meter. The images were taken in 2004 and 2010 and were orthorectified and merged to create the photomosaic. Pool 5 is located between Lock and Dam 4 and Lock and Dam 5. Pool 5 is in the Upper Mississippi River, the boundary of Minnesota and Wisconsin, and lies to the west of Buffalo City. The software we are using is Feature Analyst, developed by Visual Learning Systems. This operates off the program ArcGIS. Land cover/use identification will be done using a reduced 31-class LTRMP general wetland vegetation classification system. Based on the pixel resolution of the images and the technology, we expect our results to be of good quality. The final result of classes will be compared to the USGS standards of mapping and analysis.

### **A.U.24 How Trauma Informed Care Training Impacts Teachers' Self-Care Practices**

Destiny Miller  
Co-author: Betty DeBoer  
Mentor: Betty DeBoer, Psychology

Individuals in helping professions, such as educators, are at-risk for developing compassion fatigue and burnout due to their role in caring for students. This study aims to determine the impact that self-care training, within the context of a larger trauma-informed care training, has on residential teachers' self-care practices. Results will inform educators of the potential effectiveness of trauma-informed care and self-care training in increasing the actual self-care practices of educators.

### **A.U.25 Environmental Change along the Upper Mississippi River as Seen through the Perspective of the Mussel: A Comparative Study over 1000 Years Emphasizing the Pools of La Crosse, WI**

Ashley Nowak  
Mentors: Constance Arzigian, Archaeology & Anthropology

The primary objective of this study was to observe how the environment of and near the La Crosse District of the Upper Mississippi River has changed across the past 1000 years due to anthropogenic and natural factors. This analysis was conducted through the examination of a variety of archaeological assemblages and modern collections of mussels from different limnological habitats primarily emphasizing Pools 7 and 8. Mussel species presence, abundance, and morphology were considered. It was found that mussel species vary over time and by habitat. The impacts of anthropogenic environmental changes appear to alter the mussels present in this region too. This is due to the lock and

dam system, commercialized use of the main channel, and via the introduction of invasive species as signified by the extirpated species, Ebonyshell (*Fusconia ebena*). These concerns and this research is connected to larger implications concerning the biodiversity and resource availability within the region.

#### **A.U.26 Investigating the Accuracies of 3D-Photogrammetry in Relation to Artifacts**

Nicolette Pegarsch

Mentor: David Anderson, Archaeology & Anthropology

3D-photogrammetry is a newer photographic technological advancement in the world of archaeology. Photogrammetry is the process of taking overlapping pictures of an object, features and sites in order to digitally construct a 3D model. My research is testing the accuracy of 3D-photogrammetry regarding the error ranges between physical and digital measurements. After constructing models of five different artifacts, I employed fellow students to take measurement in digital and physical space. With this data, I will be able to confirm that there is a significant but low error range between measurements made on artifacts with calipers or measurements made on digital versions of the artifacts made in a computer program. This will demonstrate how useful 3D-photogrammetry can be for documenting artifacts for archaeologists and the general public alike.

#### **A.U.27 The Effect of Repetitive Head Impacts on Cognitive Functions in Contact and Non-Contact Sport Athletes**

Ryan Potter and Kathryn Aukerman

Co-author: Ellen Rozek

Mentor: Ellen Rozek, Psychology

Recently there has been an increase of attention in the media to the consequences of head trauma in football players. Athletes competing in football sustain multiple Repetitive Head Impacts (RHIs) each season, which have been shown to cause neurocognitive deficits even when the RHIs are not strong enough to be diagnosed as a concussion (Talavage et al., 2014). This study investigated how undiagnosed RHIs affect an athlete's cognitive abilities over one season. We recruited athletes from the University of Wisconsin - La Crosse's Division III football, men's cross country, and men's track team. Players took the online standardized ImpACT test before their athletic season began and completed a post-season ImpACT test after their last game. The ImpACT test assessed changes verbal and visual memory, reaction time, impulse control, and visual motor skills. After completing both ImpACT tests, all participants were asked to indicate their position, total number of seasons/years of contact sports played, age when they first started playing contact sports, number of previously diagnosed concussions, and number of undiagnosed concussions they believe they've had. We hypothesized that amateur athletes sustaining RHIs in tackle football would have lower cognitive ability scores compared to non-contact sport athletes from track and field. We also hypothesized that amateur football players would have lower cognitive ability scores at the end of the football season compared to pre-season.

#### **A.U.28 Impressions of Individuals with Autism**

Elise Powers

Co-authors: Jessica Zwiers, Benjamin Dumont, and Alexander O'Brien

Mentor: Alexander O'Brien, Psychology

Autism spectrum disorder (ASD) refers to a broad range of conditions identified by challenges with social skills, speech and nonverbal communication, and repetitive behaviors. Because people with Autism frequently have moments where they become more stressed and upset than people without Autism, this results in a loud and uncontrollable outburst. Watching this can make a person quite uncomfortable if they are witnessing a person having an Autism outburst in public. This study provided participants with either dry factual information, or personal anecdotes about individuals with ASD, accompanied by a video of an autistic outburst. Participants were then asked to gauge how willing they would be to provide assistance to the individual in the outburst video. Additionally, participants provided demographic information focusing on their previous knowledge and experiences with ASD. The purpose of the information and video manipulations was to determine the extent to which the various types of knowledge about, and exposure to individuals with ASD can influence observer attitudes and behaviors.

### **A.U.29 Genus Level Mapping of Woody Vegetation in University of Wisconsin-La Crosse Campus Using Unmanned Aerial System (UAS) Imagery**

Jack Radenz

Mentor: Niti Mishra, Geography & Earth Science

Canopy cover has an essential role in helping regulate climate and quality of life in urban areas. Therefore, mapping and monitoring changes in urban canopy cover and detailed mapping of urban tree species is crucial, however it has been methodologically challenging using space borne remote sensing images to do so. The use of UAS acquired imagery allows an alternative to using space borne remote sensing images. UAS imagery provides many advantages compared to space borne remote sensing images (most notably much greater spatial resolution), which enables semi-automatic machine learning techniques to map woody vegetation by genus type.

### **A.U.30 Involvement in Organized Competitive Sport and Its Effects on Overall Mental Well-Being**

Brianna Reeder and Samantha Harding

Co-author: Alessandro Quartiroli

Mentor: Alessandro Quartiroli, Psychology

**Purpose:** Research supports that physical activity can positively impact one's mental well-being (Gerber et. al, 2012; Janz et al., 2010). However, little research shows whether involvement in organized competitive sports has different effects on well-being than physical activity alone. **Procedure:** This study compared scores of mental well-being, optimism, and self-efficacy between athletes and non-athletes as well between competition levels: NCAA, club, and intramural sports. A sample of 933 undergraduate students completed an online survey containing the Ryff Psychological Well-being scale, the LOT-R, and the Self-Efficacy questionnaire, as well as a measure of physical activity (Gaumer Erickson, Soukup, Noonan, & McGurn, 2016; Ryff & Keyes 1995; Scheier, Carver, & Bridges, 1994). **Results:** There was a significant difference in overall mental well-being, self-efficacy, and optimism between athletes and non-athletes. When split between competition levels, NCAA and club athletes had higher overall mental well-being and self-efficacy scores than intramural athletes and non-athletes. Additionally, NCAA and intramural athletes had significantly higher optimism scores than club athletes and non-athletes. **Conclusions:** Being involved in organized competitive sports may help students navigate stressful academic situations and enhance their workplace performance. This research could inform policy-related decisions surrounding competitive sports.

### **A.U.31 Differences between Ratios of Male and Female Migrants: A Comparative Study between the Inca Sites Choquepukio and Machu Picchu**

Elizabeth Rosio

Mentors: Tim McAndrews and Constance Arzigian, Archaeology & Anthropology

This paper looks at different strategies the Inca used to control populations within their empire. These strategies are referred to as forced migrations and were a tool used to prevent uprisings and make managing new areas easier. This will be accomplished through the statistical analysis of the two Inca sites of Machu Picchu and Choquepukio. The different ratios of males and females at each settlement can lend a hand at taking a functionalist approach as to what form of forced migration was used at each site and how the Inca used it. In order to tell if an individual is a migrant to the area or not, strontium isotopic analysis will be used. Strontium isotopes are found within human teeth and are a marker of where an individual grew up. Strontium finds its way into the human body when the mineral is absorbed into surrounding food sources and then ingested. The levels of strontium can be very specific to a particular area. This is true even for past people. Due to this, looking at migrants using this technique can give researchers a good idea of how these migratory patterns worked.



### **A.U.32 Sleep in an Ecologically and Agriculturally Relevant Herbivore and Its Parasitoid**

Victoria Salerno

Mentor: Barrett Klein, Biology

The mechanisms and functions of sleep are still largely unknown, despite the fact that sleep is an essential and basic behavior, potentially shared by all animals. There is a distinct lack of knowledge in regard to sleep in the most species-rich group of organisms--the insects. Aphids are a commonly studied insect due to their agricultural significance as pests, yet nothing is known about their sleep or even if they sleep. In cooperation with postdoctoral research being conducted in Dr. Barrett Klein's Pupating Lab at UWL by visiting French scientist Kevin Tougeron, the research I will be performing aims to recognize behaviors in pea aphids (*Acyrtosiphon pisum*) that correlate with sleep. In order to establish these behaviors, I will video record pea aphids during periods of day and night using infrared microscopy. In addition, I will observe and record the pea aphid's natural parasite, a species of wasp (*Aphidius ervi*), to determine behavioral cues that indicate circadian rhythmicity within the species. These studies may help to provide a clearer understanding of sleep in aphids and in parasitoid wasps and to create an overlapping image of sleep between the two ecological partners. Defining and identifying behaviors that correlate with sleep in aphids and parasitic wasps would establish a foundation of study that could spearhead new applied and basic research with agricultural and ecological implications.

### **A.U.33 Deep-UV Standoff Raman Spectroscopy**

Leslie Scheurer

Co-author: Bradley Arnold

Mentor: Bradley Arnold, Chemistry & Biochemistry Department, University of Maryland, Baltimore County

Methods to detect hazardous or illicit materials accurately, rapidly, and at discreet distances are needed for public safety. Among the most promising technologies poised to address this critical need is Raman spectroscopy. This technology requires no sample preparation and does not damage the sample. Raman also has the potential to identify chemicals in a single laser pulse and from distances far enough to keep the operator safe. These properties are especially advantageous for in-field applications. The main challenges associated with Raman spectroscopy are inherently weak signals and intense background from competing fluorescence. Additionally, laser penetration depth into absorbing samples is limited and the scattered light emanating from them is further reduced. This project aims to solve these problems by using intense laser pulses at 213 and 266 nm to mitigate the appearance of fluorescence in the spectral region being observed. Furthermore, manipulation of the excitation spot size of the laser on the sample allows more molecules to scatter from the surface and does not require deep penetration into the sample to observe Raman spectra. It was shown that both 213 nm and 266 nm are effective excitation wavelengths for Raman. Spot diameters between 12 and 21 mm facilitate the best scattering in most samples. This arrangement negates the need for precise alignment, further proving itself as a viable in-field measurement technique.

### **A.U.34 Investigating Seasonal Changes in Neuron Number in the Hibernating Ground Squirrel**

Taylor Schroder

Co-authors: Kadie Krzykowski, Lauren Priem, and Andrea Ruzicka

Mentor: Christine Schwartz, Biology

During hibernation, ground squirrels undergo extreme physiological changes which result in changes to the anatomy of the brain. Hibernating animals cycle between torpor, the inactive stage, and interbout arousals (IBA), where metabolic activity resumes for a short period. Previous work showed that some neurons shrink in size and disconnect from other neurons during torpor, but reconnect during IBA. In our lab, preliminary data showed that cell counts in the cerebral cortex changed seasonally, specifically that cells showed an increase in number in torpor compared to IBA and non-hibernating. The stain used for this data was not specific for neurons and glia, so it is unclear which cell type is changing. To continue this research, we conducted further tests identifying neurons specifically to determine if this trend is real. To do this, fluorescent immunohistochemistry was used to target and fluoresce the neurons of the cerebral cortex in hibernating animals in torpor and IBA stages, as well as non-hibernating animals. Statistical analysis of our data shows that there is a significantly higher neuron count in the anterior cingulate cortex of hibernating animals ( $P=.01$ ), but no significant difference in the average size of neurons between hibernating and non-hibernating animals.

The increase in cell count in hibernating animals could be a protective measure to account for potential cell loss due to the extreme physiological changes associated with hibernation.

#### **A.U.35 Proteomics of Ground Squirrel Platelets**

Katie Sebranek, Mickaela Larkin, and Mattie Krause  
Mentor: Scott Cooper, Biology

Platelets are small cells without a nucleus that help form blood clots. Sialic acid, a sugar on the surface proteins found in platelets, promotes circulation of these cells within the blood stream. At cold temperatures, these sugars are cleaved off flagging human platelets for clearance by the liver. Hibernating organisms, such as the 13-lined ground squirrel, survive these harsh conditions through altering their vital statistics. Specifically, these ground squirrels can drop their normal body temperature from 35-38°C to 4-8°C and decrease their heart rate to 3-5 beats per minute when in the torpor phase of their hibernation cycle. To prevent extensive clotting, ground squirrels' platelet proteome and protein phosphorylation is predicted to undergo changes. To better understand how the platelet proteome is altered, Western Blot analysis in combination with indirect immunofluorescence were conducted on both human and squirrel samples to detect variations in the phosphorylated proteins. All samples in this study were treated with prostaglandin I (PGI) to prevent terminal phosphates from being cleaved off through enzymatic processes. Adenosine diphosphate (ADP), a platelet agonist important for hemostasis, was added to half the samples to simulate activated platelets in the bloodstream. Preliminary results show changes in overall protein phosphorylation in ground squirrel platelets relative to human platelets.

#### **A.U.36 Structural and Functional Effects of Altering the Nonpolar Core of Hemolysin A**

Gage Stuttgen  
Mentors: Todd Weaver and Daniel Grilley, Chemistry & Biochemistry

The protein structure and function paradigm is a foundational tenet of biomolecular science that underlies many infectious diseases. Hemolysin A (HpmA), a hemolytic protein produced by *Proteus mirabilis*, was used as a model to investigate the protein structure-function paradigm. HpmA is a member of the two-partner secretion (TPS) pathway, which is used by gram-negative bacteria to export predominantly virulent proteins outside of the cell. For these studies, a truncated version of hemolysin A (HpmA265) was implemented to define the contributions of the TPS domain toward TpsA structure and function. Recently, our group has further dissected HpmA265 into three sequentially folded structural units termed the polar core, non-polar core, and carboxy-terminal subdomains. Specifically, residues within the non-polar core subdomain have been selectively targeted and modified. Site-selective alterations within the non-polar core subdomain shift four-state  $\beta$ -helix unfolding to a three-state model, increase protease sensitivity, and increase template-assisted hemolysis. In contrast, site-selective alterations on the exterior of the non-polar core subdomain maintain four-state unfolding, decrease protease sensitivity, and increase template-assisted hemolysis. Collectively, these results point toward TPS  $\beta$ -helix stability as a requisite for robust template-assisted hemolysis. Conservation of the TPS domain across gram-negative bacteria makes development of antibiotics targeting  $\beta$ -helix structure and function attractive.

#### **A.U.37 Land Cover Use Map of the Upper Midwest Mississippi River System Pool 8**

Josie Talbert and Gabrielle Geller  
Mentor: Cynthia Berlin, Geography & Earth Science

A color infrared 1-meter aerial photograph of lower Pool 8 section of the upper Midwest Mississippi River system is analyzed to determine land cover use in the given area. Our photograph of pool 8 was taken on September 20, 2006 by USGS-UMESC. For this project, we use Feature Analyst, an object based image analysis (OBIA) software. This software uses hierarchical learning with the help of user training sites. False color infrared aerial photographs include green, red, and near infrared wavelengths. Our land cover and land use classes are based on the USGS Wetland Vegetation Classification System. The USGS National Vegetation Classification System (NVCS) is used to classify land cover types, and was developed originally for long term resource management. We expect to extract 9 feature classes. Our project is the start of a larger project creating Land Cover Use (LCU) maps of study areas along the upper Mississippi River system. Research such as ours is useful for government agencies in managing land use for both

present and future climate conditions. Keeping records of maps such as ours also enables future research on how land cover usage changes over time. The ultimate result will be a land cover/land use map.

#### **A.U.38 Racist Language: Why Is It Condoned? Examining Age, Conformity, and In-Group/Out-Group Bias**

Albert Tronnes

Mentors: Bart VanVoorhis and Bianca Basten, Psychology

Discrimination and racism are ongoing problems in the United States across all age groups. Despite many social justice movements over the last half century, racism continues. Research suggests a similar percentage of white millennials, Gen-Xers, and Baby Boomers hold racist views (Clements, 2015). In-group/out-group bias can help explain the persistence of racism across generations (Lee & Ottati, 2002). This study examines whether people would be more likely to condone racist language when it happens within their peer group's generation. Participants read a scenario describing either an in-group member (in their generation), or an out-group member (outside their generation), using racist language. Participants were surveyed about their attitudes towards the language used. It was hypothesized that participants presented with an in-group scenario would be more accepting of racist language than participants presented with an out-group scenario. Results were analyzed to understand the ways people justify the use of racist language and provide insight on why racism exists at similar levels across generations. A significant relationship between the group identity of the participants and their likelihood to call out the racist language was found. Participants were less likely to call out racist language when it came from someone in their generational peer group.

#### **A.U.39 Determining the Mechanism of Hemolytic Function and Type Vb Secretion by a Gram-Negative Pathogen**

Gina Wade

Co-authors: Daniel Grilley and Todd Weaver

Mentors: Daniel Grilley and Todd Weaver, Chemistry & Biochemistry

This project is focused on a virulent protein called HpmA that is produced by the bacteria *Proteus mirabilis* capable of destroying human red blood cells. *P. mirabilis* utilizes a two-partner secretion pathway to transport HpmA across its outer membrane without the use of ATP and release it into the blood of a human host. Our goals are to determine the pattern of hemolytic activity within the functional region of HpmA and more precisely quantify hemolytic function. To accomplish these goals, we will delete and randomize portions of the protein, purify, and quantitatively determine the effect on secretion and hemolytic activity. Knowledge of the functionally important regions of HpmA could contribute to a better understanding of how the TPS pathway is used to transport and activate toxic proteins by pathogenic bacteria.

#### **A.U.40 The Effect of Self-Efficacy on a Simulated Rehabilitation Task**

Danielle Whitish and Laura Harper

Mentors: Tesia Marshik, Psychology

Successful rehabilitation is affected by many psychological factors. Research has shown that high self-efficacy is effective for motor tasks and pain perception. However, there is limited research on frustration, which is prevalent in rehabilitation. Based on past research, we hypothesize that participants primed to have high self-efficacy will perform better on a physically frustrating task than participants not primed. To examine this hypothesis, we explored the effect of self-efficacy priming strategies on participants' abilities to complete a frustrating task, simulating those used in rehabilitation therapy. Participants were 72 undergraduate students from the University of Wisconsin-La Crosse. They were screened for right-handedness and level of activity before recruitment. Participants were randomly assigned to one group: domain-specific self-efficacy scale, mastery experience, both, or control. Following that, participants balanced on a balance board while placing push pins into a corkboard with targets. The non-dominant hand was used to simulate an injury. Accuracy was measured by the targets hit in a minute. The study involved a between-participants design. A one-way ANOVA will be used to examine the effect of self-efficacy priming strategy on task performance. We predict that participants in the condition with both priming strategies will perform the highest. The results can provide insight into the psychological factors affecting rehabilitation, improving outcomes.

#### **A.U.41 Revealing Sanist Space within a University Campus: Marginalization of Mad People at the University of Wisconsin-La Crosse**

Nancy Yang

Mentor: John Kelly, Geography & Earth Science

Sanism is a form of marginalization against those who have mental illness or are perceived to have mental illness, and it plays out in different ways in different environments. Through a case study of students, faculty and staff with a range of self-described severe mental illnesses at the University of Wisconsin-La Crosse (UWL), this project seeks to understand sanism in a university environment. As a way to compare and contrast differences in perspectives and experiences of sanism, the target population for this case study was both those with and without mental illness. Surveys and interviews, some including participatory mapping, were conducted to elucidate where and how students, faculty and staff with mental illness feel (un)comfortable, (un)safe and (dis)empowered on campus. In participatory mapping, participants were given a map of UWL and asked to express through illustration how they feel about mental illness and where they may encounter implicit and explicit sanism on campus. Thematic analysis was used to uncover patterns in all survey, interview and map results. Findings illustrate how the university perpetuates sanism, as well as how universities can better accommodate for more welcoming and empathetic environments for those with mental illness.

#### **A.U.42 Feeling the Music: Music's Influence on Emotional Perception**

Jessica Zwiers

Co-authors: Elise Powers, Benjamin Dumont, and Alexander O'Brien

Mentor: Alexander O'Brien, Psychology

Research shows that music and emotional processing are very closely related. Many people use music to connect with their emotions, express their emotions, and regulate their emotions. In addition, our ability to perceive the emotions of others is extremely accurate. However, in ambiguous situations, we must rely somewhat more on situational cues when determining the emotions of others. The current study focuses on the effect of music on participants' immediate perceptions of others' emotions in ambiguous situations. In this study, music that expresses either happy or sad emotions is played while participants rate the perceived emotional expression of faces specifically chosen for their neutral facial expressions. This tests the hypothesis that the emotion conveyed in the music will elicit certain emotions in the participants and influence their perceptions of the emotions displayed by the neutral faces. For example, one prediction is that the participants in the sad music condition will rate the images as more sad and as less happy than the participants in the control condition. Data collection for this study is currently in progress.

#### **A.U.60 Mapping of University of Wisconsin-La Crosse Campus and Creation of Interactive Web Map While Utilizing ADA Guidelines around Campus**

Matthew Peck

Mentor: Gargi Chaudhuri, Geography & Earth Science

The use of digital mapping in recent decades has become more and more successful in many applications from government planning, project analysis, and education, but also business oriented strategies including, but not limited to, similar applications. With today's changing world, new features and land cover are changing every day, calling for a detailed response in updating those changes through software and web applications. The University of Wisconsin-La Crosse Campus has many unique features that can be stored using mapping software and precision GPS. My interests are to create a useful map for Web applications at our UWL website. This Map could be continuously updated and fixed for our changing campus, but could help students, faculty, parents, and visitors navigate our campus much easier and with the exciting touch of an interactive database. With this, ADA guidelines are to be addressed as a first come first serve layer within this map. Anyone with disabilities can and will be able to utilize this map to better understand where they can or cannot access buildings and sites around our campus.

**Poster Session B**  
**The Bluffs: 10:30 am-11:50 am**

**B.U.1 A Joint Operation: Similarities and Differences in the Human and Non-Human Primate Foot Kinematics**

Jordan Appel and Sam Friederichs  
Mentor: Thomas Greiner, Health Professions

The evolution of primate intrinsic foot joint functionality is an increasingly investigated area. One of the characteristics that separates humans from other primates is bipedal locomotion, with the foot being one of the more unique anatomical features associated with human bipedalism. We analyzed different joint kinematic responses with dorsiflexion-plantarflexion driving motion in three human (*Homo*), chimpanzee (*Pan*), and baboon (*Papio*) specimens. We found three joints to be of particular interest: the talonavicular, calcaneocuboid, and subtalar. These joints were selected due to their significant action along their functional axes. Data were collected via bone pinning in dissected cadavers with a researcher providing experimental input to perform the isolated driving motion. Motion tracking was done to track each individual bone within the selected joints. The calcaneocuboid and talonavicular joints had greater flexibility in the non-humans than in the humans. This could be seen as supporting evidence for the function of the rigid human foot.

**B.U.2 Elemental Composition of Mud Lake Sediment Cores**

Megan Hickinbotham and Sophie Pitney  
Mentor: Joan Bunbury, Geography & Earth Science

In southeastern Wisconsin, there was a site, Aztalan, inhabited by the Mississippian people from approximately 1000 to 1250 CE. A lake sediment core was collected from Mud Lake, Jefferson County, Wisconsin in January 2014. Since then, extensive research has been done on the core to determine the past climate in the area. This past climate data can be constructed from a variety of data types, including particle size analysis and the use of x-ray diffraction. This project is focusing on another type of analysis, using the x-ray data to determine the elemental composition of the sediment core. The x-ray data is analyzed using a program which creates and graphs regions of interest. The specific elements being analyzed are Calcium, Magnesium, Phosphorus and Strontium. That collected data is used and graphed to analyze the elemental makeup of the core, which then can be used to reconstruct the environmental characteristics throughout Aztalan's post-glacial history.

**B.U.3 OnRamp to Parallel and Distributed Computing: Aimed at Classroom Learning**

Zachary Baklund  
Co-authors: Samantha Foley, Elise Baumgartner, Nick Salvo, and Forest Evanson  
Mentor: Samantha Foley, Computer Science

Our goal is to lower the barrier to entry for teaching parallel and distributed computing (PDC). Parallel and distributed computing is a type of computing where an application is run on multiple processors which execute tasks simultaneously and coordinate across a network of computers. It is difficult to learn to write these programs because PDC systems are unfamiliar and complex compared to standard desktop applications. However, with increasing data volumes it becomes necessary to offload work onto multiple machines on multiple processes. Our research project is designed to address the complexity of teaching PDC. OnRamp provides an interactive web portal that allows students to launch parallel applications and explore parallel and distributed computing environments with ease. We solve this problem by abstracting away the details of the unfamiliar and complex configuration tools and provide examples of working parallel applications. This approach allows students to avoid being overwhelmed by the details and minutiae of the system and allows them to explore the PDC concepts on various systems. Included in this project are learning modules designed to explore PDC concepts that allow students to understand what makes using parallelism with algorithms different and more efficient than single process computing.

#### **B.U.4 The Exploration of the Meaning Attributed to Their Professional Quality of Life by the Women Officers within the University of Wisconsin-La Crosse Reserve Officers' Training Corps (ROTC)**

Anna Baumgartner  
Co-author: Alessandro Quartiroli  
Mentor: Alessandro Quartiroli, Psychology

With the repeal of the 1994 Direct Combat Definition and Assignment Rule in 2015, more servicewomen are entering the military each year, some in positions that were previously closed to them. Some research suggests that servicewomen's experiences are not same as men and they may have additional professional stress in the military. However, many women have and continue to be interested in a military career (Mankoski, Tower, Brandt, & Mattocks, 2015). By looking through the lens of the professional quality of life construct and using qualitative methods (Braun & Clarke, 2010), this study aimed to explore what might lead women to continue to join the military, specifically the Reserve Officer's Training Corps (ROTC) program. This aim was reached by interviewing three female participants who were formerly, currently, or recently enrolled in the ROTC program. These interviews aimed to explore the motives to join the program, and what factors are perceived to either aid or hinder their experience as female cadets. Interviews were completed during the fall of 2018 and lasted between 20 and 50 minutes ( $M = 31.68$ ). Inductive thematic analysis (Braun & Clarke, 2010) was engaged to develop an in-depth understanding of these experiences. Results suggest that enrolling in ROTC programs might present positive and negative experiences for female students. Overall, through the engagement of proactive strategies, the positive experiences seem to outweigh the challenge factors.

#### **B.U.5 Effects of Simulated Shift Work on Glucose Content in *Drosophila***

Rebecca Becker  
Co-author: Alder Yu  
Mentor: Alder Yu, Biology

Shift workers experience intense exposure to light at night. Extended shift work is associated with a higher risk of developing type 2 diabetes and obesity compared to nine-to-five work. However, it is not known if shift work schedules alone causes poor health. The goal of this study is to determine how extended exposure to a light:dark cycle similar to that experienced by human shift workers will alter glucose levels in fruit flies. If glucose levels in flies are altered by a simulated shift work schedule, that would suggest that flies could be used as a model system for human shift work metabolism and associated disorders. We hypothesize that a shift work-like schedule alone will be sufficient to increase glucose levels in *Drosophila*. Flies were raised at constant density for two generations to control for amount of food available. Upon hatching, second generation adult male flies were raised on either a control schedule of 12:12 hours light:dark cycle or a shift work schedule of 8:8 hours light:dark cycle. After 9 days, the glucose content will be measured in the control and shift work flies via colorimetric assay. We predict that flies exposed to an 8:8 light:dark cycle will have a higher glucose content than their 12:12 light:dark counterparts.

#### **B.U.6 How Education Can Impact the Perception of Individuals with Disabilities and Integrated Classrooms**

Samantha Beckett and Hailey Wierzba  
Mentor: Jocelyn Newton, Psychology

The US Census Bureau (2012) reported people with disabilities make up 19% of the population; yet social acceptance of disabilities is lacking. Exposure to groups can improve perceptions, introduced by Gordon Allport (1954) as contact theory. We hypothesized that video education would increase these perceptions. We recruited 291 parents of typically developing children to participate in the current study. The experimental group ( $N = 146$ ) viewed a positive film on integrated classrooms and the control group ( $N = 145$ ) viewed a film on an unrelated topic. Perspectives on disabilities and integrated classrooms were assessed using the Attitudes Towards Disabled Persons Scale (ATDP) and an Integrated Classroom Questionnaire. We predicted that increased education would create more positive attitudes towards individuals with disabilities. A One-Way ANOVA showed that there was no significant difference between the control and experimental groups. Follow-up ANOVAs revealed that females and parents of children in public schools had significantly more positive views towards individuals with disabilities and integrated classrooms while parents with children in integrated classrooms had significantly more negative views.

### **B.U.7 Student Athletes' Perception of Value and Effectiveness of Sports Psychology Services as Influenced by the Practitioners' Training and Gender: A Quantitative Approach**

Zachary Biehn

Co-authors: Danielle Vetsch and Alessandro Quartiroli

Mentor: Alessandro Quartiroli, Psychology

An athletes' wellbeing encompasses both their physical and psychological well-being. For this reason, sport psychology (SP) practitioners (SPPs) can play an important role in supporting an athlete throughout and after their career. So, seeing the current health crisis in suicide and the overall importance of mental health in college athletes and lack of use of SPP in university settings stresses the importance of more research in this field's area as essential to the betterment of college athletes. The scope of this cross-sectional study is to gain understanding of current and former athletes' perception of effectiveness of sport psychology services and consultants. The participating individuals will be led to the ad hoc vignette-based survey hosted on Qualtrics platform. The survey, developed based off a thorough review of existing literature and the feedback provided by sport psychology experts, consisted of basic demographic questions, perceptual questions focused on practitioners' role and background, questions focused on service effectiveness and value beliefs, and finally gender-, ethnicity- and training-based vignettes designed to understand participants' inclination to work with practitioners. After completion of the data collection, analysis of the data was completed using SPSS 25. Results will be described and related recommendation will be described.

### **B.U.8 Exposing the Flesh of an Extinct Species: A Life-Size Leg Muscle Reconstruction of the Juvenile Tyrannosaur Raptorex**

Zella Cassar

Co-author: Eric Snively

Mentor: Eric Snively, Biology

Background: Anatomical reconstructions enable us to assess form and function of extinct species. These data facilitate understanding not only about the specific characteristics driving movements in these species, but also how these movements may have led to evolutionary success. Specifically, this analysis reconstructs form and function of the legs of the tyrannosaurid dinosaur Raptorex (a juvenile Tarbosaurus) through reconstruction of the leg muscles and mass properties of limb segments, including the thigh, calf, and foot. Methods: Our restoration is based on literature descriptions of muscle attachments in phylogenetically related dinosaurs, dissection of bird leg muscles, skeletal reconstructions of the Raptorex, and information about proportionality of leg muscle to bone in tyrannosaurs. Reconstructions include 1) a detailed illustration, using scales and measurements to ensure accurate proportions, and 2) muscles mapped onto the skeleton using Adobe Illustrator. From these visuals, mass and rotational inertia of the leg segments are calculated using digitized dimensions. Results/Implications: The combination of these elements results in a life-sized and accurate replication of Raptorex's leg muscles. The low mass of the foot in proportion to leg muscles gave the leg low rotational inertia for swift movements, revealing a function that likely increased predation success in tyrannosaurs. Results allow for further quantitative analysis about how Raptorex moved and behaved.

### **B.U.9 Green Biomanufacturing of Optically Pure Acetoin Using *Gluconobacter Oxydans***

Ellie Dahms

Mentor: Paul Schweiger, Microbiology

*Gluconobacter oxydans* belong to the acetic acid bacteria and are known for their unique ability to incompletely oxidize substrates under normal growth conditions, releasing the products into the medium. This feature is biotechnologically relevant as the incompletely oxidized products are often both stereoselective and regioselective. This unique metabolism is dependent on membrane-bound dehydrogenases that channel electrons from substrates directly into the respiratory chain. These biocatalysts simplify the production and recovery of enantiopure chemicals, which normally require expensive and difficult organic chemistry to produce, providing a route to sustainable green chemical biomanufacturing. Our aim is to metabolically engineer *G. oxydans* for the production of enantiopure acetoin. Acetoin is designated a top 30 platform chemical by the US DOE and is used to produce pharmaceuticals, cosmetics, foodstuff, and liquid composites. Two *G. oxydans* enzymes are predicted to be important for acetoin production: 1) a known PQQ-dependent polyol dehydrogenase (SldBA), and 2) an uncharacterized FAD-dependent sorbitol dehydrogenase (mSDH). To rationally design *G. oxydans* for enantiopure acetoin production, the roles of SldBA and mSDH were investigated using

deletion strains, and the enantiomer of acetoin produced can be determined by chiral GC-MS. This information will be used to develop improved routes for sustainable green biomanufacturing of enantiopure acetoin.

#### **B.U.10 Student Progression within a College Access Program**

Montana Fender

Mentor: Elizabeth Peacock, Archaeology & Anthropology

College Possible is one college access program that focuses on helping low-income and first-generation students achieve their bachelors degree, starting in their junior year of high school. Research has been done on similar programs and their benefits, however, there is a lack of information on how useful these programs are for participants over time (Hornig et al. 2014). This research aims to find out how the support this program gives to its students changes throughout their experience within their educational careers and the program, so that College Possible can create more inclusive programming for their upperclassman college students. I will be collecting information from College Possible students through online surveys and interviews. My findings suggest that as students advance through their education, the program becomes less helpful, students need less help because they learn strategies that create self-sufficiency, and students face a lack of new challenges that require guidance by program advisors.

#### **B.U.11 The Japanese Conceptualization of Foreignness**

Leah Griesbach

Mentor: Elizabeth Peacock, Archaeology & Anthropology

This research project attempts to analyze the way foreignness is thought of in the Japanese context and what kinds of consequences arise from this. Previous research has indicated that Japan is hesitant as a country to embrace foreignness. However, there seems to be a distinct lack of promoting this topic to the Japanese public, resulting in a void of understanding as stereotypes and generalizations of foreigners maintain false ideas about their place in Japanese society. It can tentatively be said that there is a barrier still in place between Japanese people and their ideas surrounding foreigners and their place in Japanese society. This research will investigate the reasons behind this lack of openness and the consequences that result in a cultural barrier by exploring the data I have collected. The data was gathered using interviews with participants that are of Japanese heritage and non-Japanese participants that have visited Japan, supplemented with research on completed academic pieces related to this topic. Expected results are that there are common patterns between the participants and research pieces that indicate a lack of openness and a cultural barrier between foreigners and the Japanese that is linked with historical and modern factors.

#### **B.U.12 Generation of Novel Bioorthogonal Reactions between Coumarin and Diazo Compounds**

Taylor Hackel and Kaylee Morton

Mentor: Nicholas McGrath, Chemistry & Biochemistry

Bioorthogonal chemistry is a rapidly developing field in that it emphasizes the key components of click chemistry- high selectivity, product yield, and reaction kinetics- while utilizing reagents and conditions that do not hinder cellular activity. Bioorthogonal reactions find broad applications within cellular research as its pivotal focus is the study of intracellular pathways and biomolecules through fluorescent labeling of cellular components. Coumarins are promising compounds as they exhibit fluorescent properties, or color production, that can be modified through the addition of either electron donating or withdrawing substituents. The potential of coumarin cycloaddition reactivity, a mechanism in which two molecules are conjugated in one step without byproduct formation, with diazo compounds, a functional group comprising of two nitrogens, will be explored. Organic synthesis of a variety of diazo and coumarin starting materials will be conducted, followed by reacting combinations of these starting materials in several solvents to seek a successful reactant pair. Products of the reactions will be characterized using H NMR spectroscopy and GC-MS. The successful generation of such a reaction will provide an innocuous means for chemists and biologists to study cellular processes in vivo.



### **B.U.13 Locating a Business Distribution Center through Graph Theory**

Colin Jackson  
Co-author: Huiya Yan  
Mentor: Huiya Yan, Mathematics & Statistics

This research project finds an algorithm that will identify a location out of many business stores as the distribution center so that the total cost of getting inventory to all the retail stores is minimized. To do this, we studied weighted graphs, as well as methods for finding the shortest path in a weighted graph. In a weighted graph, each vertex represents a retail store. If two vertices are connected by a weighted edge, then that means we can deliver inventory from one store to another and the weight is the cost of delivery. So, our goal was to find a vertex of the graph with the minimum distance sum to all other vertices in the graph. The methods involved include Dijkstra's algorithm and Floyd's algorithm. By studying the two methods, we will create an algorithm to find the ideal location as the distribution center out of all stores.

### **B.U.14 Analysis of Factors Relating to Student's Perceptions of a Supportive Environment at a Comprehensive Midwestern University**

Kaytee Johns  
Mentor: Enilda Delgado, Sociology & Criminal Justice

How students perceive their campus environment is affected by a multitude of factors. Some of these include interactions between students and faculty, faculty teaching practices, demographic characteristics of students and whether or not students live on campus. While some research has contributed meaningful findings related to which students see their environment as supportive and why, much of it is either outdated, or does not truly consider the campus environment as a critical factor to student success. Students are constantly engaged in the campus environment, which is why it is critical that there is more research to flesh out how a supportive environment is made and upheld at colleges and universities. The goal of this proposed study is to build on the previous research and find which factors relate to students' perceptions of a supportive environment at a comprehensive Midwestern university. This study will use survey data from first-year and senior students provided by the National Survey of Student Engagement (NSSE) and will assess the variables that are significantly related to how students perceive the campus environment as a supportive environment.

### **B.U.15 Zero-Sum Gender Beliefs: Examining Conformity to Masculine Norms as a Moderator**

Bradley Koehler  
Mentors: Ryan McKelley and Bianca Basten, Psychology

The United States has a long history of men holding a disproportionate amount of power relative to women and other minority groups. Previous research has shown that men and women hold differing perceptions of critical gender issues. For example, women do not perceive a connection between discrimination against women and discrimination against men. In contrast, men perceive the two to be related, and that a decrease in discrimination against women leads to an increase in discrimination against men. Zero-sum beliefs, or the idea that if you win then I must lose, function as a possible foundation for this phenomenon. Previous research has not accounted for masculine socialization as a contributor to zero-sum thinking. Additionally, a great deal of the literature regarding zero-sum beliefs has exhibited an over-reliance on correlational methodology. To address this limitation, this project used an experimental design to test four experimental conditions against a control. It is expected that greater adherence to masculine norms will contribute to a greater endorsement of zero-sum beliefs. As expected, sub-scales and scores from the Conformity to Masculine Norms Inventory (CMNI-46) predicted men's endorsement of a Zero-Sum Perspective. Additionally, several demographic questions also correlate with a tendency towards zero-sum thinking.

### **B.U.16 Hepatotoxicity of Simvastatin and Acetaminophen in Female Fathead Minnows (*Pimephales promelas*)**

Olivia Kulaszewicz

Mentor: Tisha King-Heiden, Biology

Pharmaceuticals have recently become an emerging contaminant of concern in aquatic environments. Simvastatin and acetaminophen are both commonly prescribed human medications that are known to damage the liver. Both medications have recently been detected widely in aquatic environments, and it is possible that aquatic organisms may experience the same pharmacodynamic effects. The purpose of this project was to use histopathological and physiological markers to assess whether they cause hepatotoxicity in adult fish. Female fathead minnows were exposed to sublethal concentrations simvastatin alone or to a combination of simvastatin and acetaminophen via flow through water-borne exposure for 3, 6, or 9 days. Histopathology of the livers along with impacts on the hepatosomatic index and blood glucose levels were used to establish dose-dependent hepatotoxicity. Our data indicates that these compounds do in fact damage the liver of fathead minnows, and we discuss our findings with respect to potential impacts these kinds of pharmaceuticals could have on wild fish populations.

### **B.U.17 Microwave-Assisted Conventional and Green Synthesis of Curcumin**

Nicholas Lang

Mentor: Valeria A. Stepanova, Chemistry & Biochemistry

Curcumin is an organic molecule present in the *Curcuma longa* plant that has demonstrated many medicinal properties such as anti-cancer, anti-tumor, anti-inflammatory, antimicrobial, and much more (Fatima et al. 2008, Sundarananthavalli et al. 2011). The traditional industrial syntheses of curcumin and its analogs are limited by long reaction times at high temperatures. In this research, we describe our attempts to substitute energy sources in the conventional and green synthesis of curcumin and curcumin analogs from conventional heating to the microwave-heating. The resulting fast, efficient, and environmentally friendly syntheses from liquid and solid aldehyde starting materials are described. The approach consists of utilizing a Biotage Initiator+ microwave reactor to conduct reactions and a sonicator for product isolation. Results indicate a successful translation of conventional procedures to microwave-assisted syntheses. Further adaptation of microwave reactions to include a Mars 5 microwave reactor is initiated.

### **B.U.18 The Link between Masculinity and Intimate Partner Violence in Honor and Non-Honor States**

Mara Limbeck

Co-author: Bianca Basten

Mentor: Bianca Basten, Psychology

Although there have been significant changes to gender norms and expectations over time, many traditional gender expectations are still prevalent today. Men are taught to be dominant and display masculine traits from a young age. Research shows that masculinity is correlated with aggression and violent behavior. Additionally, men from honor cultures are even more likely to display signs of aggression and violence as a means of maintaining their reputation and the respect they feel they deserve. This study examined the link between masculinity and intimate partner violence in honor cultures compared to non-honor cultures in the United States. Participants were assessed on the Abbreviated Masculine Gender Role Stress Scale and the Revised Conflict Tactics Scales. It was predicted that men who scored higher on the masculinity scale would also score higher on the Revised Conflict Tactics Scales, which assesses intimate partner violence. Also, men from honor cultures were expected to score higher on both scales than men from non-honor cultures. These results could have implications for how we talk to young men about masculinity, and they may provide suggestions for how to reduce intimate partner violence.

### **B.U.19 Instructor and Student Perceptions of Titles**

Averi Linz  
Co-author: Nese Nasif  
Mentor: Nese Nasif, Marketing

The title by which a professor is recognized by their students and/or by which they ask their students to address them has implications for how they are perceived by students. Prior research has found that instructors who allowed students to address them by their first name were evaluated as more approachable and made students feel more valued (McDowell 2005), students had different expectations for instructors teaching the same course based on the instructor type and title (Kendall 2012), and students' perceptions of their instructors affected their interpersonal relationships (Ellis 2007). The current research looks specifically at how professors' use of titles, such as Doctor or Professor, affects students' perceptions of them. Using qualitative data collection and analysis techniques, emergent themes of student perceptions of their instructors who have positions of assistant professor, associate professor, or professor are evaluated. Social, institutional, and pedagogical implications are provided, as well as suggestions for future research.

### **B.U.20 Study of Microwave-Assisted Syntheses of Small Biologically Important Molecules**

Milena Maldwin  
Mentor: Valeria A. Stepanova, Chemistry & Biochemistry

Fischer esterification combines a carboxylic acid with an alcohol to create an ester. Traditional conventional synthesis of esters takes time or 30 minutes with heat as a catalyst (Birney, 1999). However, a microwave reactor can be used in place of the conventional synthesis to create an ester. A microwave reactor can increase product yields, reaction times, and decrease the number of unwanted side reactions (Kappe, 2009). The purpose of this research was to develop an undergraduate organic chemistry laboratory experiment to create esters in the microwave reactor via Fischer esterification. Combinations of alcohols and esters that can be synthesized in the microwave reactor have been discovered and used to create a procedure for students to follow. Student will be assigned an unknown carboxylic acid and alcohol to synthesize and identify an ester. By introducing this procedure to the organic chemistry laboratory, students will gain comparisons between conventional synthesis and microwave synthesis of esters. .

### **B.U.21 A Concise Synthetic Route to Lactone-Containing Natural Products**

Cassidy McCann and Shivani Kulkarni  
Mentor: Nicholas McGrath, Chemistry & Biochemistry

The purpose of conducting this research is to find a new synthetic method that permits access to structural mimics of biologically active compounds. This new method will then further be used to find lead compounds for additional screening. First, we will synthesize the sulfur-based carbanion and the R-Br (bromide derivative) needed to form the natural product. Then, we will initiate lactone formation. Eventually, we will also test other complicated R-Br groups to find the limitations of which R groups can be used with our method. To ensure that the compounds are pure, the product we desire is present and to determine the structure of the compound, we will use Thin-Layer Chromatography and H-NMR. The synthesis of biologically active natural products gives us an opportunity to make modifications that are not usually found in nature. While compounds are produced in a way that benefits the organism in nature, we can transform the structures in lab to mass-produce potential therapeutics.

### **B.U.22 Recovery of Virus-Like Particles from Human Parainfluenza Virus Type 3 Matrix Protein Mutants**

Michael McKelvey  
Co-author: Bria Theodore and Ethan Larsen, UWL alumnus  
Mentor: Michael Hoffman, Microbiology

The matrix (M) protein of the human parainfluenza virus type 3 (HPIV3) is critical to the assembly and release of viral particles from infected cells. This project's goal was to assess the efficacy of viruses containing M protein mutations to release from infected cells. From this, further studies can be conducted with the mutant viruses to better understand how the M protein interacts with other virus and cell components during a natural infection. The mutated M proteins

contain tags at the amino or carboxy termini of the protein. In previous studies, these mutations resulted in decreased formation of virus-like particles. Infectious clones for each M protein mutant were transfected into HeLa cells to recover virus particles. After three days of incubation, crude media, containing infectious cells and potentially viral particles, was passed to a monolayer of LLC cells. Three viral passages, each lasting three days, were completed before purifying virus particles by centrifugation. Two mutant viruses, those containing amino-terminal HA or Flag tags, seem to release low levels of virus particles, indicating that these tags severely, but not completely, restrict the function of the M protein. Two other mutant viruses, containing an M gene deletion or carboxy-terminal Flag tag, were not recoverable, thus those mutations must be more profound. Further characterization of the mutant viruses will be done to better understand the nature of the deficiency.

### **B.U.23 Livestock Management During the Early Bronze Age at Pecica Șanțul Mare: An Isotopic Analysis of Sheep Third Molars**

Glory Melotte

Mentor: Amy Nicodemus, Archaeology & Anthropology

Pecica Șanțul Mare is an important archaeological site residing in the Eastern Carpathian Basin of modern day Romania. The site was inhabited by the Maros people throughout the Early and Middle Bronze Age over which time it would become a major center of bronze metallurgy and horse rearing. Faunal assemblages recovered from the Early Bronze Age occupation of the site indicate a reliance on domesticated livestock, specifically sheep and goat, for subsistence. Although research has been done regarding the role of various livestock species in the diet of those who lived there, less is known about how those livestock were being managed. Through the use of intra-tooth sequential sampling of sheep third molars recovered from the site, stable carbon and oxygen isotope analysis of samples allowed for investigation into the potential use of transhumance as a seasonal management strategy for sheep as well as what types of plants were being used as foddering material.

### **B.U.24 The Effects of 5-km Outdoor versus Treadmill Running on Knee Femoral Cartilage and Medial Meniscus**

Hannah Meyer, Cheyanne Massie, and Leevi Hardin

Mentor: Naghmeh Gheidi, Exercise & Sport Science

Running is a popular form of exercise with a high risk of injury among all populations. 5-km is a common form of prolonged exercise resulting in extensive knee loading. The purpose of this study was to investigate the effects of 5-km outdoor versus treadmill running on knee femoral cartilage (FC) and medial meniscus (MM). Ten healthy runners with a 5 or higher in the Tegner activity scale, were instructed to run two 5-km trials in randomized order. One was inside on a treadmill at 1% incline and set at a predetermined pace. The other 5-km was completed outside on a predetermined route and runners were equipped with a GPS watch to track mileage and pace. Pre and post-run ultrasound images were taken on the FC and the MM using a Terason t3200 ultrasound system, in a randomized order. Pre and post-run images were analyzed using Image J software to examine compression from prolonged running. Medial, notch, and lateral FC thickness and FC area were measured. Similarly, MM area and MM height were also measured. Due to increased loading with distance running, it is important for athletes to be aware of the potential risk of knee injuries.

### **B.U.25 The Effects of Hamstring Flexibility on Countermovement Jump Performance in Those with and without History of ACL Reconstruction**

Maria Nelson and Allison Oster

Co-author: Naoko Giblin

Mentor: Naoko Giblin, Exercise & Sport Science

The purpose of this study was to investigate the differences in the correlation between lower extremity flexibility and countermovement jump (CMJ) performance, in those with and without a history of anterior cruciate ligament reconstruction (ACLR). We investigated this relationship by comparing the correlation between the static flexibility of the hip and knee joints and the functional performance of countermovement jumping, for the healthy population (n = 30) and the population with a history of ACLR (n = 13). An electronic goniometer was used to measure the passive range of motion (PROM) of hip flexion and knee extension. The CMJ performance was recorded using a 3D motion

capture system, by placing specific landmarks to track movement on the participant's lower extremities. 3D kinematic data and PROM data suggest a potential relationship between static flexibility and functional performance of the lower extremities, especially in those with a history of ACL-R.

#### **B.U.27 Study of Stability of Immature Red Blood Cells in Ground Squirrels**

Julianne Pekol, Erin Balthazor, and Matthew Vanselow  
Mentor: Scott Cooper, Biology

Thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*) will hibernate for about 6 months each year, or approximately 180 days. The normal lifespan of human red blood cells is about 100 days, at which point they become fragile and more prone to lyse. This suggests that ground squirrel red blood cells may be more resistant to storage. The stability of ground squirrel red blood cells was measured throughout their hibernation cycle. In order to investigate red blood cell stability, we measured hemoglobin levels released after red blood cells were stored in hypotonic solutions which would cause lysis in less stable cells (no saline, 0.9%, 0.75%, 0.6%, and 0.45%). When the data were analyzed, it showed that cold stored cells were the most stable. By studying the stability of mature red blood cells throughout hibernation, we could gain insight into the process by which the squirrels regulate oxygen transport. Currently, the process of storing blood is very fragile and has a short longevity; if this process can be replicated, there are possible human applications related to blood storage that would be very beneficial study of stability of immature red blood cells in ground squirrels.

#### **B.U.28 The Building of a Replica Viking Shield and Its Subsequent Weapons Testing. An Experimental Approach to an Archaeological Thesis**

Samuel Peterson  
Mentors: Constance Arzigian and David Anderson, Archaeology & Anthropology

The Viking Age started in the late 8th Century A.D. and lasted until the late 11th Century A.D. and it is a period where people from Scandinavia (Norway, Denmark, and Sweden) explored and raided much of Europe, and even stretched down to the Middle East and all the way over to North America. They have such a rich and unique history, and a large part of that history is that of their fierce warfare. This includes their weapons technology and we cannot talk about Viking weapons without talking about their shields. They are a very unique style of shield that have a relatively easy construction or at least appears to have an easy construction. This thesis breaks down the construction of a replica Viking shield and its subsequent testing against various weapons that the Vikings would have had. The objective of this thesis was to try to figure out just how these shields would have held up in combat. Through my testing, I've gained data to help support that these shields would have been extremely effective in combat and could take a lot of damage and even cause some damage.

#### **B.U.29 Acoustical Analysis of the Frederick Theatre**

Rachael Reis  
Mentor: Benjamin Golden, Theatre Arts

The purpose of this project is to identify the ways to improve the intelligibility of speech and recorded sound in the Frederick Theatre at the University of Wisconsin La Crosse. This includes using Rational Acoustics Smaart software to measure sound in the Frederick Theatre. A system of microphones with a flat frequency response and software were used to analyze acoustical properties of the room such as interference patterns, reverberation, equalization and coverage patterns. Using the information gathered, recommendations were made for alterations to the acoustic space of the Frederick Theatre as well as alterations to the electroacoustic system.

### **B.U.31 Systematic Disruption of the Nonpolar $\beta$ -Helix of Hemolysin A and its Site-Specific Effect on Protein Structure, Function, and Secretion**

Roman Schlimgen

Mentors: Daniel Grilley and Todd Weaver, Chemistry & Biochemistry

Gram-negative bacteria utilize a two-partner secretion (TPS) pathway to export disease causing virulence factors. This pathway is a member of the Type Vb secretion systems which are thought to utilize the energy of protein folding to accomplish secretion across the outer membrane. In the TPS pathway, the secreted protein (TpsA) is produced along with a specific outer membrane protein (TpsB), which uses POTRA domains to recognize nonpolar segments on the TpsA. In our current model, this recognition leads to transport and folding of the TpsA protein via a Brownian ratchet mechanism. Utilizing this TPS pathway, Hemolysin A (HpmA), a hemolytic protein from *Proteus mirabilis*, is able to cross the bacterial outer membrane. Utilizing a version of this protein, comprising a conserved TPS domain and truncated at position 265 (HpmA265), we can model secretion and folding. We have systematically replaced nonpolar amino acids with polar amino acids in the nonpolar  $\beta$ -helical core of the protein. Using CD spectroscopy and template assisted hemolytic activity (TAHA) assays of the polar variants, we can refine our model for HpmA265 to determine the driving mechanisms in the TPS pathway, down to an amino acid level.

### **B.U.32 Varying Cation Types Differentially Stabilizes Poly(dA:dT) DNA**

Thomas Schultz

Mentor: Daniel Grilley, Chemistry & Biochemistry

DNA is packaged by histone proteins into complexes called nucleosomes, which allow it to fit into a space one micron in diameter. Consecutive AA base steps (A-tracts) exclude nucleosomes. This A-tract nucleosome exclusion is biologically important as DNA not in nucleosomes is highly active in terms of gene expression and binding of transcription factors. All AA base steps are known to form a narrowed minor groove. This narrowed minor groove brings the negative charges of the phosphodiester backbone into closer proximity which is normally not favored due to repulsion. Our research is focused on the energetics of this narrowed minor groove with a focus on cationic salts as stabilizing agents. Using absorbance and circular dichroism, we show that the structure and stability of A-tract DNA is dependent on the size of the cations in solution. Using in vitro competitive reconstitutions, we show that the cation dependence of A-tract structure results in differential exclusion of A-tracts from nucleosomes. Our results show that A-tract structure, unlike generic sequence DNA, is sensitive to the type of cation that is present inside of cells, and that this sensitivity is important for understanding the packaging of DNA into nucleosomes.

### **B.U.33 Effect of Simulated Shift Work Schedules on the Triglyceride Content of *Drosophila***

Harry Soeder

Co-author: Alder Yu

Mentor: Alder Yu, Biology

Circadian Rhythms are biological processes in the body that vary predictably over the course of the day. In humans, long term disruption of circadian rhythms, as in individuals on shift work schedules, is correlated to an increased likelihood of obesity or type 2 diabetes. In order to better understand the relationship between circadian rhythms and metabolism, we are examining the relationship between shift work-like schedules and body composition in fruit flies. We initially hypothesized that flies raised on a schedule simulating shift work would have elevated body fat content compared to flies on a normal 12:12 light: dark cycle. Flies were raised on a simulated shift work schedule or a normal light:dark cycle for nine days and the triglyceride content was analyzed via a colorimetric assay. Surprisingly we found a trend toward decreased triglyceride content in the fruit flies kept on a simulated shift work schedule. To further investigate the role of the circadian clock in fruit fly metabolism, we repeated the experiments in fruit flies lacking a circadian clock. Preliminary results suggest that fruit flies lacking circadian clocks have similar body compositions under both normal and shift work cycles.

### **B.U.34 Standard-Based Assessment in a High School Geometry Classroom**

Atlanta Stanton

Co-author: Matthew Chedister

Mentor: Matthew Chedister, Mathematics & Statistics

Summative assessments in the mathematics classroom have been commonplace for many years. The purpose of our research was to find whether an alternative form of summative assessment was effective in demonstrating student understanding and identifying misconceptions. High school students were given a standard-based assessment in which they calculated the height of various objects in the school using two different methods of indirect measurement: the Mirror Method and the Ruler Method. The assessment was designed to provide the students an opportunity to demonstrate their understanding of similar triangles and indirect measurement. They were also being assessed on their ability to successfully model with mathematics. We then analyzed the results of the assessments and looked for trends in understanding and misconceptions. Overall, the students showed proficiency in the Mirror Method of indirect measurement and in using triangle similarity to calculate the measurements. However, there was a mixture of results in using the Ruler Method of indirect measurement, wherein some of the students were unable to identify the criterion needed to show triangle similarity and, as a result, were unsuccessful in calculating the measurements. We found that the standard-based assessment was therefore an effective way to measure student understanding and to identify misconceptions.

### **B.U.35 Neutral Hydrogen Shells in the Interstellar Medium**

Owen Thompson

Co-authors: Shauna Sallmen and E.J. Korpela, Space Sciences Lab, University of California at Berkeley

Mentor: Shauna Sallmen, Physics

The interstellar medium (ISM) is the gas and dust between stars. When stars die they push large amounts of gas into the surrounding ISM, which is eventually incorporated into new stars. This expanding gas creates neutral hydrogen walls forming a shell-like shape. This neutral hydrogen can be observed via 21-cm radio emission. Much is still unknown about how shells affect both the ISM and future star formation. Radio observations allow us to measure the location, apparent size, velocity, and shape of interstellar structures. These can be used to gain a better understanding of how such shells influence the ISM. Having a large sample of shells of all ages is necessary, but older catalogs typically don't include smaller shells or older, slowly expanding shells. A group at UWL is using new, more detailed radio survey data to identify previously unknown shells. I used the kvis software to search for and measure potential shells in the 21-cm GALFA-HI survey data. At the same time, I re-measured features discovered by a previous student to determine the uncertainty in these somewhat subjective visual measurements. I will present a comparison of the two sets of measurements and describe their level of consistency.

### **B.U.36 Understanding the Construction of Oneota Vessels through Experimental Archaeology**

Marina Tingblad

Mentors: Constance Arzigian, Archaeology & Anthropology, and Randy Reeves, Art

The Oneota were farmers living in La Crosse, across Wisconsin, and the surrounding states from 1300-1650 A.D. They are known for their sturdy, large, shell-tempered, and rounded bottomed vessels accented with various linear designs. Oneota vessels are upwards of 10 gallons--significantly larger than the previous Woodland culture's vessels. While earlier Woodland vessels have been successfully replicated, Oneota vessels have not been replicated using comparable clay and temper. Several possible construction methods were tested and compared to the archaeological record to learn about how the Oneota constructed their unique vessels. The most successful method was used to construct a replica Oneota vessel comparable in size and shape that can be used in future Oneota studies.

### **B.U.37 Big Ideas Club: A Philosophy Club for 4th and 5th Graders**

Brandon Tristano  
Co-author: Teri Holford  
Mentor: Teri Holford, Murphy Library

Using children's literature, primarily picture books, the researchers organized a one-week "Big Ideas Club" to teach Philosophy to 4th and 5th graders at Hamilton Elementary in La Crosse, Wisconsin. Through children's literature, the researchers, along with volunteers, were able to facilitate discussions centered around philosophical topics like ethics, philosophy of the mind, and the philosophy of language. The research used surveys to get an idea of the volunteers' educational philosophy and if they believe philosophy to be a part of it and important enough to be included in curriculum prior to High School. The club and lessons showed that young students have the capacity to engage in philosophical discussions but have little practice having academic conversations or experience answering questions with no "right" answer.

### **B.U.38 Stress in the Mandible of the Collared Peccary (*Pecari tajacu*) When Cracking Palm Seeds**

Cora Uidl  
Co-authors: Eric Snively  
Mentor: Eric Snively, Biology

The collared peccary (*Pecari tajacu*) cracks the nuts of palm seeds it finds on the rainforest floor. Adults will often crack seeds to scatter the flesh and allow the young to feed, so the ability to crack seeds is very important for the peccary. I tested the stress in the mandible of a collared peccary using a biomechanical model based on a CT scan. First using the program Avizo, I color coded bone in CT x-ray images to make a surface model and filled the surface with millions of pyramid-shaped elements to make what would function as a solid finite element engineering model for stress analysis. To the teeth of this model I applied the same force needed by the peccary to crack the toughest nut that it eats, added muscle attachments and bone material properties and ran the program in Strand7. The peccary's canine tusks brace the jaws while applying maximum force to the seeds. When this interlocking was simulated the stresses on the jaw were higher than expected, but the peccary cannot apply as much force without this bracing. The jaws did not experience potentially damaging stresses. Bite force is likely limited more by muscle and joint structure than bone strength. Since palm seeds provide the main food source for peccary and their young, the ability to crack seeds is crucial for a peccary's evolutionary fitness.

### **B.U.39 The Role of *Staphylococcus aureus* Global Regulatory Gene *agr* in Expression of Staphylococcal Superantigen-Like Protein**

Hannah Watkins  
Co-author: Daniel Brett, Microbiology and Molecular Genetics Department, Medical College of Wisconsin  
Mentor: William Schwan, Microbiology

*Staphylococcus aureus* is part of the body's normal flora, but possesses the mechanistic capabilities to compromise human health. Contributing to the microorganism's potent ability to cause disease is a group of staphylococcal superantigen-like proteins (SSL) that are described as aiding in host immune system evasion. The exact purpose of these toxins has yet to be identified—a critical piece of information that would lend an understanding to the evolution of the species as a major clinical threat. To determine what gene products may regulate SSL1 expression in *S. aureus*, an *agr* global regulatory mutant strain was compared to unmutated *S. aureus* cells. RN4220 (wild-type) and RN6911 (*agr* mutant) strains with an *ssl1* promoter:*lux* reporter system inserted into the chromosome were grown in brain heart infusion broth containing kanamycin. Luminescence was measured over a 24-h period for both strains. The *agr* mutant yielded greater luminescence compared to the wild-type strain, suggesting that Agr may affect *ssl1* expression.



#### **B.U.40 Apoptosis of Ground Squirrel and Human Platelets**

Shanna Weber, Amelia Thompson, and Emma Weber  
Mentor: Scott Cooper, Biology

Platelets, small cells found in the blood, are involved in blood clotting and can be used and stored for transfusions. Apoptosis, or programmed cell death, is triggered in platelets when stored in the cold. This reduces their lifespan and reduces the number of days they can be stored for transfusions. Apoptosis can be controlled through an intrinsic and an extrinsic pathway and is regulated by the BCL-2 family of proteins. When squirrels hibernate, their body temperature drops to 4-8°C, which should trigger apoptosis in the platelets. However, squirrel platelets have been shown to still be functional after hibernation and could be more resistant to apoptosis, leading to a longer life span. Assays were performed to measure levels of apoptosis through different proteins. Flow cytometry was performed to show levels of mitochondrial depolarization through a switch in fluorescence from green to blue. It was found that apoptosis is reduced in squirrel platelets, and is further reduced when they are stored at 4°C.

#### **B.U.41 Investigation into a Protein of Unknown Function from Two Related Cancer-Associated Herpesviruses**

Hannah Wheaton and Jaime Kloehn  
Mentor: Kelly Gorres, Chemistry & Biochemistry

The Kaposi's Sarcoma-Associated Herpesvirus (KSHV) is a gammaherpesvirus that can cause several types of infections and diseases within its host, including but not limited to Kaposi's sarcoma (KS), multicentric Castleman's disease (MCD), and primary effusion lymphoma (PEL). KSHV, like all Herpesviruses, has the ability to reproduce and cause infection in the active lytic phase, but also survive virtually undetected within a host during the inactive latent phase. The lytic and latency phases found within Kaposi's Sarcoma-Associated Herpesvirus can also be observed within the Murine Herpesvirus 68 (MHV68) found in mice. MHV68 is used as an experimental model for KSHV due to its close relation within the gammaherpesvirus subfamily. The protein of interest expressed similarly within KSHV and MHV68 is the ORF48 protein. Not much is known about this protein's structure or general function within these viruses. The ORF48 protein will be studied further by designing and optimizing a protocol to overexpress, purify, and isolate the protein from both KSHV and MHV. The end goal of this project will be to determine the protein's characteristics and function, specifically during the lytic phase of infection, from KSHV as well as a model organism, MHV68.

#### **B.U.42 The Effect of Body Weight Support, Velocity, and Incline on Ankle Joint Loading**

Ashley Woltmann, Susan Weiss, and Bryce Ertman  
Mentors: Naghmeh Gheidi, Exercise & Sport Science, and Thomas Kernozek, Health Professions

Due to the injury risk of running and its popularity, the antigravity treadmill has become an increasingly utilized rehabilitation device. The antigravity treadmill allows running at different weights, velocity and incline, but the interaction effect of these three factors has not been assessed previously. This experiment consisted of 18 randomized trials per subject which lasted approximately 15 seconds each. Three independent variables were tested including velocity (5, 7, or 9 mph), incline (0% or 10%), and bodyweight (20%, 50%, or 100%). It was hypothesized that these variables can alter the ankle loading (force on ankle joint). Healthy rear foot strike runners with at least five miles of running per week (Tegner activity level=5) were included. A high-speed Panasonic camera at 240Hz was used to record the subject's dominant side in the sagittal view. LED markers were placed at seven lower extremity landmarks. A Novel Pedar insole system was used to measure force at 120Hz. Ankle loading will be calculated by inverse dynamics using a customized program in MATLAB. The results of this study could help runners, physical therapists, and coaches to alter training to reduce overall ankle loading.

### **B.U.43 Effects of Nature and Forest Therapy Class Activities on Mindfulness, Nature Connection and Well-being Outcomes**

Maren Youngquist, Namyun Kil, and Stephanie Zukowski

Co-author: Emily Bartig

Mentor: Namyun Kil, Recreation Management & Therapeutic Recreation

The presenters will address whether a nature and forest therapy (NFT) course influences nature connection and place meanings for the students enrolled in such a course (Fall 2018), as conceptualized within specific psychological theories (e.g., stress reduction theory). Little research has examined whether beneficial outcomes are fostered by regular engagement in NFT activities over a period of time (i.e., ~three months). The professor of the NFT course introduced students to various NFT activities including sit-spot journals, nature drawings, tea ceremonies, and nature/forest therapy walks. Sit spot journals involve sitting alone in the same place in a natural setting for 30 minutes at a time for a series of seven days and reflecting on the experiences had during each time. Nature drawing consists of taking time in drawing a natural plant found in nature. Tea ceremonies were practiced in a natural environment where students thanked the forest for all it offers. The beneficial outcomes were measured twice: 1) at the beginning of the semester (i.e., pre-NFT exposure), and 2) at the end of the semester (i.e., post-NFT exposure). Results of paired samples t-tests ( $n = 11$ ) reveal substantial increases in nature connections, place dependence, place identity, place affection, nature bonding, and social bonding, indicating the importance of engagement in nature connection activities. Such outcomes are verified with many populations including individuals with special needs.

**Poster Session C**  
**The Bluffs: 12:00 pm-1:20 pm**

**C.U.1 Ability Groupings Effect on Students Achievement**

Abby Oudinot  
Mentor: J. Scott Baker, Educational Studies

Ability grouping is separating students in classrooms based on the level students test into. This article examines the effects on students due to school districts using the method of ability grouping. Data was collected through interviews with three college students who were each placed in different levels through their PK-12 schooling identifying as low, average, and high levels of ability. The students gave in-depth examples and reasonings as to why they support this or don't based on their experiences. The overall results from this show how ability grouping is negatively affecting student's achievement currently. Results offer that this lowers achievement, causes bullying, and forms limitations in schools.

**C.U.2 The Functional Role of Kaposi's Sarcoma-Associated Herpesvirus (KSHV)**

Jacob Auman  
Co-author: Kelly Gorres  
Mentor: Kelly Gorres, Chemistry & Biochemistry

Kaposi's Sarcoma-Associated Virus (KSHV) is an infection that is linked with the malignancy, Kaposi's Sarcoma (KS), which is common among individuals with untreated HIV-infection. The virus targets endothelial cells of lymphatic vessels and B cells, ultimately leading to an infiltration of inflammatory cells and abnormal neoangiogenesis. To further explore KSHV, we will study the enzyme Deoxyuridine 5-triphosphate nucleotidohydrolase (dUTPase) from the virus. There has been some research on the homologous protein in humans, other animals and viruses, but less is known about the protein in the KSHV virus. Through purification of this protein, we can develop a basis for analyzing and understanding its function in KSHV, with goals of using it towards cancer prevention someday.

**C.U.3 Microplastics in the Upper Mississippi River: Fact or Fiction?**

Courtney Baker  
Co-author: Eric Strauss  
Mentor: Eric Strauss, Biology

In a world that is constantly creating waste, water pollution is a concern for many. My project focuses on a specific form of water pollution: microplastics. These particles can pose a threat to aquatic ecosystems because they are not filtered out by wastewater treatment plants. They then can be consumed by wildlife or re-enter our drinking water, so it is important to determine whether or not this is a concern for riverine systems. In my project, I collected water samples upstream and downstream of the La Crosse Wastewater Treatment Plant's effluent tube that releases treated water into the Upper Mississippi River (UMR). Analysis of these samples for microplastics will confirm whether or not the treatment plant is a source of microplastics. I also collected samples from a backwater location on the river in order to compare concentrations of microplastics in different types of riverine ecosystems. I have found that microplastics are present in downstream, upstream, and backwater locations. Plastic fibers have been identified in the samples, which come from clothing material. Upon final sample analysis, I will be able to draw complete conclusions on the Wastewater Treatment Plant's role in contributing microplastics to the UMR. Finding microplastics in the UMR means that microplastics are in fact a problem here in the La Crosse area and could affect the aquatic species that reside in the river and the people living here.

#### **C.U.4 Research on the Relationship between Shift Work and DNA Repair Accuracy**

Anna Bower and Nathan Krueger  
Co-author: Alder Yu  
Mentor: Alder Yu, Biology

Shift workers have an elevated risk of cancer, and DNA misrepair is a potential influencing factor. *Drosophila melanogaster* is a good model organism to test whether disrupted circadian rhythms decrease the accuracy of repair of damaged DNA. We hypothesize that *Drosophila melanogaster* that are kept on an 8:8 light:dark cycle will have more extensive sequence changes during repair of DNA double-strand breaks than flies kept on a more typical 12:12 schedule. A transgenic line of flies expressing a restriction endonuclease was used to create double-strand breaks in fly chromosomes in all cells. These flies were raised on either 8:8 or 12:12 schedules. To recover individual double-strand break repair events for sequencing, we took advantage of the fact that each sperm cell in a male fly will harbor one unique double-strand break, and mated flies to produce individual progeny with the same repair event in all cells. Individual flies will be sequenced and the changes caused by double-strand break repair compared between the 8:8 and 12:12 flies. If we see an effect we can compare expression of DNA repair genes between the 8:8 and the 12:12 flies to see if there is a mechanistic difference. In the event that no difference is found, that would indicate that misrepair of DNA double-strand break would not necessarily be the main contributor to increased cancer rates in shift workers.

#### **C.U.5 Teachers' Attitudes: Disciplinary Action in the Education System**

Kylee Britton  
Mentors: Nicholas Bakken, Lisa Kruse, and Laurie Cooper Stoll, Sociology & Criminal Justice

The proposed study is a survey of La Crosse School District teachers to examine attitudes held by teachers regarding disciplinary action towards students. The survey will also ask experiential information and demographic information, and personal reactions on data-supported trends in the U.S. education system and La Crosse in particular. Dr. Lisa Kruse and Dr. Nicholas Bakken along with partners of the disproportionate minority contact (DMC) task force through the La Crosse criminal justice system found that much of the disproportionate contact for minority youth in the area takes place in and around the schools. The current body of research leaves room for exploration of teacher attitudes within the current patterns of disciplinary action in the schools.

#### **C.U.6 A 3D Look at the Specific Binding Site of NpmA to the Bacterial 30S Ribosome**

Carter Caya and Gaoying Vue  
Co-author: Ross Soens  
Mentor: Basudeb Bhattacharyya, Chemistry & Biochemistry

Roughly 33% of *E. coli* cases in the United States are resistant to one or more commonly used antibiotics. One of the culprits of this trend in antibiotic resistance is aminoglycoside-resistance. Aminoglycosides are a class of antibiotics that target the highly-conserved sequence and structure of bacterial ribosomes, thus interfering with necessary protein production. The plasmid-mediated aminoglycoside-resistance rRNA methyltransferase A (NpmA) in *E. coli* confers resistance to aminoglycoside antibiotics. NpmA modifies the drug binding site on the ribosome by binding specifically to the 30S ribosomal subunit helices h24, h27, h44, and h45 using linkers between beta-strands 2/3, 5/6, and 6/7. Once bound, NpmA methylates adenine 1408 on helix 44 of the 30S subunit using a S-adenosylmethionine (SAM) molecule. This methylation of the 30S subunit provides resistance to common aminoglycosides such as kanamycin. A three-dimensional model of NpmA has been assembled to exhibit its 30S ribosomal subunit specific binding site. With this model, we can help visualize this specific binding of NpmA with the hopes of generating novel inhibitors to combat aminoglycoside resistance.

### **C.U.7 Rare-Earth Thin Film Target Preparations and Techniques for (p,t) Reactions**

Leah Clark

Co-authors: Shelly Leshner, Physics Department, UW-La Crosse, Khachatur Manukyan, Physics Department, University of Notre Dame, and Ani Aprahamian, Physics Department, University of Notre Dame

Mentor: Shelly Leshner, Physics

Accelerator-based, low energy nuclear physics can provide great insight into the nuclear structure of nuclei. The search for  $0^+$  states in the rare-earth region via the (p,t) reaction has proven successful at the Maier-Leibnitz Laboratory (MLL) in Munich, Germany with the Q3D spectrometer; however, the ability to obtain the targets of interest are limited. At the University of Notre Dame, the lanthanides, Erbium-168, Dysprosium-162, Ytterbium-174, and Ytterbium-176, were experimented on to create the best thin film targets for this experiment. The preparation of thin targets is not always an easy task and requires consideration for each factor in the process, including carbon backing floating, powder mixing, pellet pressing, and evaporation. Because of the different reduction temperatures of lanthanides, a bell jar terminal evaporator and electron beam evaporator were used for the low and high temperatures, respectively. Similar target making techniques have been around for decades with few variations in the process; however, the challenge in this experiment was in the deposition of the high temperature lanthanides, and the overall trial and error process took many weeks. In time, the procedure worked and multiple targets for each isotope were created for the experiment in Germany. The different techniques, how the targets performed, and preliminary experimental results will be presented.

### **C.U.8 Gut Content Mass vs. Individual Body Mass: Is There a Predictable Relationship in Predatory Stream Fishes?**

Vanessa Czeszynski

Co-authors: Eric Strauss and Daniel McGarvey, VCU Life Sciences, Virginia Commonwealth University

Mentor: Eric Strauss, Biology

Gut contents have been used to understand feeding behavior and to predict trophic position across fish populations. Gut fullness has received less attention but may be an important indicator of bottom-up regulation. Metabolic theory predicts that the rate of consumption of energetic resources is a power-law function of body mass. Larger individuals have lower mass-specific metabolic rates that may allow them to eat less frequently or otherwise utilize energetic resources more efficiently. This fundamental relationship provides a potential mechanism to link the sizes of individual fishes and, by extension, population size to the availability of energetic resources. Using predatory fishes from three different streams located in Washington, Oregon, and California, we tested the hypothesis that gut fullness is a predictable function of body mass. Sampled fishes were frozen and returned to the lab, where gut contents were surgically extracted and weighed. Linear regression will be used to determine whether a power-law relationship exists between gut content mass and body mass, as predicted by metabolic theory. This relationship will also be compared across study sites to assess whether local environmental conditions influence this relationship.

### **C.U.9 Comparison of Current Egg-Based Gastric Emptying Protocol with SNMMI Practice Guideline Protocol**

Zachary Daniel

Co-authors: Carlyn Johnson, Abigail Grancorvitz, and John Dahlin, Marshfield Clinic

Mentors: Carlyn Johnson, Marshfield Clinic, and Aileen Stafforoni, Health Professions

After eating a meal, stomach acids and smooth muscle break down food which then travels from the stomach, into the small bowel and beyond. This process is called gastric emptying (GE). A Nuclear Medicine GE study is a non-invasive diagnostic procedure that examines the emptying process using an egg-based meal and radioactive tracer, technetium-99m sulfur colloid, added to the eggs before cooking. Using a gamma camera, images are taken at different time intervals and stomach emptying percentages are rendered for evaluation/clinical diagnosis. The clinical implications of the scan include delayed gastric emptying, or rapid dumping of stomach contents and may be accompanied by physiological symptoms, such as pain, nausea or loss of appetite. Our facility developed its own egg-based gastric emptying protocol decades ago, and in an effort to re-establish new reference values the decision was made to investigate the possibility of transitioning to the recommended Society of Nuclear Medicine & Molecular Imaging (SNMMI) protocol. The purpose of this study was to compare our facility's current egg-based gastric emptying protocol to those published in the SNMMI Procedure Guideline for Adult Solid-Meal Gastric-Emptying Study 3.0. Aspects, such as methods, results and conclusions will be presented during the poster session.

### **C.U.10 Effect of Instant Oatmeal Reconstitution Methods on Gastric Emptying Results**

Christian Erickson

Co-authors: Carlyn Johnson, Abigail Grancorvitz, and John Dahlin, Marshfield Clinic

Mentors: Carlyn Johnson, Marshfield Clinic, and Aileen Stafforoni, Health Professions

Instant oatmeal is a common alternative to an egg-based meal for solid-phase gastric emptying (GE) studies for patients that have an egg allergy. However, since no standard of preparation for the instant oatmeal has been established, including within our own department, clinical reliability is limited. The purpose of this study was to determine the most effective reconstitution method of instant oatmeal for GE studies in order to obtain results similar to the egg-based meal. Four healthy adult volunteers with normal gastric function were chosen to undergo GE scintigraphy. Participants ingested 99mTc-sulfur colloid (SC) radiolabeled instant oatmeal on two separate occasions varying only the oatmeal preparation method. Methods, results and conclusion will be displayed on the presentation poster.

### **C.U.11 Quantifying Persistence Length Using Distribution of Curvature**

Mason Faldet

Mentor: Taviare Hawkins, Physics

Microtubules, the largest filaments found the cytoskeleton of all animals, are responsible for both the transportation of motor proteins and chromosome separation. Quantifying and cataloging the physics of microtubules gives researchers a more complete understanding of the mobility and functionality of a cell. The persistence length is the best way to quantify the mechanical properties of microtubules. The persistence length, also known as flexural rigidity, quantifies the stiffness of a filament. The ability to tune microtubule mechanics has assisted in breakthroughs in cancer research as well as facilitate multitudes of potential treatment options. The schools of both biophysics and medicine will likely find research in the field of persistence length advantageous to their respective disciplines. In Dr. Hawkins lab microtubules are grown and imaged under a microscope. A computer program then processes the video and calculates the persistence length using the algorithm method known as Fourier Mode analysis. I intend to develop a rigorous complementary program that instead calculates the persistence length using the distribution of curvature. This will be achieved by programming an algorithm called the worm-like chain model in MATLAB. This additional program will be beneficial for Hawkins lab to cross check previous results. Distribution of curvature analysis also opens the door to develop new assays for observing microtubules in three dimensions.

### **C.U.12 U.S. Nuclear Strategy on North Korea**

David Alfonso Fernández

Mentor: Adam Van Liere, Political Science & Public Administration

Honors thesis: An investigation of the 2018-2019 U.S.-North Korean political negotiations on nuclear arms control using National Security Strategy (NSS) qualitative data concerning the scope and limits of cooperation and strategic policy-making on the basis of institutional mechanisms.

### **C.U.13 Using a Fluorescent Reporter to Measure Effects of Shift Work on DNA Repair in Drosophila**

Caleb Fitzmaurice and Tyler Jeschke

Co-author: Alder Yu

Mentor: Alder Yu, Biology

Many workers follow irregular work schedules that interfere with their sleep-wake cycle. Shift work involving exposure to light at night leads to circadian disruption. Long term shift work is associated with an increased risk of cancers, such as breast, colorectal, and prostate cancer. However, whether there is a direct link between circadian disruption and cancer risk is unclear. The objective of the current study is to determine if a light:dark schedule modeled after shift work schedules will alter the ability of fruit flies to repair damaged DNA. On a molecular level, flies and humans are very similar. If a simulated shift work schedule interferes with DNA repair in flies, that would indicate that the same could be true in humans. To compare DNA repair between flies on a normal 12:12 light:dark schedule and a shift work-like 8:8 light:dark schedule, we will use a system in which a DNA break is introduced in the middle of a

gene for a red fluorescent protein. If the break is repaired accurately by single-strand annealing it will restore gene function and the flies will fluoresce red. If the break is repaired inaccurately by non-homologous end joining the flies will not fluoresce. We will use this system to compare the ratio of accurate to inaccurate repair for flies on each schedule. If the results support the hypothesis, the *Drosophila* on a shift-work-like schedule will show increased inaccurate repair to damaged DNA.

#### **C.U.14 Epstein-Barr Virus Is Not Inhibited through GABA Signaling**

Cullen Gaffy  
Co-author: Kelly Gorres  
Mentor: Kelly Gorres, Chemistry & Biochemistry

The Epstein-Bar virus (EBV) is a herpesvirus, a virus that goes through inactive and active cycles, and is linked to lymphoma cancer. The antiepileptic medication valproic acid is known to prevent the lytic, or active, cycle of the virus. The way valproic acid prevents the lytic cycle of EBV is still unknown. To understand more about how valproic acid prevents the EBV lytic cycle, the neurotransmitter GABA was tested. GABA is known to affect a protein in cells, called GABA-T, that valproic acid is also hypothesized to interact with. To test the possible effects of GABA on the EBV lytic cycle, B-lymphocytes, a type of immune cell, infected with the EBV virus were treated with GABA. The cells were harvested and the expressed genes of the virus, mRNA, was extracted from the cells. The mRNA was used to measure the lytic cycle activation of EBV through a process called reverse transcription quantitative polymerase chain reaction, RT-qPCR, and lytic cycle activation was evaluated relative to the positive and null controls in each replicate. The resulting data showed no effects on the EBV lytic cycle by GABA. These findings suggest that valproic acid must inhibit EBV through another mechanism.

#### **C.U.15 Single Session Mindfulness Meditation Effects on Stress, Frontal Lobe Asymmetry, and Salivary Immunoglobulin-Alpha Production in a College Student Population**

Sam Gowan, Cullen Schull, Chelsa Schneider, and Colin Griffin  
Mentors: Michael Wong, Psychology, and Bernadette Taylor, Microbiology

Current research suggests mindfulness meditation has many health benefits, including enhancing immune function and reducing stress levels. To investigate the temporary effects of meditation on immune function and brain activity, we will be collecting saliva samples for immunoglobulin-Alpha (IgA) analysis via enzyme-linked immunosorbent assay and assessing right-left frontal cortical alpha-band (8-13 Hz) brain activity via electroencephalogram. Participants will be given an experimental treatment of a 20 minute mindfulness meditation session or a control session of a 20 minute audiobook. Samples will be taken prior to, immediately after, and one hour after intervention. We expect to see an increase in IgA quantity and greater left-relative-to-right brain asymmetrical activity after treatment. With this information of the relationship between immune function and mindfulness meditation, meditation could be implemented to improve the mental health of a college population.

#### **C.U.16 Novel Plasmid-mediated Aminoglycoside-resistance rRNA Methyltransferase A (NpmA)**

Julian Grosskopf, Bryton Foate, Paige Goethel, and Rachel Senft  
Co-authors: Basudeb Bhattacharyya and Margaret Franzen  
Mentors: Basudeb Bhattacharyya, Chemistry & Biochemistry, and Margaret Franzen, Center for BioMolecular Modeling, Milwaukee School of Engineering

The novel plasmid-mediated aminoglycoside-resistance rRNA methyltransferase A (NpmA) is used to confer bacterial resistance to aminoglycosides (antibiotics) that target the 30S ribosomal subunit. With the increasing number of antibiotic-resistant infectious strains, the study of antibiotic-resistant mechanisms becomes a necessity for the push against these organisms. NpmA recognizes adenosine 1408 (A1408), a member of the 30S subunit rRNA, and alters this site to act in masking it from aminoglycosides. Because NpmA modifies the aminoglycoside drug target, and not the drug itself, it confers class-wide resistance against these drugs. NpmA does this specifically by methylation at A1408, producing m1A1408 with the help of an S-adenosyl-L-methionine (SAM), bound in the class I methyltransferase SAM-binding fold. Conformational changes within NpmA after the binding of the SAM molecule allow the conformational “flipping” of A1408 away from its RNA double-helical structure and into the NpmA catalytic site. The orchestration of

this event brings many critical residues into symphony with one another, in most cases showing that a single missing residue compromises the catalytic activity of NpmA. The rRNA structure recognized by NpmA is heavily conserved, thus offering NpmA as a great model system to begin work with inhibitors targeting bacterial resistance mechanisms as unique as this.

#### **C.U.17 Expansion of the Synthetic Approach to Curcumin and Curcuminoids**

Andres Guerrero

Co-authors: Joshua Christensen, Joshua Cook, Kyle Wolmutt, and Valeria A. Stepanova

Mentor: Valeria A. Stepanova, Chemistry & Biochemistry

Curcumin and its analogous demonstrated anti-inflammatory, antioxidant, anti-bacterial, and chemotherapeutic biological properties. Current industrial synthesis is inefficient, limited, and not-environmentally friendly. To boost availability of curcuminoids and decrease their production cost new methodology is needed. Our study describes applicability of solvent-free protocols towards that objective. The resulting synthetic outcomes have been matched up with theoretical modeling of relevant compounds. Our findings indicate the mismatch between experimental and theoretical data. Potential explanation and impact of these results on reaction mechanism are provided. Our attempts towards the optimization of the methodologies are summarized.

#### **C.U.18 Learner Characteristics: The Effects of Internal Locus of Control and State Anxiety Levels on Training Outcomes**

Austin Haas

Mentor: Christa Kiersch, Management

The current study expands on previous training research to inform training practitioners' ways to impact training outcomes by influencing trainee mental states. More specifically, the objective of this experiment is to better understand the effect locus of control has on training outcomes, by studying state anxiety and motivation to learn as partial mediators. Although there have been a number of research studies examining the effect locus of control has on training outcomes (Tziner, Haccoun, and Kadish, 1991; Baumgartel et al. 1984; and Colquitt et al. 2000), the findings have been mixed. The current study seeks to understand why locus of control impacts training outcomes, by proposing that possessing an internal locus of control reduces state anxiety and increases training motivation. Participants are 55 employees from a local credit union who participated in a leadership development training session.

#### **C.U.19 Effects of Defendant Characteristics on Jury Verdicts**

Alexis Hofmann

Mentors: Katherine Kortenkamp and James Puckett, Psychology

The United States is often seen as a country that offers fair trials to all. However, there tend to be other factors that influence convictions and sentencing. Much of the research on the influence of defendant characteristics in trials have looked into the obvious variables of gender and race, but less research has examined the age of the defendant across the entire life span. In addition, little is known about how the effect of adverse childhood events, specifically witnessing drug and domestic abuse as a child, impacts an individual in the court system later on in life. This online study with 348 participants examined the effects of adverse childhood events as well as the age of the defendant on the length of sentencing recommended. The results showed that there was not a difference in the length of sentencing across age groups and adverse experiences. However, there was a significant difference in the amount of blame and responsibility placed on an individual with the groups experiencing adverse experiences receiving less blame and responsibility for their actions.



### **C.U.20 Analyzing the Effects of Unmet Modeling Conditions on Model Power**

Emily Hunsberger

Mentor: Barbara Bennie, Mathematics & Statistics

Randomized controlled trials, “trials where the subjects are randomly assigned a method or treatment that includes a placebo or control group and are measured before and after the method or treatment”, are a useful design to assess many types of treatments. We are comparing the effectiveness of five statistical methods for analyzing balanced randomized controlled trials when usual conditions are not satisfied, by observing the power of a method, or the probability of rejecting the claim that there is not a treatment effect. Usual conditions of these methods call for approximately symmetric or normal population distributions; however, we applied these with non-normal, skewed distributions and small data samples. We applied different levels of correlation between the pre-test and post-test scores to observe the effects of correlation and skewed data on the power of each method, as well as changing the variance of the control group. Using three parametric and two nonparametric methods, we ran simulations and calculated the power for each method within every skew, sample size, control group variance, and correlation combination. Trends among the power are that the average power increases as the sample size increases, increases as the correlation between the pre-test and post-test scores increase, decreases slightly as the population skewness increases, and decreases slightly as the variance of the control group increases.

### **C.U.21 Developing Temperature Gradient SPR to Quantify Single Nucleotide Variability in DNA**

Laura Kaiser

Co-authors: Rafael Rodriguez and Aric Opdahl

Mentor: Aric Opdahl, Chemistry & Biochemistry

We are developing temperature-gradient surface plasmon resonance (TG-SPR) spectroscopy as a tool to rapidly identify and quantify the abundance of specific single nucleotide variations (polymorphism, SNP) in DNA. Having advanced tools to quantify these single base variations is important for understanding how susceptible a person may be to a genetic based disease. To accomplish this objective, we are performing a set of competitive DNA hybridization experiments. In a competitive hybridization, two types of DNA strands that differ by as little as a single base (A,T,C,G) are given an opportunity to bind (hybridize) with a single type of DNA strand (probe) attached to an SPR sensor chip. Conventional SPR instruments are limited to analysis at a single temperature. Here we show how the application of a temperature gradient to the sensor surface provides detailed information about these competitive interactions. This is because the complete temperature dependences of binding kinetics and equilibrium are obtained in a single measurement.

### **C.U.22 Establishment of a Normal Reference Values for Radiolabeled Oatmeal Gastric-Emptying Studies and Comparison to an Egg-Based Radiolabeled Meal**

Abigail Kolbe

Co-authors: Carlyn Johnson, Abigail Grancorvitz, and John Dahlin, Marshfield Clinic

Mentors: Carlyn Johnson, Marshfield Clinic, and Aileen Stafforoni, Health Professions

Physicians will commonly order a nuclear medicine gastric emptying (GE) scan to determine if their patient has normal stomach function. This procedure is performed in hospitals throughout the world and is a non-invasive way to measure the stomach's function. The patient eats eggs that were cooked with a small amount (about 1 mL) of a radioactive substance (<sup>99m</sup>Tc-Sulfur Colloid) injected into them. This radioactive substance acts as a “tracer” to see how fast food empties from the patient's stomach. The radioactive tracer sends out gamma photons which are seen by a gamma camera detector, which then uses computer technology to create an image of the stomach. The ingestion of eggs for GE imaging isn't applicable for some patients due to allergy, intolerance, or personal preference. An alternative food used in Marshfield Medical Center Nuclear Medicine Department to do GE studies on patients who can't have eggs is oatmeal. However, there are no emptying standards established and little supporting literature published. The purpose of this study was to establish normal reference values for oatmeal GE studies in an effort to increase clinical correlation between institutions within the Marshfield Clinic Health System and to compare them to reference values for our egg-based meal. All methods, results, and conclusions, will be shared during this poster presentation.

### **C.U.23 Comparative Study of Museum Exhibits Cross-Culturally: The British Museum, Museum of London, and the Field Museum Compared**

Samantha Leicht-Ruskey

Mentors: Constance Arzigian and David Anderson, Archaeology & Anthropology

Museums are houses of artifacts, where visitors can congregate and learn about different cultures, particularly groups that are other than their own. In this paper, three different museums will be compared in how they represent cultures. These exhibits will be analyzed to see what the differences and similarities between the exhibits are and how they portray cultures. In order to do this, I spent time in the British Museum, the Museum of London, and the Field Museum to collect data on how culture material is presented. I took pictures of select exhibits and then categorized the artifacts into five themes: ritual/religious items, exotic items or items that are imported, items that are art, utilitarian objects that are decorated, and mundane or undecorated utilitarian items. I expect to find that the results of these exhibits will differ depending on what culture that is being portrayed in the exhibit and the relationship to the museum's history. These results are important because the way that cultures are represented will heavily influence the way that they are interpreted in the public's mind.

### **C.U.24 Testing Assumptions with Experimentation: A Comparative Analysis of Lithic Debitage from the Pammel Creek Site**

Kyle Lopata

Mentor: Constance Arzigian, Archaeology & Anthropology

Study of stone tools has long been a major focus of archaeology, but relatively little has been done to categorize stone artifacts by their method of reduction. This study seeks to create original lithic waste product in order to compare it to archaeological remains from the late prehistoric Oneota site of Pammel Creek in La Crosse, WI, which dates to the 15th century AD. The project used three major methods of stone tool creation, "hard hammer percussion, soft hammer percussion, and pressure flaking", to encompass the whole range of stone waste produced by this Native American group. These experimentally produced flakes were compared to archaeological samples from the Pammel Creek site using statistical methods. This data has the potential to explain much about Oneota habits of stone tool manufacture, and thus explain much about their economy and lifestyle.

### **C.U.25 Ceramic Sourcing and Pastoralism in Prehistoric Africa**

Avery McLain

Mentors: Kate Grillo, Anthropology Department, University of Florida, and Seth King, Physics

Pastoralism, a way of life based around the herding and management of livestock, has played a significant role in eastern Africa. It was influential in the transition from foraging to food production, and it has also been the main method of subsistence in the region for over three thousand years. However, despite its importance, not much is known about prehistoric pastoral groups. At Luxmanda, a recently discovered site in Tanzania, ceramic sherds from the Pastoral Neolithic period have been discovered; studying these sherds could lead to greater understanding about pastoral groups in eastern Africa. Using X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) to analyze the mineral and elemental compositions of the clay in the ceramic sherds gives information about whether the clay came from a single source or from multiple sources, depending on whether the compositions of the clays are similar or have differences between them. This information can be used to determine if the pastoral groups' pottery was all locally crafted or if they were either traded or brought along to different regions during migration.

### **C.U.26 Race and Space: Examining Racial Rhetoric, Self Belonging and Identity in Post-apartheid South Africa**

Kaitlin Meye

Mentor: Elizabeth Peacock, Archaeology & Anthropology

This research aims to explore the social environment in Cape Town, South Africa post-apartheid and examines how racial rhetoric from governmental policies, practices and laws from the apartheid era are still seen today in everyday

interactions among different socioeconomic or sociocultural groups. Apartheid is a policy of segregation on terms of race. Previous research has shown that the majority black South African population still receive immense amounts of discrimination in the social institutions of education, employment, inadequate housing, and etc. (Zelda 2013). While other research includes examining racism during apartheid, there is a lack of research on racism in post-apartheid South Africa, especially on the structural level. During the winter of 2019, I traveled to South Africa and observed social behavior among different sociocultural groups. I collected data for four weeks by participant observation and interviewed 10 individuals of varying identities and ethnicities. Results from the interviews found that individuals who identified as black, colored, or Afrikaan experienced social discrimination in various aspects. This is important because this population makes up over 85% of South Africa. This research shows that laws and practices from the apartheid era still trickle down into everyday life for black and Afrikaan South Africans, and effects their social mobility in a negative way

### **C.U.27 Mental Health of Teacher Candidates: Are Teacher Candidates Getting the Resources They Need to be Successful?**

Lauren Meyer and Hannah Guyette  
Mentor: J. Scott Baker, Educational Studies

Teacher Candidates (TCs) need to be prepared in their preservice classes for their future careers and the stresses associated with the job. Teacher Education programs also need to do a better job informing students of the mental health services available to them and to make sure that the school does everything they can to help their students succeed. Through two survey questions asked to a group of 74 current TCs, the researchers ask what topics related to teaching and education affect their mental health, and as a TC, if participants feel that there are enough resources provided to them regarding their mental health. It is important that TCs learn to take care of themselves and keep their mental health in check so that they can be successful in their future teaching careers. Many schools worry primarily about the well-being and mental health of young students, and overlook teacher and TC mental health.

### **C.U.28 GadX and GadW Promote *fliC* Transcription in Uropathogenic *Escherichia coli***

Abigail Multerer  
Co-authors: Nicole Kathamegos and William Schwan  
Mentor: William Schwan, Microbiology

Uropathogenic *Escherichia coli* (UPEC) cause urinary tract infections in humans by using flagella to move through the urogenital tract. Flagella are composed of monomeric subunits of FliC proteins, which are encoded by the *fliC* gene. UPEC also produce proteins tied to acid tolerance, including GadE, GadX, and GadW. These acid tolerance proteins allow UPEC to tolerate the acidic urine environment of humans. In this study, we examined the effect of *gadX* and *gadW* mutants on *fliC* transcription. UPEC strains with mutations in the *gadX*, *gadW*, or *gadXW* genes were transformed with a single copy number plasmid containing a *fliC-lux* fusion (pNK2-29). All three strains, as well as the wild type strain, were grown overnight in Luria Broth set at pH 7.0 and  $\beta$ -galactosidase assays were performed. The results of the  $\beta$ -galactosidase assays showed that the three mutants had half the  $\beta$ -galactosidase activity in comparison to the wild type strain. This data leads to the conclusion that GadX and GadW are partially responsible in activating *fliC* transcription, but are not essential to *fliC* transcription as partial  $\beta$ -galactosidase activity was conserved when *gadX*, *gadW*, and *gadXW* were mutated.

### **C.U.30 Optimal Control and Longevity of Treatment in a Seasonal Model of Swimmer's Itch**

Jordan Pellett  
Co-authors: James Peirce and Gregory Sandland  
Mentor: James Peirce, Mathematics & Statistics, and Gregory Sandland, Biology

Swimmer's itch is an emerging disease caused by flatworm parasites that use water birds as definitive hosts and aquatic snails as intermediate hosts. When parasite larvae mistakenly penetrate human skin, they initiate an inflammatory skin reaction leading to intense itching and discomfort. While swimmer's itch has plagued Midwestern lakes for decades, a recent rise in the global occurrence and its subsequent impact on recreational activities has increased the interest in implementing effective control regimes. However, optimal control strategies may change depending on the costs

associated with treatment and the targeted reduction in human swimmer's itch cases. We have derived a sequence describing the prevalence of infected bird hosts in the years after treatment. The sequence increases asymptotically towards the initial prevalence providing a method for recommending the time to the next optimal treatment. Here, we share the results of our investigation into the longevity of treatment when various optimal control strategies are applied to a mathematical model of swimmer's itch.

### **C.U.31 Omega-3 Fatty Acids Modify the Learning and Performance of a Balancing Motor Skill in Healthy Young Adults**

Benjamin Ringham, Matthew Waldrop, and Brady McCormick  
Mentor: Attila Kovacs, Exercise & Sport Science, and Margaret Maher, Biology

Every moment of our lives is composed of calculated muscular movements that allow us to move through the physical world. A motor skill is a learned ability to cause a predetermined movement outcome with maximum certainty. When learning a motor skill, the nervous system works to create more efficient neural pathways to accomplish that task. The omega-3 fatty acid, docosahexaenoic acid (DHA), is a major fatty acid in the brain and a structural component of neuronal membranes. It's been reported that omega-3 fatty acids may play a role in nervous system activity and that they improve memory-related learning, improve cognitive development, increase neuroplasticity of nerve membranes, and aid in synaptic transmission. In this study, omega-3 fatty acids were supplemented by UWL students for 35 days. After supplementation, the students learned a balancing motor skill and their data was compared to a placebo. We hypothesize that supplementation of omega-3 fatty acids (with DHA) improves the learning and performance of a balancing motor skill in young adults (ages 18<30).

### **C.U.32 Structural Properties and Enzymatic Activity of dUTPase from Epstein-Barr Virus**

Alexander Robbins  
Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein-Barr Virus (EBV), which causes infectious Mononucleosis, contributes to many diseases such as autoimmune disorders, lymphomas, and other cancers. The target of this research is a protein encoded by the viral genome. The protein, dUTPase, an enzyme encoded by EBV catalyzes the reaction of  $dUTP + H_2O \rightarrow dUMP + PP_i + H^+$ . This reaction is an intermediate in the formation of the thymidine nucleotide. The availability of thymidine is critical for cellular survival. Characterization of the critical components of the EBV dUTPase may facilitate the discovery of molecules which bind as inhibitors. Inhibition of dUTPase decreases the formation of thymidine nucleotides creating a high dUTP/dTTP ratio. In place of thymidine uracil becomes incorporated into DNA which causes mutations that are detrimental to cell survival. Selectively inhibiting the dUTPase from Epstein-Barr Virus provides a mechanism to target cells infected with the virus without damaging uninfected cells. Our results demonstrate the importance of a metal cofactor for activity of the EBV dUTPase. The role of active site residues in substrate binding and the catalysis of dUTP to dUMP is being examined by site-directed mutagenesis to better understand possible inhibitor binding sites.

### **C.U.33 Mental Health: Preservice Teachers Voicing Their Effects from Traumatic Events**

Zoe Sasman  
Mentor: J. Scott Baker, Educational Studies

This article examines preservice teachers' knowledge about advocating for students who have been impacted by a traumatic event through sharing their own personal stories about the effects they encountered from traumatic events. Using an online Qualtrics survey addressing traumatic events, preservice teachers answered with personal stories by explaining the effects they experienced and acknowledged their experiences to help advocate for their students in their classrooms. The responses I received expressed strong emotions which guided me to share their stories through poetic inquiry. Poetry allowed participants to uniquely express their traumatic event experiences, the things in their lives that suffered because of traumatic events, the effects from the traumatic event(s), and the help participants felt was needed. This article gives preservice teachers an opportunity to share their voices and contribute to the conversation of the importance of being informed about mental health; specifically, traumatic event effects.

### **C.U.34 Examining the Community Supported Agriculture Program of an Organic Farm**

Olivia Schauls

Mentor: Christine Hippert, Archaeology & Anthropology

Why do people become members of CSAs? The Old Oak Family Farm is a certified organic farm located in Bangor, Wisconsin. They are known for their organic vegetables, herbs, and plants. The farm uses the alternative food way of Community Supported Agriculture, or CSA, to distribute their product to their customers. CSA is a program where customers receive boxes filled with organic vegetables, herbs, plants to plant in their gardens, and a newsletter describing the products in their box, along with fun recipes to try. In the past, the products that were put into the boxes were chosen by the farm. This year that changed to the customers choosing specifically what goes into their box. By observing the CSA food program this year, I examined how the food is grown and distributed to the customers, the aspects that go into choosing to eat locally grown food, and what model, the new or old, aligned better with members reasons for joining a CSA.

### **C.U.35 Site-specific Mutations of a Putative Transcriptional Regulator Change Biofilm Formation in *Staphylococcus aureus***

Lillian Schulte

Co-author: Allison Zank

Mentor: William Schwan, Microbiology

*Staphylococcus aureus* causes thousands of biofilm-associated infections in the United States each year. A complete understanding of what regulates biofilm formation in *S. aureus* is important. We have identified a putative two-component system named MW2284/MW2285 that may be involved in regulating biofilm formation in *S. aureus*. The MW2284 protein is thought to be the transcriptional regulator for the two-component system. Site-directed mutagenesis of the MW2284 gene was done to ascertain which amino acids on the MW2284 protein may be involved in regulating the sortase A gene (*srtA*), an amino whose gene product is involved in the first phase of biofilm formation. An amino acid substitution of aspartic acid (D) to asparagine (N) at the 59<sup>th</sup> position caused a decrease in the ability of *S. aureus* to form a biofilm, additionally, substitutions of D to N at the 26<sup>th</sup> position and N to Valine (V) at the 56<sup>th</sup> position caused an increase in biofilm formation, whereas a D to N substitution at the 127<sup>th</sup> position had caused no change in biofilm formation. Our data suggests that mutations in the DNA binding region of the MW2284 protein have a significant effect on biofilm formation.

### **C.U.36 Individual-specific Tibia Stresses in Female Athletes**

Leah Schwartz, Talia Tripp, and Tiana Carlson

Mentors: Eric Snively, Biology

This project investigates the stresses of standing and running on the tibia (the large lower leg bone) in female athletes. Research was focused specifically on forces related to sprinting motion in female collegiate athletes, with the objective being to determine how muscle forces applied to the tibia throughout the sprinting motion cause stress in the bone. As a proof of concept, we simulated stresses of standing and the contribution of several muscles to stresses in a fast run. A CT scan of a female tibia was obtained and models were created in the programs Mimics and Avizo, then scaled to the self-reported tibia length and width of eleven female collegiate sprinters. Standing weight force and muscle forces simulating a sprinting position were applied to each of the replicates using the finite element engineering program Strand7. The results were then examined, specifically noting how stress amount and distribution was different according to different tibia dimensions. Smaller, more slender tibiae had greater stresses than the tibiae of larger individuals. It is hoped that this study may shed light on ways to alter gait and stride to reduce stress on the tibia and therefore prevent or reduce injury, especially shin splints that are common in female sprinters. Additionally, this study may provide insight about how these adjustments should differ for tibiae of varying sizes.

### **C.U.37 White Pre-Service Teacher Perceptions of the Black-White Student Achievement Gap**

Brandon Tristano

Mentor: Ann Yehle, Educational Studies

This research study used in-depth interviews and surveys to examine what the perceptions white pre-service teachers hold towards the black-white student achievement gap. What they believe to be the causes and possible solutions are to the gap. In total there were eight interviews done with white pre-service teachers participating in a summer program organized by the Center for Urban Teaching (CfUT) based in Milwaukee, Wisconsin. The researcher focused specifically on schools that were majority-minority schools and low-income. The researcher gained information on their K-12 experience and undergraduate experience. Overall, the researcher found that the CfUT summer program experience provided the pre-service teachers with the confidence to run a classroom and the passion to teach in a low-income urban setting. They believed CfUT provided them knowledge that their undergraduate experience did not. The interviews also showed that their knowledge of the achievement gap was limited.

### **C.U.38 Experimental Exploration of the Optoelectronic Properties of ZnO Polycrystalline Thin Films**

Trenten Smith, Samuel Haeuser, and Alexander Condon

Mentor: Eric Gansen, Physics

Zinc oxide is a wide-bandgap semiconductor material of growing interest for its optoelectronic properties. Exhibiting a bandgap in the ultraviolet (UV) region, ZnO is a promising material for use in short-wave optoelectronic devices like electrically and optically controlled modulators (ECMs and OCMs). These devices are constructed by alternating thin layers of two materials with different bandgap energies creating a semiconductor multiple-quantum-well (MQW) structure. ECMs utilize the quantum-confined Stark effect (QCSE) where the absorption of the MQW is altered by an applied DC electric field. OCMs use a strong pump pulse to modulate the transmission of a weaker probe pulse through band-filling effects. By coding information on a light beam, ECMs and OCMs are useful for optical communication and data storage. We have been studying the optoelectrical properties of polycrystalline ZnO thin films grown by DC sputter deposition as a first step to developing short-wave ECMs and OCMs. We will discuss the results of our research on sputter-grown ZnO structures where we have investigated how the structural composition, temperature, and the application of applied DC fields influence the absorption spectra of the structures. We will also discuss the results of pump-probe transmission experiments that are used to track the dynamics of optically excited electrons in the ZnO films and may lead to the development of ZnO-based OCMs.

### **C.U.39 Structure Guided Functional Studies of a Lipoprotein Involved in Salmonella Copper Homeostasis**

Ross Soens

Mentors: John May and Basudeb Bhattacharyya, Chemistry & Biochemistry

Cells from aerobic organisms require copper ions to generate biochemical energy and for certain enzyme-catalyzed redox reactions. However, recent studies suggest that when bacteria are engulfed by phagosomes within macrophages, Cu<sup>2+</sup> is used in high concentrations, among other molecules, to kill the bacterium. To infect a host, bacteria must survive this toxic environment. A recently discovered protein of unknown function, DcrB, plays a role in copper homeostasis within *Salmonella enterica*, a major cause of food-borne illness. Currently, *Salmonella* phenotypic assays have shown DcrB is necessary for growth in high levels of Cu<sup>2+</sup>. The hypothesis of this project is that DcrB binds copper and possibly other divalent cations. To test this, we are using our recent crystallographic structure of DcrB to identify possible metal ion binding sites that might necessary to confer resistance to Cu<sup>2+</sup>. For each site, we used site-directed mutagenesis to generate an allele of *dcrB* that encodes a DcrB variant lacking the functional side-chains at the site. Then, we determined whether a multicopy plasmid that contains the mutant allele of *dcrB* can complement the copper sensitivity of a *dcrB* knockout mutant of *Salmonella enterica*. Our results led to the identification of potential metal binding sites, which we anticipate will shed light on the role of DcrB in metal homeostasis in pathogenic bacteria.

#### **C.U.40 Determination and Analysis of Protein Kinetics of Hemolysin A**

Lucas Spellman

Mentor: Daniel Grilley, Chemistry & Biochemistry

HpmA is a gram-negative bacteria whose function is to lyse, which means pop or break, red blood cells. This protein is secreted outside of its cell and into extracellular space through a Two Partner Secretion (TPS) mechanism. This TPS mechanism is generally conserved throughout many gram-negative bacteria so there is hope that learning about this mechanism will give insight on proteins that secrete similarly, despite that they may have a different function. This TPS process is very important due to the fact that it folds HpmA and allows it to secrete into the host and perform lysis. The scope of this project is to determine which of our current models for this mechanism is most probable, quantify how fast HpmA folds and also how fast this protein lyses red blood cells. Beyond this, this project will look to compare variations to both the template and HpmA in order to determine which sites are important for HpmA to fold and why.

#### **C.U.41 Screening for Drug-Like Inhibitors of Salmonella Virulence**

Michaela Thielen

Co-author: John May

Mentor: John May, Chemistry & Biochemistry

In the United States alone drug resistant *Salmonella enterica* causes 1.2 million food-borne stomach illnesses, 23,000 hospitalizations, and 450 deaths annually. Because *Salmonella* is a gram-negative bacterium, it is particularly good at surviving in harsh environments such as the human stomach and intestines. *Salmonella*'s ability to cause such successful infection is due to the activation of genes necessary to cause disease such as the PhoP/PhoQ system. The goal of my research project is to discover a new drug-like small molecule that prohibits PhoP from turning on *Salmonella* virulence. I have looked at stressors that mimic those that *Salmonella* would encounter during an infection with additive affects from molecules such as polymyxin B. Polymyxin B is a last resort antibiotic commonly used in topical antibiotic ointments and is similar to antibacterial compounds produced by our immune system. Preventing *Salmonella*'s ability to resist toxic conditions is a promising way to develop new antibiotics to treat infections. In this research project, I have found new drug-like compounds that prevent *Salmonella* from resisting polymyxin B. My research could lead to new antibiotic drug options to treat *Salmonella* and other infectious bacteria.

#### **C.U.42 Measuring Circadian Gene Expression in Drosophila Adipose Tissue**

Tevin Trinh

Co-author: Alder Yu

Mentor: Alder Yu, Biology

Circadian rhythms are patterns in living organisms that repeat on a daily basis, driven by an internal pacemaker. One circadian rhythm is daily variation in gene activation or "gene cycling". We are specifically interested in identifying cycling genes in adipose tissue, with the goal of understanding how gene cycling contributes to metabolic health. Previous research used a genome-wide technique to identify potentially cycling genes in fat tissue of *Drosophila melanogaster*, the fruit fly. This technique is broad, but imprecise. The goal of this project is to confirm these findings by a more reliable technique, quantitative reverse transcriptase PCR (qRT-PCR). We focused on three candidate genes: IM2, CG43114, and CG15861. IM2 is involved in immunity. CG43114 is a potentially secreted gene of unknown function. CG15861 is a gene of interest regarding neurodegeneration. We have validated PCR protocols for these genes and are in the process of measuring daily rhythms in their expression. The findings from this research will be a step towards understanding whether these genes cycle in response to signals from fat cells, or signals from other cell types.

#### **C.U.43 Trepanation with Obsidian Tools in the Ancient Andes: Comparing Cross-Hatch and Scraping Methods Using Experimental Archaeology**

Hannah Van Genderen

Mentors: Amy Nicodemus and Timothy McAndrews, Archaeology & Anthropology

For thousands of years, humans have been removing portions of the skull by scraping, drilling, and cutting. The intent behind this procedure, known as trepanation, has been hypothesized to include: surgery in relation to existing cranial trauma, treatment for mental health, a cure for seizures, and even attempts to achieve a state of elevated consciousness. In the ancient Andes of Peru, Bolivia, and Ecuador, trepanation occurred frequently, and often resulted in the individual healing from the procedure, at times receiving multiple trepanations within their lifetime. This is in dramatic contrast to the trepanations that would occur in Europe, that often led to immediate death in the trepanned. Two methods known as the “cross-hatched” and “scraping” methods were commonly used in the Ancient Andes for trepanation. This study compares the two methods using both an analysis of burial contexts and experimental archaeology to replicate them both on a comparable animal skull. The goal of this study is to determine possible tradeoffs between the methods and compare those results with what is seen in the archaeological record.

#### **C.U.44 Student Athletes' Perception of Value and Effectiveness of Sport Psychology Services as Influenced by the Practitioners' Training and Gender: A Qualitative Approach**

Danielle Vetsch

Co-authors: Alessandro Quartiroli and Zachary Biehn

Mentor: Alessandro Quartiroli, Psychology

This study was developed to analyze the perceived effectiveness of Sport Psychology professionals primarily by DIII athletes through a qualitative approach, focusing on influence of gender, training, and ethnicity. A series of mock interviews were conducted before interviewing participants. Participant interviews were, on average, about 10 minutes and consisted of open-ended questions pertinent to the topic. Interview transcripts were then analyzed using thematic analysis to determine athletes' perception of main characteristics leading them to choose or not choose to use a Sport Psychologist as a part of their collegiate sport performance. Due to the small sample size among other factors, further research is needed to determine if findings are applicable to a more diverse pool of athletes.

#### **C.U.45 Metal, from Prestige to Utilitarian: An Analysis of Butchery Marks during the Bronze Age Occupation of Pecica Șanțul Mare, Romania**

Sandra Weiss

Mentors: Amy Nicodemus and Constance Arzgian, Archaeology & Anthropology

The Copper and Bronze Ages (c. 3000-700 BC) in Europe were transformative times in human history. The use of metal was key to advancements in war and marking status; initially, however access was restricted and controlled by elites. By the Late Bronze Age (1200-700 BC) metal was widely used for utilitarian purposes and available to the general population. Archaeologists do not yet have a detailed understanding of how and when metal changed from being a nearly exclusive item, to an everyday raw material widely available. Due to its value, metal was not discarded in everyday contexts and common tools are rarely recovered. Therefore, to research this transitional period I identified metal's use indirectly by further analyzing the faunal materials at Pecica Șanțul Mare, Romania. I expect that with the increased availability of copper to the general population over the Copper and Early Bronze Age that it would be used for increasingly utilitarian tasks. (i.e. butchery) Specifically, I conducted experimental archaeology to assist in identifying differences in the form of cut-mark characteristics of specific raw materials (copper or obsidian), then analyzed the cut-mark profile seen on the archaeological ones to identify the implements, and developed a timeline covering this transition.



#### **C.U.46 Creating a Social Development Index for Use in Equitable Planning**

Maxwell Molls

Mentor: Gargi Chaudhuri, Geography & Earth Science

This project aims to develop a social deprivation index (SDI), which is a measure of material deprivation in a geographic area. An SDI can be used to identify areas defined by socioeconomic marginalization and poor access to services (Cabrera-Barona, et al., 2016). The purpose of developing a social deprivation index is to assist in evidence-based, socially equitable, planning. While there are examples of using a social deprivation indexes in large metropolitan areas, and in places outside the United States, there is an opportunity to explore its use in less populous regions locally. This study uses the La Crosse metropolitan area as a model. Variables are collected from American Community Survey data and the Integrated Public Use Microdata Series at census tract level, as it is the smallest areal unit available. After these variables are pre-processed, they are first used to create individual choropleth maps. Then the chosen variables are combined into the social deprivation index after proper normalization and standardization. The SDI is grouped into deciles, with least disadvantaged groups occupying the top 10% and most disadvantaged groups the lowest 10%. Results of the SDI are compared with walking distance from grocery stores to show any correlation between socially deprived areas and poor access to fresh foods. This strategy is one that could be used to plan cities with less social deprivation by targeting deprived areas with public transportation access or encourage business development.

## UNDERGRADUATE ORAL PRESENTATION ABSTRACTS

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### **O.U.9 The Utilization and Impacts of Warm-Hand-Offs, Shared Care, and Phone Consultations during Integrated Behavioral Health Care Visits**

Mattie Krause

Co-authors: Catherine Schuman and Karen Haville, Gundersen Health

Mentor: Catherine Schuman, Gundersen Health

The focus of this retrospective study was to look at the ways integrated behavioral health specialists in primary care departments are being utilized and the treatments they can provide for patients. This innovative model of behavioral health care was integrated into primary care departments at Gundersen Health System at their La Crosse and Onalaska campuses, as well as multiple Minnesota regional sites starting in 2016. The purpose of having behavioral health professionals in the clinics is to increase the chances of patients receiving mental health care while decreasing the wait list time. This program structure is a relatively new model starting to be used across the country and is a part of the quadruple aim of integrated health care which includes improving the experience of care for patients and their health outcomes, the long-term health of populations, the financial cost/benefits, and decreasing provider burn out. Over 3000 behavioral health consultations were reviewed to find the primary reasons providers are referring patients to see a behavioral specialist and to find the most common treatments utilized for those patients. Where those patients are being referred to for follow up care was also recorded.

### **O.U.14 At Home Genetic Tests and Their Psychosocial Effects**

Nathaniel Conley

Mentor: Dawn Norris, Sociology & Criminal Justice

The primary focus of this project is to examine how Direct to Consumer (DTC) genetic testing relates to a person's sense of identity. Two main components from a genetic test are the data received about ancestry and genetic markers for inheritable diseases. Coding of in-depth interviews conducted with people who have completed an at-home genetic test in the past three years reveal two patterns: 1) the experience of conflict between biological and social aspects of identity; and 2) concerns about privacy and how genetic information may be used by others. Study results may be used by genetic counselors to better identify and address patients' needs, and to give sociologists insight into how genealogy plays a role in identity development.

### **O.U.15 Gender Identity in the Language Classroom: The Central Role of Salient Identities in Multicultural Education and Mentorship**

Mary Franitza

Mentor: Omar Granados, Global Cultures & Languages

Gender plays an active role in an educational environment, impacting the education one receives and how an instructor presents information. Research states that women in the classroom receive less one-on-one attention, participate less, and in language courses are encouraged to learn domestic vocabulary in lieu of inclusive professional vocabulary. That is to say, inherent gender biases that instructors hold manifest in teaching patterns which tend to favor inherent gender biases as means of categorizing and introducing vocabulary of interest. Additionally, identity of an instructor and internal biases as they may present themselves in construction conduct themselves as hindrances to academic accessibility for students. A comparative observational study will be conducted using the University of Houston's Spanish Heritage Language program and the Spanish language program at Arcadia High School. The conclusions drawn will be discussed in the context of how language instruction addresses gender differences in the classroom, similar-identity mentoring, and faculty inclusivity. This study aims at a better understanding of successful and inclusive language programs for heritage speakers of Spanish, a solid assessment of the needs of Latina students in local Western Wisconsin area high school language courses. Hopefully, the research contributes to a better-informed heritage language program currently under construction at UW-La Crosse.

### **O.U.17 Predator-Predator Interactions? Are Gray Wolves (*Canis lupus*) Affecting the Spatial Distribution of Mesopredators in Central Wisconsin?**

Erynn McNeill  
Co-author: Meredith Thomsen  
Mentor: Meredith Thomsen, Biology

Since the recolonization of gray wolves (*Canis lupus*) into Wisconsin's central forest little research has been done to look at how they have been affecting the abundance and distribution of predator species such as coyotes, foxes, and bobcat through competition for limiting resources. There have been numerous studies conducted on the relationship between these canid species, while most predict a trophic cascade where wolves suppress coyotes in turn leading to an increase in fox abundance, others suggest that coyotes may benefit from living in wolf territories by scavenging off wolf kills. In full, research indicates that the impacts of wolves on coyotes and foxes is context dependent. Additionally, very little research discusses how wolves may affect bobcats. The Black River State Forest provides an opportunity to examine the effect of wolves on all three mesopredators in sympatry. This study monitors the occurrence of each species with trail cameras placed within two variables consisting of high wolf activity and low wolf activity areas. While the study will continue through late spring of 2019, preliminary results suggest a lower occurrence of coyotes and a higher occurrence of bobcats in high wolf activity areas whereas the occurrence of foxes is currently unclear. This project hopes to contribute to the ongoing ecological debate about the nature of apex and mesopredator interactions by testing current hypotheses in an environment which has not previously been studied.

### **O.U.19 Transcorporeality and Eco-theory: A New Understanding of the Body**

Mari Sweetman  
Mentors: Kimberly DeFazio and Susan Crutchfield, English

What is a body? Is it a mind, a soul, a physical form? The limits of the body are difficult to define. Experiences physical, mental, and emotional form a complex sensory existence, muddling what we understand to be a part of us. These are important to examine, for so much of what we do not only impacts us but all that is around us. Transcorporeality, a theory in which the body does not end with the physical or mental self but extends beyond, can help us grapple with this. In transcorporeality, the body becomes porous, ending not with the physical or mental, but with the actions, thoughts, feelings, and impacts of one's actions. In this beings (both human and nonhuman) and matter are intermeshed within a web of consciousness and existence beyond human-centric thought. In response to a world damaged by this human-centric thought and action (i.e., human-driven climate change), I am compelled by the possibilities that an understanding of transcorporeality could bring to human understanding of human and nonhuman bodies, and the environment. In my oral presentation, I will address the connectedness between transcorporeality and the environment in through an exploration of both theoretical texts (including Alaimo, Barad, and Haraway) and environmental literature (including Williams and Erdrich), with the aim of helping us go beyond our human-centric understanding of our own bodies in their interactions with the environment and in the marginalization of the bodies of others.

### **O.U.23 Can Women Combat Corruption? An Economic Case Study of Cameroon**

Haley Maus  
Mentor: Anne Keefe, Global Cultures & Languages

This project highlights the importance of representation of women in positions of power, specifically in the government at both local and national levels. To better understand the relationship that women have on governments especially within those struggling to combat corruption, I discuss how women positively impact economic indicators like health, education, finance and how these can translate to lower levels of corruption. Cameroon is a country with a very rich and diverse history. Now post-colonization Cameroon has worked to create a democracy that works for the people. Corruption has been a serious problem in Cameroon; the current president Paul Biya's party has been in power since 1991. This party has been accused of swaying elections in their favor since they first took office during the first democratic election. In this project, I use a variety of current literature and data from The World Bank to aid to explain how a greater share of women in government can improve economic indicators like health, education and financial liberation. With improvements in all these sectors we also find that as a result women can have help to reduce the level of corruption.

## **O.U.26 Arranged Marriages in India: An Analysis of Generational Perceptions and Family Communication**

Natalie Sims

Mentors: Tony Docan-Morgan and Ayesha Patnaik, Communication Studies

The present study examines arranged marriages in India and how this process affects family communication. This project explored perspectives from various age groups (young adult, middle age, senior) in order to gain a deeper understanding of this significant cultural tradition. Via in-depth interviews conducted on a study abroad trip in India during January 2019, 16 participants discussed their thoughts and personal experiences regarding arranged marriages. Interviewees in the current study revealed that although some perceptions about marriage have changed over time, arranged marriages are still perceived as beneficial and enhance collectivist culture. Participants also reported that family is extremely valuable and individuals have an overwhelming amount of faith in their parents to find them a well matched spouse. It was evident from the participants how important the combining of two families is within an arranged marriage. This combination involves many members of the family, and is not taken lightly. The current study also addresses how metropolitan areas are experiencing changes in perspectives regarding arranged marriages; in particular, people in larger cities are exposed to other sites, cultures, and perspectives that lead them to form love marriages instead. The implications of these findings are discussed.

## **O.U.27 The Ethics of Drama: Making Meaningful Theatre That Addresses Trauma and Motivates Action**

Leah Williams

Mentor: Gregory Parmeter, Theatre Arts

Art is often at the forefront of conversations about abuse, trauma, oppression, discrimination, and other humanitarian concerns. Theatre, in particular, pushes the envelope by confronting sensitive and controversial topics in order to challenge and change society's views and actions. This research and analysis project focused on what makes certain productions and theatrical literature effective in successfully communicating sensitive subjects as well as things to avoid. The purpose is to better equip playwrights, dramaturgs, directors, actors and other theatre professionals with resources to effectively write, research, and produce theatrical work about complicated subjects and difficult social and cultural themes. I focused on thorough analysis of scripts and performances and interviewing experts in theatre and psychology in order to develop comprehensive resources for artists to apply to performance based projects. UWL produced two plays this season that contained sensitive subjects and themes; I assisted the production of both the plays with the resources from my research; this research can be applied to future productions as well. I also began the process of producing a play at UWL that focuses on the stories of sex trafficking victims that will inspire the audience to take action and advocate for survivors and victims of sex trafficking. The goal is to use theatre's dramatic power to affect meaningful change.

## O.U.28 Rainbow Sums

Kean Fallon and Simon Wagner

Co-author: Colin Giles, UWL alum, and Hunter Rehm, UWL alum and current graduate student at University of Vermont

Mentor: Nathan Warnberg, Mathematics & Statistics

Schur numbers, denoted  $S(x)$ , are named after the Russian mathematician Issai Schur. Since their discovery in 1916, only five of them have been computed. Due to the intractability of computing more Schur numbers, we decided to create and investigate anti-Schur numbers, denoted  $aS(x)$ .

To understand  $aS(x)$  one must first consider the counting numbers  $[1, 2, \dots, x]$ . If four of these counting numbers satisfy the equation  $a+b+c = d$  then we say they form a sum. For example,  $\{1, 3, 5, 9\}$  is a sum since  $1 + 3 + 5 = 9$ .

Now we assign a color to each counting number in our set. Here is an example using four colors and the set of counting numbers  $[1, 2, \dots, 14]$ :

1	2	3	4	5	6	7	8	9	10	11	12	13	14
r	g	g	b	b	y	r	g	y	r	y	b	b	r

r = red, g = green, b = blue, y = yellow

One of the sums in this set is  $\{1, 3, 5, 9\}$ . We call this a *rainbow sum* due to the fact that each number is colored distinctly. We then define  $aS(x)$  to be the smallest number of colors needed to color the set  $[1, 2, \dots, x]$  such that a rainbow sum is guaranteed to exist in the set.

Using case analysis, logic, and number theory, we concluded the following:

$$aS([n], x_1 + x_2 + x_3 = x_4) = \left\lfloor \frac{n+7}{2} \right\rfloor.$$

## O.U.29 Establishing the Need for a Nuclear Medicine and Molecular Imaging Pediatric Specialty, Based on Quality Image Acquisition and Patient Care Atmosphere

Emily Seib

Co-authors: Kelly Shaw, Brianna Wirkus, and Dawn Lawry

Mentor: Aileen Staffaroni, Health Professions

Nuclear Medicine and Molecular Imaging (NMMI) has been prospering in technological, diagnostic, and therapeutic advancements. After the first pediatric patient in 1946, this population has grown, highlighting a lack of standardization. Today, 90% of pediatric patients are being treated at adult-focused hospitals. The lack of standards makes it difficult for adult-focused hospitals to find support to care for pediatrics and acquire quality images. This results in a deficit in practices, education, and awareness surrounding pediatrics in NMMI. This research investigated the need for a pediatric specialty. Questionnaires consisting of 25 questions were distributed to professionals within NMMI at the Central Chapter Society of NMMI Fall Symposium. Expansion was done nationally through the Joint Review Committee on Educational Programs in NM and the Pediatric Imaging Council totaling 163 questionnaires. Data showed 75% of professionals desired more education surrounding pediatrics, with 51% of departments needing assistance from child life specialists. A pediatric specialty would benefit patients according to 72% of professionals, and 68% said it would be a step forward for NMMI. Quantitative results and compelling short answer responses confirm a new, innovative approach to education is needed surrounding pediatrics. Efforts towards a pediatric specialty would benefit patients and professionals while ensuring the field is aiding in diagnosing and restoring the health of children.

### **O.U.30 Radical Interpretation and the Underdetermination of Epistemic Entrenchment**

Brady Grapentine

Mentor: Mary Krizan, Philosophy

Davidsonian-style semantic theories do not explicitly formalize doxastic change. *Radical interpretation* is the process whereby an interpreter crafts a Davidsonian-style semantic theory for a speaker of a hitherto unknown language. If interpreters can account for changes in a speaker's beliefs, symbolized in first-order predicate logic, through *epistemic entrenchment* (i.e. an integrity constraint), then the set-theoretical principles of dynamics supplied by *Belief Revision Logic* may be utilized by an interpreter during *radical interpretation*. On this synthesis, interpretive change would be given by a valued set of sentences according to their relative degrees of *epistemic entrenchment* and the application of the revisionary principles, and, if *radical interpretation* could proceed thus, then theoretical failure would be explained by undetected doxastic change or misinterpretation. In the case of successful theories, when the speaker is prompted to change their beliefs in some way, the consequent changes in the speaker's beliefs and their implications match the theoretical predictions. On a Davidsonian-style meaning theory supplemented by *Belief Revision Logic*, interpretive change is only predictable if an interpreter can uniquely order the potential infinitude of held-true sentences according to their relative degrees of *epistemic entrenchment*. However, the interpreter cannot do this; theoretical underdetermination arises during *radical interpretation*. Given Davidson's interpretive constraints and the possibility of lower-level theoretical indeterminacy and underdetermination, the ordering of *epistemic entrenchment* is impossible to uniquely determine. Moreover, orderings of *epistemic entrenchment* and Davidsonian-style semantic theories are only momentarily accurate.

### **O.U.31 Relevancy and Impact of Convolutional Neural Networks**

Christian Stohlmann

Mentors: Chad Vidden and Nathan Warnberg, Mathematics & Statistics

This talk will build a ground up mathematical understanding of neural networks, specifically with convolutional neural networks (CNNs) applied to image processing. The presentation will primarily emphasize education of CNNs, and then discussing the importance of this research, as well as understanding of neural networks in general. This research involved applying CNNs to medical image processing of chest radiographs which would automatically detect pneumonia in patients' lungs. Multiple cutting-edge CNN models (Mask-RCNN, YOLOv3, and HeatMapping) will be analyzed. Inspiration for this project came from participation in an international data science competition, placing in the top 8%.

### **O.U.32 Assessing the Efficacy of EarthTec QZ for Controlling *Bithynia tentaculata* Populations in the Upper Mississippi River**

Alex Galbraith

Co-authors: Nadia Carmosini and Gregory Sandland

Mentors: Nadia Carmosini, Chemistry & Biochemistry, and Gregory Sandland, Biology

The invasive freshwater snail, *Bithynia tentaculata*, has become a growing concern to the Great Lakes and Mississippi River Regions since its introduction in the late 1800s. *Bithynia* is a carrier of multiple parasites that have caused the death of over 200,000 waterfowl since 2002. Because of this, and due to the fact that the species may be outcompeting native species, there has been great interest in identifying ways to mitigate the spread of this snail and its parasites. For this project, we conducted two laboratory studies that assessed the effectiveness of a copper-based molluscicide, EarthTec QZ, on our target species, *Bithynia*. In the first study we compared the effects of two concentrations of EarthTec QZ on *Bithynia* and a coexisting native snail species, *Physa gyrina*. Upon completion of this study, we observed that *Bithynia* experienced lower mortality to EarthTec QZ in comparison to its native counterpart. We also found that female *Bithynia* experienced higher mortality than males after exposure to the compound, which may lead to a decrease in the reproductive output of this species. In the second study, we conducted a LC50 experiment where we identified the EarthTec QZ concentration required to eradicate 50% of our exposed snails. Together, our results demonstrate that Earthtec QZ holds potential for *Bithynia* control, but further work needs to be conducted in order to minimize the negative effects of this compound on non-target, native species.

### **O.U.33 The Impact of Job Stability on Health Outcomes**

Melissa Clement

Mentor: Mary Hamman, Economics

While stress due to employment is not new, today's workers are less attached to one particular job than previous cohorts and job to job transitions or threat of involuntary displacement can be particularly stressful. Although there is no consensus among economists about whether jobs are actually becoming more or less secure, perceived insecurity may lead to adverse health outcomes even when actual job security is not changing (Stewart, 2002). This research tests the hypothesis that worry over unemployment is directly correlated with the likelihood of being diagnosed with hypertension. Using 2010 data from the National Health Interview Survey, this paper estimates differences in the likelihood of hypertension between people who have different subjective beliefs about their likelihood of becoming employed, while controlling for potential confounding factors like occupation type, age, and gender. This work is relevant to both employers and policy makers and may inform the design of workplace wellness programs and unemployment benefits. Reference: Stewart, J. (2002). Recent trends in job stability and job security: Evidence from the March CPS (Bureau of Labor Statistics No. 356). Nebraska: Office of Employment Research and Program Development.

# UNDERGRADUATE EXHIBIT PRESENTATION ABSTRACTS

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## Exhibit Session A The Bluffs: 9:00 am-10:20 am

### **A.U.100 The Impact of the Media Advertisement on Theatre in the Digital Age**

Megan Roddy  
Mentor: Laurie Kinckman, Theatre Arts

In my research project, I would like to measure the impact of greater online advertisement and publicity for University of Wisconsin - La Crosse Theatre Arts Department and their productions. Through social media, I want to see the impact of added online promotion of productions on ticket sales, alumni relations, and recruitment. I plan to accomplish this through promotional videos, student Instagram takeovers, and photo and event posts. I will measure the impact of the new promotion in Google and Facebook analytics, to see if we are reaching our target demographics. I hope that through this research we can add social media promotion as a long-term part of yearly publicity plan for the Theatre Department.

### **A.U.101 Examining Truth: Photography and Rhetoric in the Trump Era**

Emiko Wilks  
Mentor: Kate Hawkes, Art, and Darci Thoune, English

Fear has become an instrument of power. This project uses photography, digital media, and printmaking to question fear through the lens of rhetoric. Throughout his campaign and presidency, Donald Trump has overwhelmed the public with misinformation via his use of Twitter. Today in America we live in an age of partial truths, hidden biases, and coded language. We are challenged to decipher what is factual from a barrage of invented news. Fearmongering, as seen in the President's rhetoric, further inhibits our already compromised ability to listen, see reason, and feel hope. The dichotomies in these constructed photographs prompt the viewer to question nuances embedded in text and images concerning gender, race and the intersection of the two. By focusing attention on controversial quotes and tweets, this project questions what we see and hear. Ultimately, these constructed images examine the nature of truth in today's digital world by begging the question: Can we trust what we see?



**Exhibit Session B**  
**The Bluffs: 10:30 am-11:50 am**

**B.U.102 The Reproduction of Egyptian Faience**

Toua Yang

Mentor: Constance Arzigian and David Anderson, Archaeology & Anthropology

This poster explores the reproduction of Egyptian faience. Egyptian faience is a self-glazing paste that permeates its chemical compound to the outside to create a turquoise blue color. By using modern technology to experiment different faience recipes and ceramic techniques to create replicas found in the archaeological record, I hope to be able to better understand the manufacturing process of faience, so that I can better understand why we perceive prestige items. To answer these questions, I explored the basics of ceramics with the use of terminology, faience construction using different recipes, Egyptian ceramics in relation to faience using molds, and the theoretical approaches of experimental archaeology. The experiment had its fair share of difficulties that help better understand why we perceive prestige goods.

**Exhibit Session C**  
**The Bluffs: 12:00 pm-1:20 pm**

**C.U.103 Fortifying the Sense of Community in Wausau, WI: A Photo Essay on How Wausau Events Inc. Is Building the Community**

Hayley Nelson-Perkins  
Mentor: Elizabeth Peacock, Archaeology & Anthropology

This is a photo essay looking at the culture of Wausau citizens who attend events held by the nonprofit organization Wausau Events Inc. This organization has become a staple in the Wausau community and the events they hold bring a lifestyle to citizens as it also acts as being a major attraction to tourists in Wisconsin. The events used in this research include Concert on the square, Balloon and Rib Fest as well as other weekend festivals held throughout the year, though they are mainly focused in the summer months. I used informal interviews, surveys, and participant observation methods to collect the findings for this work. Photos were taken to show the many different events and the groups of people who attend them. Some events do appeal to certain crowds but there is a diversified number of events that appeal to every age. Though finding that there are some events that are better attended than others, attendees still claim that these events bring the community together in a fun and free environment.

**C.U.104 Barbizon Printmaking**

Lydia Reilly, Rachel Alderton, and Julia Mielke  
Mentor: Joel Elgin, Art

A collection of Barbizon Prints recently donated to UW-La Crosse presents printed images created in the 1800s of architecture, people, and landscapes throughout France. These prints were created in the Barbizon region of France where artists worked together to create realistic and accurate representations of the world around them, now known as Impressionism, instead of giving in to Romanticism's popular trend which focused more on emotion and feeling than actuality. In July, 2018 we traveled to France to develop a deeper understanding of the significance of the structures, locations, and people of France that were important enough to be captured in print 200 years ago and the artists that created them. We studied the people and architecture in French culture today compared to how it was presented in the Barbizon prints and learned more about the artists by visiting their school, home, and the cities they spent their lives in. This project enables UWL and the La Crosse community to look at both the past and present French culture through our Spring 2019 exhibition displaying prints we have created of the areas we visited and the research we have gathered on the locations and the artists. Our project takes the donated prints out of the drawers in the Center for the Arts building and presents their history and continued significance to the public.

# **GRADUATE STUDENT ABSTRACTS**

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Poster Session A  
The Bluffs: 9:00am-10:20am

**A.G.43 Sleep Loss May Adversely Affect Maze-Learning in Honey Bees**

Dylan Baldassari and Drew Lysaker  
Co-author: Dan Reinhardt  
Mentors: Todd Osmundson and Tom Volk, Biology

Sleep is touted to be an essential component to the life of animals. Despite a century of investigation, however, many of the questions regarding sleep remain unanswered. Fundamental questions regarding the function(s) of sleep, particularly in insects, remain unstudied. Insects have largely been neglected from this aspect of research due to size constraints, differences in brain anatomy, and difficulties in identifying sleep stages. To complement other research being conducted by Dr. Barrett Klein's lab at UWL, we have designed and implemented an experiment to test the cognitive functions and capabilities of western honey bees (*Apis mellifera*) while in a sleep-restricted state through a series of Y-maze learning trials. For a full honey bee foraging season, bees were collected, trained to recognize food rewards on a randomly-assigned side of the Y-maze, then randomly assigned to a control or sleep-restriction treatment group. Testing followed sleep restriction, measuring choice made in the maze, latency to designated thresholds, and latency to acquiring reward. Preliminary testing has offered insights into honey bee cognitive performance and influenced our future experimental approaches. This study, coupled with work defining sleep stages in honey bees, should help us to address questions pertaining to the fitness of honey bees that are expected to have broad relevance to sleep and learning in other animals. Namely, does sleep disruption damage an insect's ability to learn, or to find resources? Are motor functions, communication, or memory disabled when insects experience sleep loss? Are functions of sleep shared across distant lineages?

**A.G.44 Impacting Self-Regulation in Traumatized Students: A Mindfulness Intervention**

Lindsey Bucki  
Co-author: Betty DeBoer  
Mentor: Betty DeBoer, Psychology

It's an unfortunate truth that exposure to traumatic stress is part of the experience of a significant proportion of our children, negatively impacting physical, mental, and emotional functioning. One significant effect of trauma is on children's regulation abilities. This study aims to investigate the impact of a mindfulness-based intervention on self-regulation and life satisfaction in traumatized students in a school setting. Results provide important considerations for school psychologists in the implementation of mindfulness-based interventions.

**A.G.45 Does a Community-Based Physical Activity Program Improve Balance for Individuals with Parkinson's Disease?**

Molly Carlson, Rachel Davis, and Joseph McInerney  
Co-authors: John Greany, Michelle Olson, and Kristin Greany  
Mentor: John Greany, Health Professions

**Purpose:** To determine the effectiveness of a physical activity program on postural control using the Sensory Organization Test (SOT) in individuals with Parkinson's disease (PD). **Subjects:** Eighteen subjects ( $74.2 \pm 9.1$  years; 11 males, 7 females) with a diagnosis of PD. **Methods:** Subjects attended a 60-minute program twice weekly for 12 weeks. Balance assessments were completed using computerized dynamic posturography with the SOT. The SOT consists of six conditions. Variables were analyzed for significance using a paired-samples t-test. **Results:** Condition 4 (stable visual reference with an unstable platform) showed an average pre score of  $68.3 \pm 7.4$  and post score  $75.3 \pm 7.3$ ,  $p=0.008$ . Similarly, Condition 6 (moving visual reference with an unstable platform) showed a change from  $62.3 \pm 13.1$  to  $69.7 \pm 11.4$ ;  $p=0.016$ . The composite score also increased;  $p=0.021$ . Conditions 1-3 and 5 did not show changes (p

>0.05). **Conclusion:** Subjects with PD demonstrated improvements in postural control measured by SOT after a 12-week physical activity program, specifically in testing conditions where eyes were open with an unstable platform. **Clinical Relevance:** Rehabilitation professionals implementing a physical activity program can improve postural control in individuals with PD. Further research looking at various types of balance training, specifically with decreased visual input, should be evaluated for changes in this population.

#### **A.G.46 Drop Landing Performance in Female Collegiate Athletes: Effect of a Four-Week Training Intervention**

Jacqueline Cleereman, Maria Lee, and Brett McCutchin

Co-authors: Thomas Kernozek, Drew Rutherford, and Becky Heinert, Gundersen Health System-La Crosse

Mentor: Thomas Kernozek, Health Professions

Anterior cruciate ligament (ACL) injuries are common in athletes during landing in females. Performance-based feedback may be used to alter landing mechanics. Our purpose was to determine how many post-trial feedback-training sessions may be necessary to change landing mechanics in female collegiate athletes using a custom portable system. 22 female collegiate athletes participated. Trials were performed from a 50 cm drop height in blocks of 3 ST and 6 DT pre-tests without feedback, 6 ST and 6 DT with post-trial feedback (peak vertical ground reaction force (vGRF) in bodyweight (BW), frontal plane video and force symmetry), and 3 ST and 6 DT post-tests without feedback. Peak vGRF and frontal plane knee-to-ankle ratio were compared for pre and post-trial landing tasks (ST or DT) over each session (pre/post training) and week (4 weeks) using a two-way repeated measures ANOVA ( $\alpha = 0.05$ ). Reduction in Peak vGRF [ $-0.91 \pm 0.63$  vs.  $-0.35 \pm 0.38$  vs.  $-0.31 \pm 0.35$  vs.  $-0.17 \pm 0.31$  BW ( $p < 0.05$ )] and improved knee-to-ankle ratio [ $0.14 \pm 0.08$  vs.  $0.07 \pm 0.08$  vs.  $0.04 \pm 0.07$  vs.  $0.06 \pm 0.08$  ( $p < 0.05$ )] occurred over 4 weeks. Greatest improvements in vGRF ( $-0.60 \pm 0.18$  BW,  $p = 0.02$ ) and knee-to-ankle ratio ( $0.11 \pm 0.03$ ,  $p = 0.003$ ) occurred during the first session but continued up to week 3. Three weeks of once a week, post-trial feedback training appears necessary to improve landing mechanics in female collegiate athletes. This may be important to reduce ACL injury incidence.

#### **A.G.47 Post-Trial Feedback May Alter Single and Dual Task Landing Performance in Female Collegiate Athletes**

Maria Lee

Co-authors: Jessica Onsager, Jeremie Schiedermayer, and Becky Heinert, Gundersen Health System-La Crosse, Drew Rutherford, Thomas Kernozek

Mentor: Thomas Kernozek, Health Professions

Anterior cruciate ligament (ACL) injuries are common in females. Performance-based feedback (FB) may alter landing mechanics. Our purpose was to provide vertical ground reaction force (vGRF), loading asymmetry (LA), and frontal-plane (FP) video as post-trial FB of each landing task using a portable system to evaluate and train female collegiate athletes during single- and dual-task (ST and DT) landing performances. 65 female collegiate athletes performed both ST drop landings and DT (with/without jumping for a suspended ball). These were performed in blocks of 3 ST and 6 DT pre-tests, 6 ST and 6 DT with post-trial visual FB (peak vGRF in bodyweight (BW), LA, and FPV), and 3 ST and 6 DT post-tests. Peak vGRF and FP knee-to-ankle ratio between task (ST or DT) and over time (pre-test, FB, post-test) were compared using a two-way repeated measures ANOVA. Peak vGRF decreased ( $4.29 \pm 0.93$  vs.  $3.55 \pm 0.57$  vs.  $3.44 \pm 0.66$  BW,  $p < 0.001$ ) and an improvement in knee-to-ankle ratio ( $0.97 \pm 0.15$  vs.  $1.01 \pm 0.12$  vs.  $1.04 \pm 0.13$ ,  $p < 0.001$ ) occurred over the time course of the blocked trials. A main effect showed ST to have lower peak vGRF than DT ( $3.71 \pm 0.82$  vs.  $3.81 \pm 0.83$  BW,  $p = 0.002$ ), with the greatest difference in the post-test ( $3.35 \pm 0.57$  vs.  $3.53 \pm 0.73$  BW,  $p = 0.001$ ). Peak vGRF and knee-to-ankle ratio were improved with immediate post-trial FB. Post-trial FB appears immediately produces short term changes in landing performance in female collegiate athletes within a single training session.

#### **A.G.48 Post-Trial Feedback Alters Single and Dual Task Landing Performance in Healthy and ACL Reconstructed Athletes**

Brett McCutchin, Maria Lee, and Jacqueline Cleereman

Co-authors: Thomas Kernozek, Drew Rutherford, and Becky Heinert, Gundersen Health System-La Crosse

Mentor: Thomas Kernozek, Health Professions

ACL reconstructed (ACLR) individuals have unequal lower extremity loading during landing. Post-trial feedback may be used to alter landing mechanics in both healthy and ACLR populations. Determine how post-trial feedback of vertical ground reaction force (vGRF), loading asymmetry (LA), and frontal-plane video (FPV) of control and ACLR groups can be used to alter these variables during single and dual-task landing performances in female athletes. 24 female athletes were placed in a control (n=12) or ACLR (n=12) group. Single-task (ST) or dual-task (DT) drop landing trials were performed in blocks of 3 ST and 6 DT (pre-tests), 6 ST and 6 DT with post-trial visual feedback, and 3 ST and 6 DT post-tests. Peak vGRF, LA, and frontal plane knee-to-ankle ratio between task (ST or DT) and over time (pre-test, feedback, post-test) were compared using a three-way repeated measures ANOVA. Peak vGRF decreased ( $4.43 \pm 0.81$  vs.  $3.64 \pm 0.44$  vs.  $3.44 \pm 0.48$  BW,  $p < 0.001$ ) and improved knee-to-ankle ratio ( $0.94 \pm 0.13$  vs.  $1.01 \pm 0.12$  vs.  $1.05 \pm 0.12$ ,  $p < 0.001$ ) occurred over time (pre-test, feedback, post-test). ACLR group LA was larger compared to controls ( $0.16 \pm 0.08$  vs.  $0.09 \pm 0.08$ ,  $p = 0.043$ ). Peak vGRF and knee-to-ankle ratio improved over time for both groups. The ACLR group had higher LA compared to controls. Post-trial feedback may produce immediate changes in peak vGRF and knee-to-ankle ratio, however more post-trial feedback in LA may be necessary to produce changes in asymmetry in ACLR populations.

#### **A.G.49 Patellofemoral Joint Loading during Forward and Backward Lunges**

Danielle Goulette and Patrick Griffith

Co-authors: Michael Schiller, Christopher Durall, Drew Rutherford, and Thomas Kernozek

Mentors: Thomas Kernozek and Drew Rutherford, Health Professions

*Introduction:* Patellofemoral pain (PFP) is a common pathology often treated with rehabilitation exercises, such as the lunge. The aim of this study was to examine patellofemoral (PF) joint loading during different movements and phases of the lunge: Single Forward Lunges (SFL), Single Backward Lunges (SBL), Down Phase (DP), and Up Phase (UP). *Methods:* Twenty healthy females (Age:  $22.6 \pm 1.9$  yrs.; Height:  $172.3 \pm 6.5$  cm; Mass:  $65.1 \pm 11.0$  kg) performed six trials of each lunge (SFL and SBL) to a distance of 75% leg length. Kinetic and kinematic data were used with a musculoskeletal model and custom software to estimate quadriceps force (QF), peak patellofemoral joint reaction force (PFJRF), patellofemoral joint stress (PFJS), and joint loading rate (JLR). A 2-way repeated measures multivariate analysis of variance and a paired t-test were used to analyse these data ( $\alpha = 0.05$ ). *Results:* Peak QF, peak PFJRF, and peak JLR were greater ( $p < 0.01$ ) during the SFL compared to SRL, as well as UP compared to DP. The peak PFJS did not differ between SFL and SRL or UP and DP. *Conclusion:* Early rehabilitation for treatment of PFP may consider focusing on using the SRL variation to reduce PF joint loading. Consistently increased loading occurred during the UP of each lunge variation.

#### **A.G.50 Building a Sense of Community: Protecting Students from Premature Burnout**

Adalyn Green

Co-author: Robert Dixon

Mentor: Robert Dixon, Psychology

Graduate school is a stressful experience for many, requiring adaptive coping mechanisms to prevent burnout. The experience of graduate school has been examined in doctoral psychology students; however, no research has explored the experience among non-doctoral school psychology students (e.g., Ed.S.). The present study examines sense of community and well-being as protective factors that may reduce burnout. Results have important implications for promoting self-care practices among graduate students.

### **A.G.51 Mental Health in the Classroom: Exploring Teacher Knowledge and Advocacy**

Samantha McGarvey  
Co-author: Robert Dixon  
Mentor: Robert Dixon, Psychology

Teachers are instrumental in identifying mental health problems in youth. However, teachers often report lacking knowledge of specific diagnoses, which may impair their ability to identify children who need support. This study examines teacher knowledge of internalizing and externalizing disorders to explore whether this knowledge differs based on teachers' sense of mental health advocacy and school setting. Results have important implications regarding how school psychologists can support teachers' knowledge of student mental health.

### **A.G.52 Is Fidelity Not Enough? Student-Teacher Relationships and Intervention Effectiveness**

Anna Hamer  
Co-author: Daniel Hyson  
Mentor: Daniel Hyson, Psychology

Intervention fidelity has been repeatedly shown to be an important component of predicting student success. Strong student-teacher relationships are also predictive of academic achievement. Both intervention fidelity and student-teacher relationships have been thoroughly researched independently of one another, but never in conjunction with each other. The current study aims to determine how the quality of student-teacher relationships and the degree to which interventions are implemented with fidelity individually and together predict academic outcomes in students.

### **A.G.53 Low-dosage Inspiratory Muscle Training for Individuals with Neuromuscular Disorders Participating in a Community Physical Activity Program**

Alyssa Patten and Brandon Wiley  
Co-author: Kristin Greany  
Mentor: John Greany, Health Professions

**Purpose:** The purpose was to determine whether low-dosage inspiratory muscle training (IMT) can improve maximal inspiratory pressures (MIP) in individuals with neuromuscular disorders (NMD) participating in an exercise program. **Subjects:** Fifty-five community members were recruited and placed into one of three groups by diagnosis: multiple sclerosis (MS=6), Parkinson's disease (PD=37), and hemiplegia (CVA=12). **Methods:** MIP values were determined at the beginning and end of the program. Subjects were given an Inspiratory Muscle Trainer and performed 60 repetitions twice a week. Resistance was progressively increased each week. ANOVA and Paired t-tests were used to evaluate MIP change. **Results:** Inspiratory muscle strength improved with training ( $p < 0.001$ ). In addition, each group improved; PD  $56.3 \pm 28.9$  to  $63.0 \pm 26.0$  cm H<sub>2</sub>O;  $p < 0.01$ ; CVA from  $46.4 \pm 15.9$  to  $59.3 \pm 22.5$  cm H<sub>2</sub>O;  $p < 0.001$  and MS from  $62.5 \pm 21.9$  to  $79.8 \pm 20.0$  cm H<sub>2</sub>O;  $p = 0.049$ . Results also demonstrate that each group benefited equally. **Conclusion:** Low dose inspiratory muscle training demonstrated significant improvements in muscle strength for adults with NMD participating in an exercise program. **Clinical Relevance:** Results suggest that a low dose inspiratory muscle training regimen may be an alternative to high dose training for the improvement of ventilatory strength in individuals with NMDs.

### **A.G.54 Benefits of Equine-Facilitated Therapy in Mental Health: An Educational Leadership Experience**

Samantha Petite  
Mentor: Kate Evans, Recreation Management & Therapeutic Recreation

Specifically within the realm of animal-assisted therapy as a therapeutic intervention in mental health, there has been specific intrigue about the use of horses as therapeutic agents. Special certifications are required to be an equine therapy professional. There are several different facets of equine therapy that require different certifications. Through RSEL grant funding, the certifications sought are Therapeutic Riding Instructor and Equine Specialist in Mental Health and Learning through the Professional Association for Therapeutic Horsemanship, International (PATH Intl). This Educational Leadership project has produced not only an opportunity for me to further myself as a

professional in Therapeutic Recreation, but has also produced a research publication entitled Review of Literature: Potential Benefits of Equine-Facilitated Therapy for Individuals with Eating Disorders, published in *Recreation, Parks, and Tourism in Public Health*. This poster presentation will share more about this article as well as the experience of seeking these certifications.

#### **A.G.55 Dyadic Coping: The Impact of the Coach-Player Relationship on Stress**

Hannah Picel  
Co-author: Daniel Hyson  
Mentor: Daniel Hyson, Psychology

The coach-player relationship has been shown to have a significant impact on athlete well-being, including stress levels (Jowett & Nelek, 2011). Within the coach-player relationship, dyadic coping, which is how two individuals interact to reduce each other's stress levels, has been shown to increase these positive effects and improve relationship satisfaction within the coach-athlete dyad (Nicholls & Perry, 2016). This study will examine the difference in stress levels for participants who reported high and low levels of dyadic coping within their coach-player relationship. With this knowledge, School Psychologists can advocate for training for coaches on how to incorporate stress-reducing strategies within their coach-player interactions.

#### **A.G.56 Training Paraprofessionals on Behavior Management to Increase Knowledge and Self-Efficacy**

William Vogt  
Co-author: Betty DeBoer  
Mentor: Betty DeBoer, Psychology

Many paraprofessionals report feeling unprepared to fulfill the roles they are assigned, especially those related to behavior management. Training that increases knowledge and self-efficacy has promise in increasing job satisfaction and retention, and the likelihood effective techniques are utilized in practice. This study examines the effect of behavior management training on paraprofessionals' knowledge and self-efficacy. Results of this training may lead to increases in effective practices, self-efficacy, job satisfaction, and ultimately, the retention of paraprofessionals.

#### **A.G.57 Phosphorus Starvation Affecting Microbial Corrosion of Copper Metal and Its Implication towards Home Drinking Water Quality**

Eric Wenzel  
Co-author: Bonnie Bratina  
Mentor: Bonnie Bratina, Microbiology

Microbial corrosion is defined as the degradation of industrial material by microbiological activity. In home drinking water systems, corrosion of piping material can lead to hazardous levels of copper or lead in potable water. Current monitoring and remediation practices focus mainly on chemical factors while giving little attention to biological. Our project looks at the impact that phosphorus limitation can have on causing microbial corrosion to copper pipes. A grade of copper pipe (C12200) is commonly used for home water distribution. This grade of copper pipe contains trace amounts of phosphorus left inside the copper pipe from the smelting process. If microbial corrosion under phosphorus limited conditions is able to liberate the copper bound phosphorus, it could be a new source of phosphorus that microbes could use for growth. This would have serious repercussions on water quality. With a new source of phosphorus, microbes could support larger numbers of cells, which in turn could cause more corrosion to the pipe. With an increase in corrosion, copper would be released into the bulk water used for drinking.



**Poster Session B**  
**The Bluffs: 10:30 am-11:50 am**

**B.G.44 Effect of Increasing Running Cadence on Force in an Outdoor Environment**

Jacob Anason and Taylor Musgjerd  
Co-author: Drew Rutherford  
Mentor: Drew Rutherford, Health Professions

The incidence of running-related injuries occurs in an estimated 56 percent of recreational runners. One proposed mechanism behind such injuries is high impact forces occurring during foot strike. Previous studies found that a low step rate (cadence) while running on a treadmill is associated with higher impact forces. Therefore, increasing cadence while maintaining a consistent speed is an effective way to lower the impact forces, thus reducing risk for injuries. Purpose: The purpose of this study was to examine effects of increased cadence on peak impact force in an outdoor setting, in order to better simulate a natural running environment. It is hypothesized that as cadence increases, peak force will decrease. Methods: Peak force measurements were collected from 15 healthy, male and female, recreational runners during two 2-mile outdoor runs. Force was measured using an in-shoe pressure measurement device. Peak force measurements were recorded at quarter mile intervals during the baseline trials (participant-selected cadence) and follow-up “cadence” trials (set at 10% above baseline cadence). Pace and cadence were set and measured using a GPS watch and digital metronome. Results: Peak force within time and within runs will be analyzed using a repeated measures analysis of variance. Preliminary analysis suggests participants had good compliance with maintenance of pace while varying cadence from baseline to follow-up trials.

**B.G.45 Educator Burnout: The Impact of Organizational Health**

Alyssa Anderson  
Co-author: Robert Dixon  
Mentor: Robert Dixon, Psychology

As teacher attrition and burnout rates continue to rise, there is a critical need to understand factors that may contribute to burnout in educators. This study examined how different factors of organizational health in schools may impact the three dimensions of burnout in educators: emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment. Participants included 70 elementary-school teachers from Wisconsin who completed the Organizational Health Inventory- Elementary (OHI-E), which measures five organizational health factors (Academic Emphasis, Institutional Integrity, Collegial Leadership, Resource Influence, and Teacher Affiliation); and the Maslach Burnout Inventory-Educator Survey (MBI-ES) to measure the three dimensions of burnout in educators. Three stepwise multiple regression analyses were conducted to determine the predictive relationship between the five organizational health factors and the three dimensions of burnout. These analyses revealed significant predictive relationships for organizational health factors and all three dimensions of burnout (Emotional Exhaustion: Academic Emphasis and Collegial Leadership; Depersonalization: Teacher Affiliation; Sense of Personal Accomplishment: Resource Influence). These results indicate that administrators can mitigate the impact of educator burnout by providing positive support for teachers, creating a school climate that emphasizes academic achievement, implementing staff activities that promote cohesion among staff, and advocating for allocating resources in the classroom.

**B.G.46 Building Positive Student Outcomes: The Importance of School Climate**

Mikayla Mlsna  
Mentor: Robert Dixon, Psychology

With the passage of the Every Student Succeeds Act, the focus on student outcomes in schools has expanded from just academics to include student psychosocial functioning and overall well-being. School climate has been correlated with both academic achievement and student well-being. The purpose of this study is to predict which school climate and student-level factors best impact academic achievement and well-being. Results will inform school personnel which factors should be addressed to improve student outcomes.

### **B.G.47 Achilles Tendon Stress during Added Weight Running**

Katelyn De Starkey, Ashley Zander, and Ryan Thyssen  
Co-author: Thomas Kernozek  
Mentor: Thomas Kernozek, Health Professions

**Background:** Achilles tendon (AT) disorders are one of the most common overuse injuries, especially in runners. A risk factor of AT disorders is increased body weight. Greater stress at the AT may be due to increased force or decreased AT cross sectional area. Our purpose was to compare stress at the AT during three running conditions with various added weight. **Participants:** Twenty-three female runners with a rear-foot strike pattern were tested. **Methods:** Ultrasound imaging was used to measure cross sectional area of the AT. Participants ran across a force platform under three conditions (0.0, 4.5, and 9.0kg) while 3D motion capture data were collected. Lower extremity running mechanics were analyzed. **Results:** Peak AT stress, strain, and force were greatest during the 9.0kg running condition ( $p < .0001$ ). There was a 4.3% and 8.8% increase in AT stress during the 4.5kg and 9.0kg conditions, respectively, compared to baseline. **Conclusion:** Added weight increased stress on the AT. There may be an increased risk for AT injury with added weight. Runners should consider to slowly progress training with added load to allow for AT accommodations.

### **B.G.48 Reliability of Novice Clinicians Measuring Brachial and Carotid Artery Diameter Using Ultrasound Imaging in Healthy Subjects**

Anna Flottmeyer, Janna Fjelstad, and Garrison Jones  
Mentors: John Greany and Kristin Greany, Health Professions

**Purpose:** The purpose of this investigation was to determine the intra- and inter-rater reliability of novice clinicians (DPT students) using ultrasound imaging to measure the diameter of the brachial and common carotid arteries. **Subjects:** Participants consisted of a convenience sample of thirty apparently healthy subjects (15 males, 15 females) age  $25.0 \pm 6.1$  years. **Methods:** Three testers, with 4 hours of training, were randomly assigned and blinded during data collection. The right brachial and carotid arteries were palpated for probe placement. Images were obtained and artery diameter was measured using a GE Healthcare LOGIQ P6 ultrasound system. Intraclass correlation coefficients (ICC 2,2 and ICC3,1) were reported for inter- and intra-rater and split half reliabilities. **Results:** Analysis revealed good to excellent reliability between novice testers for inter-rater (brachial:  $n=30$ , ICC2,2 = 0.94; carotid:  $n=30$ , ICC2,2 = 0.86) and intra-rater for both measurements ( $n=20$ ; ICC3,1 = 0.80 to 0.91). In addition, split half reliability for each tester was excellent. **Conclusion:** In this study, novice clinicians demonstrated good to excellent reliability utilizing ultrasound to measure artery diameter. Reliability may be artery dependent, as the brachial artery had higher reliability when compared to the carotid. **Clinical Relevance:** Ultrasound imaging is an emerging technique, which can be implemented as a cardiovascular screening tool by novice clinicians with good reliability.

### **B.G.49 The Effect of Exercise Dosage on Motor Learning and Retention of a Drop Vertical Jump Landing Strategy in Females**

Marlee Freitag, Kevin Bohn, Xaarki Gamedinger, Sam Mason, Austin Palazzolo, Pierce Russell, Bethany Smith, and Allison Von Brevern  
Co-author: Patrick Grabowski  
Mentor: Patrick Grabowski, Health Professions

**Introduction:** Aerobic exercise greatly impacts motor learning. Past studies demonstrate that moderate intensity exercise performed post skill acquisition enhances retention. Optimal dosage remains unknown. **Purpose:** Compare effects of 10 minutes (10m) to 30 minutes (30m) of moderate exercise on skill retention following drop landing vertical jump (DVJ) training. **Methods:** 22 females, ages 18-25, performed 1 practice DVJ followed by 2 recorded baseline (BL) trials, then by 30 trials with fading feedback, observational learning, and visual feedback using 2D video analysis. The goal of feedback was to increase peak hip flexion angle (PHFA) during landing. Post-acquisition, participants were randomized to groups and biked for 10m or 30m at 55-65% heart rate reserve. A retention session was completed 7 days later. **Results:** Both groups improved with practice (10m mean $\Delta=19^\circ$ , SD=20°,  $p<0.05$ , 30m mean $\Delta=20^\circ$ , SD=12°,  $p<0.05$ ) with no between group difference ( $p=0.84$ ). At retention, the 30m group had a significant regression towards BL by  $4.8^\circ$  (SD=6°,  $p<0.05$ ) while the 10m group increased PHFA by  $1.3^\circ$  (SD=10°). 10m showed 70% skill retention, 30m only 33%. **Discussion:** A single bout of moderate intensity exercise for 10m post-acquisition of a motor skill

results in greater retention at 7 days. Fatigue may explain current findings, and caution is warranted, as results are currently preliminary only and thus underpowered. **Conclusion:** 10m of moderate aerobic exercise may enhance motor learning.

#### **B.G.50 Does Early Low-Intensity Aerobic Exercise Hasten Recovery in Adolescents with Sport-Related Concussion? A Critically-Appraised Topic**

Ryan Henke, Savana Kettner, Gus Greife, and Stephanie Dreifuerst  
Co-author: Christopher Durall  
Mentor: Christopher Durall, Health Professions

**Clinical Scenario:** Sport-related concussion (SRC) is relatively common among adolescents. SRC consensus statements recommend physical and cognitive rest until an athlete is asymptomatic before starting a return to sport protocol (RTSP). However, emerging evidence suggests that low-intensity aerobic exercise below the symptom-exacerbation threshold (LIAEX) may speed recovery after SRC. **Clinical Question:** Does implementing LIAEX <2 weeks after SRC hasten symptom resolution in adolescents? **Key Findings:** Following an extensive literature search, two randomized controlled trials (RCT) and one non-randomized trial (NRT) were selected to answer the clinical question. All three studies reported decreased post-concussion symptom scale (PCSS) scores with LIAEX. One RCT reported a shorter time to initiate a RTSP with LIAEX vs stretching. The NRT found fewer days to start RTSP with LIAEX vs. rest. The 2<sup>nd</sup> RCT did not find between-group differences in recovery duration, although recovery duration effect sizes were similar between this study and the NRT. No adverse effects from LIAEX were reported in the studies. **Clinical Bottom Line:** Level 1b & 2b evidence suggests that LIAEX started <10 days after SRC is safe, does not appear to delay recovery, and may result in greater symptom reduction and faster medical clearance than rest or stretching in adolescents.

#### **B.G.51 The Effect of Visual vs. Auditory Biofeedback on Weight-bearing Symmetry during a Squat**

Heidi Bohrer, Taylor Terbilcox, and Breanne Thompson  
Mentor: Drew Rutherford, Health Professions

**Introduction:** A variety of daily functional activities involve completing a bodyweight squat movement. Due to the functional use of the squat, it is a commonly used exercise in lower extremity rehabilitation with a focus on symmetrical weight-bearing (WB). Visual and auditory biofeedback (BF) have been used to provide feedback of symmetrical WB during squats in clinic settings. While both forms of BF are often used in the clinic, there is little research identifying which form of BF is more effective for retaining improvements following training. **Purpose:** The purpose of this study was to compare the effects of visual and auditory BF on the immediate and delayed retention of WB symmetry during bodyweight squats in healthy, college-aged participants. **Methods:** Thirty-eight students participated and were randomly assigned to visual or auditory BF groups. The participants completed a training session in which they completed squats while receiving BF. Joint angle and ground reaction force data were collected before, during, immediately after, and one week after training. **Results:** Future analysis will focus on determining the effect that different types of BF have on symmetry during a squat for both immediate and delayed retention by calculating symmetry ratios for the forces under each foot.

#### **B.G.52 Does Blood Flow Restriction Increase the Effectiveness of Neuromuscular Electrical Stimulation? A Critically-Appraised Topic**

Austin Sawyer, Abigail Kuzas, and Niklaas Mattson  
Co-author: Christopher Durall  
Mentor: Christopher Durall, Health Professions

**Background:** Given that blood flow restriction (BFR) and neuromuscular electrical stimulation (NMES) can both increase muscular strength and hypertrophy, it has been postulated that adding BFR to NMES may elicit superior strength and hypertrophy gains than NMES alone. **Focused Clinical Question:** Does the addition of BFR to NMES elicit superior gains in muscle strength and hypertrophy when compared to NMES alone? The literature was searched for studies that directly compared muscular hypertrophy and strength gains with NMES training versus combined NMES and BFR training. The search yielded three studies that satisfied inclusion/exclusion criteria. **Summary of Key**

**Findings:** Moderate-quality (level 3) evidence from 3 cohort studies supports adding BFR to NMES of the quadriceps in untrained healthy adult males, but not trained adult males or females. Moderate-quality evidence also suggests that adding BFR to NMES of the wrist extensor muscles of individuals with spinal cord injuries is not beneficial. **Clinical Bottom Line:** Current evidence is limited and mixed regarding the efficacy of combining BFR and NMES. BFR training is relatively new, and accordingly, more data are needed to demonstrate its efficacy and optimal utilization.

### **B.G.53 Relationship between Muscle Inspiratory Pressure and Functional Performance in Individuals with Neuromuscular Disorders**

Alyssa Patten

Co-authors: Brandon Wiley, Kristin Greany, and John Greany

Mentor: John Greany, Health Professions

**Purpose:** Individuals with neuromuscular disorders (NMD) commonly experience shortness of breath and fatigue with exercise secondary to impaired posture and weak inspiratory muscles. The purpose of this study was to evaluate the relationship between MIP and functional performance in individuals with NMD. **Subjects:** 48 participants with NMD were recruited from a community exercise program at the University of Wisconsin-La Crosse. **Methods:** MIP was measured for each participant. Functional outcome measures were also recorded for gait velocity, Six-Minute Walk Test (6 MWT), Timed Up and Go Test (TUG), Five Times Sit-to-Stand Test (5TSTS), and the Functional Gait Assessment (FGA). Pearson Product Moment and Spearman Rho Rank correlation coefficients were calculated. **Results:** The correlations were significant and fair between MIP values and 6 MWT ( $r = 0.38$ ,  $p = 0.01$ ), FGA ( $r = 0.36$ ,  $p = 0.01$ ), and gait velocity ( $r = 0.33$ ,  $p = 0.02$ ). The coefficient of determination ( $r^2$ ) ranged between 11-14%. No significant relationship was noted between MIP values and 5TSTS or TUG tests ( $p > 0.05$ ). **Conclusion:** MIP values demonstrate a fair strength between 6 MWT, FGA, and gait velocity measures in individuals with NMD who participate in a community exercise program. **Clinical Relevance:** There appears to be a relationship between inspiratory muscle strength and functional performance in individuals with NMD. Therefore, it may be beneficial to incorporate inspiratory muscle strengthening into the exercise programs of these individuals.

### **B.G.54 Localization of Matrix Protein Mutants of Human Parainfluenza Virus Type 3**

Jacob Schmidt

Co-authors: Michael Hoffman and Zachary Porior

Mentor: Michael Hoffman, Microbiology

The matrix (M) protein of human parainfluenza virus type 3 (HPIV3) is important for directing assembly and release of new virus; however, the mechanism of release remains unclear. Identifying domains of M required for proper function can help to understand how M directs its function in an infection. Alanine substitutions at amino acids Y300, L302, and L305 of M inhibit growth of HPIV3 and release of M protein from cells. Revertants of the Y300A and L305A mutants have been isolated and greatly restore growth of HPIV3. These revertants contain an alanine to valine change at amino acid 289 in mutant Y300A, and a change at amino acid 161 from glutamate to histidine for mutant L305A. These residues could be essential for proper host cell localization of M. To understand this, wild type (WT)M, alanine substitution mutant M proteins, and the revertants were expressed in 293T cells, and viewed via immunofluorescent localization assays. The WT M was approximately 50% nuclear, and 50% cytoplasmic, with the cytoplasmic staining being uniform. The L305 mutant and its revertant M mutant and revertant had nuclear staining amounts similar to WT, but were present in patches in the cytoplasm. The L300 mutant had nuclear staining greater than 80%, while its revertant was 10% lower. However more data needs to be collected to confirm this localization is real. Additionally M protein interactions affected by these mutations need to be assessed to determine amino acid residue function.

### **B.G.55 From Theory to Practice: Student Teacher's Experiences of Implementing Adventure Based Education**

Alyssa Trad

Co-author: Jenna Starck

Mentors: Jenna Starck and Brock McMullen, Exercise & Sport Science

Physical education teacher education (PETE) programs are striving to provide pre-service teacher's increased opportunities to utilize and explore teaching a variety of curricular models, in hopes that they develop innovative ways

once becoming in-service teachers. One instructional model that can be taught is adventure education. Although many PETE programs see this potential, research has shown that pre-service teachers do not feel prepared or confident enough to teach this model in a K-12 setting, regardless of their increase in content knowledge. Utilizing occupational socialization theory, the purpose of this study is to understand how pre-service teachers learn to teach the adventure education model. Four pre-service physical education teachers in their student teaching, who have previously taken two adventure education courses will participate in this study. Their student teaching experience must include one adventure education unit. Formal interviews, weekly journals, informal observations, and informal interviews will be the form of data collection for this study.

**Poster Session C**  
**The Bluffs: 12:00 pm-1:20 pm**

**C.G.47 A Twenty-Year Morphological and Molecular Study of Macrofungi in the Driftless Region of Southwestern Wisconsin, USA**

Sabrina Aspenson  
Co-authors: Thomas Volk and Todd Osmundson  
Mentors: Thomas Volk and Todd Osmundson, Biology

Southwestern Wisconsin was unaffected by the glacial drifts that ended some 10,000 years ago and is now referred to as the driftless area. Centered on the Mississippi River, the forested hillsides offer relicts of forests, prairies, wetlands and grasslands that house a diverse array of organisms. A 20-year survey of fruiting bodies of three older growth forests within the driftless found approximately 1200 species of macrofungi that include some species with disjunct geographical distributions. At least 400 students, graduate students, and visitors from three mycological forays have been involved in these collecting efforts. Despite the high numbers of fungi documented and the proximity of the study sites, there is only a 25% of overlap between sites. Preliminary data from groundwork DNA sequencing suggest that, because of its isolation, the driftless area may be home to cryptic species of fungi. Through further DNA analysis of the specimens collected we will be able to determine the evolutionary history of these species compared to species outside of this region. This will answer the question of whether this area of the United States is a biodiverse area for fungi or is it an anomaly because of the unique historical and geographical location based on speciation over time. This study is novel because of the amount of species with both morphological and sequence data documented over 20-years in a geographically distinct region.

**C.G.48 The Effect of Pitch Velocity on the Timing of the Kinetic Chain of a Baseball Swing**

Nicholas Bertone  
Co-authors: Attila Kovacs, Naghmeh Gheidi, Charlend Howard, and Taylor DeGroot  
Mentors: Attila Kovacs and Naghmeh Gheidi, Exercise & Sport Science

Objective: To determine the specific activation pattern of relevant musculature (kinetic chain) involved in a batting motion, and to determine the relationship between bat velocity and the timing of the kinetic chain. Methodology: Collegiate Baseball players were recruited and asked to perform 20 swings. The timing accuracy of batting at different stimulus velocities was measured with a Bassin Anticipation Timer. Surface electromyography (EMG) was used to record muscle activation for four lower body and four upper body muscles, and to determine the timing of the kinetic chain. Bat velocity was recorded via a motion capture system. Offline data processing and analysis was performed with a custom developed MATLAB code. Results: The ideal batting motion displays a continual linear increase in bat velocity from movement initiation until bat-ball impact. Previous research showed that the velocity profile has phases of deceleration during batting. Preliminary analysis suggests that there are specific phases in timing of the kinetic chain associated with the deceleration phases of bat velocity. Conclusions: These results could provide information for athletes regarding their batting mechanics and a basis for changes in future instructions. Additionally, strength coaches and rehabilitation specialists will be able to prescribe sport-specific exercise modalities for baseball players.

**C.G.49 Clinical Implications of Variations of the Human Lumbar Plexus**

Alyssa Docter, Alina Gur, Tyler Jenson, Mitch Kontny, Trent Napp, and Ashley Sachse  
Co-author: Thomas Greiner  
Mentor: Thomas Greiner, Health Professions

**Background:** The lumbar plexus originates from the ventral nerve roots of (T12) L1-L5 and encompasses six peripheral branches that convey motor and sensory information of the trunk and lower limbs. **Methods:** Observations were drawn from dissection of left and right lumbar plexus in eleven individuals (five males and six females; median age at death: 87 years). All subjects are body donors that were first utilized within the gross anatomy courses of the Health Professions department at UWL. **Results:** Variation was found in nearly every spinal level of the plexus. The most variable level was L3, where twelve of twenty-two plexus deviated from textbook definition, while L4 conformed best to conventional expectations. The most common variations of peripheral nerves were found in the lateral femoral

cutaneous nerve (six variations) and genitofemoral nerve (three variations). One dissection revealed an unconventional presentation of the L5 nerve root contributing to the femoral nerve. **Conclusions:** Variations in presentation of the lumbar plexus have potential to complicate tests and measures used by physical therapists to distinguish the source of a patient's pain. Clinician knowledge of the diverse nature of the lumbar plexus can diminish perplexing findings during an examination.

### **C.G.50 Stress and Burnout: The Impact of Effective Consultation for Teachers**

Erin Kahnke  
Co-author: Jocelyn Newton  
Mentor: Jocelyn Newton, Psychology

Teachers are more prone to burnout, poor classroom quality and student outcomes without protective factors. School psychologists are knowledgeable on consultation strategies to support teacher services to students. Teachers will be surveyed using the Professional Skills of the School Psychologist in the Consultation Process (COMPPE) and the Maslach Burnout Inventory-Educators Survey (MBI-ES). Results will contribute to existing research on school psychologists' collaborative and supportive consultation services that alleviates burnout.

### **C.G.51 Fitness Impact of the *yicJ* and *yicI* Genes in *E. coli* Growing in Human Urine**

Christopher Kalinka  
Co-author: Audrey Schlenvogt  
Mentor: William Schwan, Microbiology

*Escherichia coli* (*E. coli*) is the most common cause of urinary tract infections (UTIs). Furthermore, *E. coli* is responsible for causing UTIs in 150 million people around the globe and costing \$3.5 billion in healthcare costs in the U.S. alone. To survive in the conditions found in the human urinary tract, *E. coli* uses two-component systems (TCSs) to regulate gene expression. TCSs like the EnvZ-OmpR TCS, can also regulate the expression of small regulatory RNAs (sRNAs). Two of the most pertinent sRNAs regulated by the EnvZ-OmpR TCS are the trans-encoded sRNAs OmrA and OmrB. During RNA sequencing (RNAseq), it was determined that OmrA and OmrB regulate the expression of over 400 genes in uropathogenic *E. coli* grown in human urine. Two of the most significantly upregulated genes identified in the RNAseq were *yicJ* and *yicI*. The *yicJ* and *yicI* genes comprise the *yicJI* operon, which elicits a fitness phenotype during late stationary phase. This leads to the question is the *yicJI* operon important for the fitness of *E. coli* grown in human urine? To answer this question, *yicJ*, *yicI*, and *yicJI* will be ligated into the plasmid pMMB91 downstream of the *tac* promoter and transformed into the *E. coli* strain DH5a to be overexpressed. Growth curves of these pMMB91 complemented strains will be performed in pooled human urine to determine the impact *yicJ* and *yicI* have on *E. coli* fitness.

### **C.G.52 Mental Health: The Role of Parent Involvement for Secondary Students**

Victoria Klaas  
Co-author: Jocelyn Newton  
Mentor: Jocelyn Newton, Psychology

The concern surrounding mental health in youth has exploded in recent years. Parental involvement has been linked to various positive student outcomes, including academic success and decreased depression (Wilder, 2014; Wang and Sheikh-Khalil, 2013). The present study investigated parental involvement and student mental health more broadly, looking at multiple areas of mental health functioning including social, emotional, and behavioral functioning. Results provide critical implications for family-school relationships and interactions with school psychologists and other educators.

### **C.G.53 Teacher Efficacy & Knowledge: Predicting Outcomes for English Language Learners**

Alicia Olsen

Co-author: Jocelyn Newton

Mentor: Jocelyn Newton, Psychology

Teacher efficacy has been linked to academic achievement, yet teacher preparation programs fail to equip teachers with the necessary knowledge to serve English Language Learners (ELLs). The purpose of this study is to investigate the relationship between teacher efficacy and knowledge on the academic achievement of ELLs. By seeking new information and professional development opportunities regarding ELLs, results will encourage school psychologists to be advocates and consultants for their schools.

### **C.G.54 Evaluating Improvement across Rehabilitation in Peripheral Artery Disease Patients: A Comparison between the 6 Minute Walk Test and Max Treadmill Graded Exercise Test**

Charles Schauer

Co-authors: John Porcari and Kimberley Radtke

Mentor: Carl Foster, Exercise & Sport Science

**Purpose:** Peripheral artery disease (PAD) is a debilitating disease that increases mortality and negatively affects quality of life. The primary non-invasive therapeutic step after diagnosis is supervised exercise therapy (SET). A commonly used tool to measure outcomes in PAD patients is a maximal graded exercise test (GXT) on a treadmill. A possible alternative to the GXT is the 6-minute walk test (6MWT). **Methods:** Patients with peripheral artery disease completed a symptom-limited GXT and 6MWT pre and post SET. The order of the treadmill GXT and 6MWT both pre and post SET was randomized for each patient. Primary outcome measures for the tests included total walking time for the treadmill GXT and total distance traveled for the 6MWT. **Results:** Preliminary results suggest that percent change from pre to post SET, for the treadmill GXT and 6MWT, are similar to one another. At this time, correlation between the two tests cannot be determined due to ongoing data collection. **Conclusion:** To date, the study has revealed that the maximal treadmill GXT and 6MWT show similar improvements across SET. These findings suggest that the 6MWT could be used in place of the maximal treadmill GXT to assess outcomes in PAD patients.

### **C.G.55 Impact of Neuromuscular & Perceptual Fatigue from Practice Training Loads on Weekly Readiness to Play during an NCAA Division III Collegiate Football Season**

John Schimenz

Co-authors: Glenn Wright, Scott Doberstein, and Salvador Jaime

Mentor: Glenn Wright, Exercise & Sport Science

**PURPOSE:** The aim of this study was to examine changes in neuromuscular and subjective measures using nontraditional periodization of the weekly practice schedule during an NCAA Division III collegiate football season. **METHODS:** Thirty subjects (10 linemen, 10 skill, 10 combination) were recruited from the university football team to participate in the study through the preseason and competition season. During each practice between competitions, each participant wore an integrated triaxial accelerometer (IA) device affixed to an elastic strap around his torso. Mechanical training load was determined from the IA for each practice through the first seven weeks of the competitive season. Subjects were assessed for changes in loaded countermovement jump performance and subjective measures on Mondays, Wednesdays, and Fridays at the same time of day. We hypothesized that there would be signs of neuromuscular fatigue indicated by lower performance and subjective measures scores on the first day of the practice week resulting from the weekend competition. In addition, we expected to observe a recovery in performance and subjective measures by the end of the practice week to be ready to perform during the weekend competition.



### **C.G.56 Trauma-Informed Care: Its Impact on Knowledge, Attitudes and Burnout**

Ashley Schuh  
Co-author: Betty DeBoer  
Mentor: Betty DeBoer, Psychology

Trauma-Informed Care is a framework for understanding and responding to the impact of trauma. This study will examine the influence of a Trauma-Informed Care training on teachers' knowledge, attitudes and level of burnout. After this training, teachers may be better able to understand and respond to students with trauma histories. School psychologists can use this research to understand the importance of trauma-informed care and create professional development opportunities for other school staff.

### **C.G.57 Ward or Winterfell? The Impact of *Game of Thrones* Tourism on Irish Historic Sites**

Sarah Stepanik  
Mentor: Brian Kumm-Schaley, Recreation Management & Therapeutic Recreation

Nearly since the dawn of mankind, people have been traveling. However, since entering the Information Age, the traditional ideas of travel and tourism have changed drastically. Instagram photos of azure blue seas and Facebook articles touting the best places to visit have become nearly inescapable, undoubtedly having an effect on the people who view them. Another incredibly influential form of pop culture that is influencing travel decisions is film, specifically, *Game of Thrones*. The purpose of this study was to determine how *Game of Thrones* related tourism is impacting Irish historic sites that were used in the show's filming by exploring 1) what kind of demographic is visiting the sites, 2) what is motivating them to visit, and 3) whether they connected to the pop or historical culture of the sites more during their visit. Data includes pre and post-test surveys from 21 Game of Thrones Tours, LLC attendees and participant observation from November 2018 through January 2019. Results suggest that numerous demographic factors and a preexisting interest in the show had significant influence over how attendees became attached to the sites. While there were no significant changes to place attachment after taking the tours, those who connected to the history of the sites were more likely to recommend these sites to others. Furthermore, local tourists were more likely to experience increased place attachment and revisit the sites.

### **C.G.58 Dynamic Postural Stability in Healthy College-Aged Population with and without Ankle Bracing during Multi-directional Jumping Tasks**

Kari Willett, Clint Tudahl, and Luke Sievers  
Co-author: Drew Rutherford  
Mentor: Drew Rutherford, Health Professions

**Background:** Ankle sprains, a common sports injury, result in a large economic burden and missed practices and games across multiple sports. Previous ankle sprains are also a risk factor for future sprains. Ankle braces are frequently used to try to prevent injuries; it has been shown that bracing does reduce injury rates, but the mechanism of this protection is unknown. It has been suggested that people who have sustained ankle sprains have worse dynamic postural stability, as measured by the Dynamic Postural Stability Index (DPSI). Ankle bracing has also been suggested to improve DPSI scores, though the literature shows mixed results for this theory. Previous studies utilized only a forward jumping protocol, but a multi-directional jumping protocol may better mimic athletic activity. **Purpose:** The purpose of this study was to use this protocol to examine changes in DPSI scores and lower extremity biomechanics. **Methods:** This study used a repeated measures design. Healthy college students performed a protocol involving forward, horizontal, and diagonal jumps. There was a braced and non-braced condition. Order of conditions and jump direction was randomized. **Results:** Future analysis of data will focus on DPSI score changes and kinematic differences between conditions in the lower extremity.

## GRADUATE ORAL PRESENTATION ABSTRACTS

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### **O.G.2 The Talk Test as a Measurement of Exercise Intensity in Children: Replication Study**

Brandon VanGalen and Makayla Heim  
Mentor: Carl Foster, Exercise & Sport Science

Physiologic exercise response tests are completed to determine the intensity of exercise and exercise capacity of a participant. These tests of physiological response and exercise intensity are easy to measure when in a clinical setting because of the readily available equipment. In a clinical setting it would be difficult to know intensity of exercise without monitoring equipment. Consequently, subjective measures for exercise intensity have been introduced to lessen the burden of using expensive equipment. Subjective tests allow for simple questions (i.e. "Are you able to speak comfortably?") to be asked about intensity and the relative physiologic responses correlated with the answer. This simplicity of subjective measures sparked the interest in the Talk Test (TT). The purpose of this study was to identify the reproducibility of the TT as an indicator for exercise intensity in children. As well as identify if the TT as an appropriate measure of intensity with natural exercise patterns in children. This study looks specifically at the TT as a measurement of exercise intensity in children ages eight to 12. Ten children were recruited to perform the study. Subjects completed three visits at the laboratory. The three tests consisted of familiarization and the TT, a maximal oxygen consumption test, and an interval based exercise bout with the TT. Statistical analysis will be done to compare the results between the TT and the maximal exercise test.

### **O.G.3 Assessing the Perceptions of Academic Success in Students of Color: A Phenomenological Hermeneutics Study**

Jason Yang and Mai Nue Lor  
Mentors: Emily Whitney and Anders Cedergren, Health Education & Health Promotion, and Richard Sims, Multicultural Student Services

For students to succeed in college, they will require adequate preparation and need to have certain skills to navigate the college environment efficiently and effectively. Results from Bonous-Hammarth's (2000) study showed that African American, American Indian, and Chicano/Latino undergraduate students left the STEM field in larger quantities more than entering the STEM field. Hurtado et al. (2007) shared that students of color switched out of STEM fields if they were faced with isolation due to racism and if they perceived different ethnic and racial values. Schwartz (2012) indicated undergraduate research assists in bridging classroom content with application of knowledge and improves the understanding of course materials. Undergraduate research builds on information learned in the classroom to include better understanding of research methodologies, improves instrumentation and technical skills, and improves their analytical thinking skills. Results from Jones & Reddick's (2017) study indicated students valued their leadership experiences in leading Black student organizations, but also acknowledged there was an unjust power dynamic in predominantly White organizations, such as Student Senate, and Black student organization. Students also shared how administrators provided financial support and encouragement, but those lacked any means to change the internal structure of the university to create an equal power dynamic between all student groups.

### **O.G.7 The Effects of Short-Term L-Citrulline Supplementation on Arterial Stiffness in Prediabetic and Healthy Adults**

Jessica Nagel and Chris Martinson  
Co-authors: Kimberley Radtke and Richard Mikat  
Mentors: Salvador Jaime and Kimberley Radtke, Exercise & Sport Science

**Background:** Prediabetes is marked by elevated levels of plasma glucose. Chronic hyperglycemia may induce thickening of the arteries, oxidative stress, and endothelial dysfunction, a primary cause for cardiovascular disease. In cold temperatures, exaggerated vascular responses augments the risk for cardiovascular events. L-citrulline may attenuate the exaggerated hemodynamic responses to cold exposure. The purpose of this study was to measure the effects of a 2-week L-citrulline supplementation on hemodynamics at rest and during a cold pressor test (CPT). **Methods:** Blood pressures, indices of wave reflection (augmented pressure (AP) and augmentation index (AIx)), and arterial stiffness (pulse wave velocity (PWV)) were measured at rest and during a CPT in 16 normal and prediabetic

older adults (60-85 yrs). Subjects were randomly assigned to 2 weeks of L-citrulline (6g/day) or placebo supplementation in a double-blind crossover design. **Results:** No significant changes with either intervention at rest. Central pulse pressure ( $P=.031$ ) and AP ( $P=.011$ ) in non-prediabetics and AP ( $P=.027$ ) and Alx ( $P=.028$ ) in prediabetics were significantly decreased following L-citrulline supplementation compared with placebo. **Conclusions:** Although L-citrulline had no effect on resting hemodynamics, supplementation attenuates exaggerated vascular responses during CPT. Therefore, L-citrulline may elicit cardioprotective effects from cold exposure in older adults with and without prediabetes.

#### **O.G.12 Effects of L-Citrulline on Microvascular Function, Skeletal Muscle Oxygenation, and Lipolysis in Healthy and Prediabetic Older Adults**

Chris Martinson and Jessica Nagel

Co-authors: Kimberley Radtke, Richard Mikat, and Salvador Jaime

Mentors: Salvador Jaime and Kimberley Radtke, Exercise & Sport Science

**Background:** Prediabetes may increase the risk of endothelial dysfunction and reduce skeletal muscle oxygenation. Increased lipolysis during exercise may reduce fat mass and improve insulin sensitivity. L-citrulline improves endothelial function, although there are no data on lipolysis in humans. The purpose of this study was to measure the effects of a 2-week L-citrulline supplementation on microvascular function, skeletal muscle oxygenation and exercise lipolysis. **Methods:** 16 healthy and prediabetic older adults ( $\text{age}=68.8\pm 9.8$  yrs) participated in this study. Each intervention involved a two-week supply of L-citrulline or placebo in a double blind, crossover design. Each participant completed an occlusion and submaximal handgrip protocol, and a perceptually regulated exercise test (PRET) before and after each intervention. **Results:** There were no significant responses in microvascular function, skeletal muscle oxygenation, or lipolysis rates during submaximal exercise to L-citrulline between normal and prediabetic adults. **Conclusion:** As an exploratory study, there were no significant effects of L-citrulline on efficiency of skeletal muscle oxygenation or rates of fat oxidation during exercise in this population. However, the variables were trending in the direction of our hypotheses. A larger sample size may be needed.

#### **O.G.16 Vascular Health and Physical Performance in Older Normal and Pre-Diabetic Adults Following a Diabetes Prevention Program**

Logan Lasack and Blaire Thielen

Co-authors: Kimberley Radtke, Richard Mikat, and Salvador Jaime

Mentors: Salvador Jaime and Kimberley Radtke, Exercise & Sport Science

**Purpose:** The CDC led a Diabetes Prevention Program (DPP) to negate the progress of prediabetes developing into type 2 diabetes (T2D). Prior research has reported DPP decreasing the rate of T2D (58%) compared to Metformin (31%) among prediabetics. Vascular health and physical performance (PP) limitations have been related with comorbidities of T2D. The purpose of this study is to examine the effects of the DPP on peripheral and central hemodynamics, one-legged balance test, maximal grip strength, and gait speed in normal and prediabetic older adults. **Methods:** Participants were allocated to pilot control ( $n=16$ ) and intervention ( $n=11$ ) groups. The intervention group performed baseline testing and participated in 12-week pedagogy focused lifestyle intervention. Analysis of variance was used to analyze changes between groups over time. **Results:** There were no significant differences in demographic data between groups, except for glucose. There were no significant differences ( $P<.05$ ) between groups for any vascular measures, except for HR, which was significantly reduced ( $P=.031$ ) following the DPP. No significant changes to PP measures. **Conclusion:** Preliminary data demonstrated that the DPP was not significant in altering vascular measures in prediabetics, except in lowering resting HR. As rate pressure product reflects myocardial oxygen demand; lower resting HR may reduce myocardial workload. It is important to note there were only 2 prediabetics included in this pilot dataset.

## O.G.20 Effects of Twelve Weeks of Diabetes Prevention Program on Cardiovascular Risk Factors

Blaire Thielen and Logan Lasack

Co-authors: Kimberley Radtke, Salvador Jaime, and Richard Mikat

Mentors: Kimberley Radtke, Salvador Jaime, and Richard Mikat, Exercise & Sport Science

**Purpose:** The Diabetes Prevention Program (DPP) is an approved curriculum designed to prevent or delay the progression of pre-diabetes to diabetes. Individuals with diabetes have a 2-fold increased risk of developing cardiovascular disease. The purpose of this study was to generate hypotheses and measure the effectiveness of 11 weekly education sessions focused on increased physical activity, implementation of healthy eating habits, and dietary portion control as it relates to cardiovascular disease risk factors. **Methods:** Participants from the La Crosse Exercise and Health Program and Strong Seniors Program (n= 13) (>60 years of age), habituated to exercising a minimum of two days per week, who met one of the following criteria: BMI >25; fasting glucose of 100 to 125 mg/dl; hemoglobin A1c of 5.7-6.4 mmol/L; > 9-point score on DPP questionnaire or a positive screening for prediabetes completed 11 education sessions from the approved DPP curriculum. Body weight, hemoglobin A1c, total cholesterol, low density lipoprotein, high density lipoprotein, triglycerides, body mass index, fat free mass, body fat, systolic and diastolic blood pressure, pulse pressure, and waist circumference were measured pre and post completion of 11 education sessions. Paired samples T test was used to measure for statistical significance ( $p < .05$ ). **Results:** There was a significant decrease in hemoglobin A1c and total cholesterol ( $P < 0.05$ ). No significant difference was found in body weight, low density lipoprotein, high density lipoprotein, triglycerides, systolic and diastolic blood pressure, body mass index, pulse pressure, or waist circumference. **Conclusion:** This study revealed that education on healthy eating habits, portion control and increased physical activity significantly improved hemoglobin A1c and total cholesterol among regularly active older adults. It also revealed that 12 weeks of DPP was not significantly effective at improving other cardiovascular biomarkers.

## O.G.21 Effects of Attentional Focus on Dynamic Whole-Body Movements as a Function of Skill Level

Charlend Howard

Co-author: Attila J. Kovacs

Mentor: Attila J. Kovacs, Exercise & Sport Science

The track and field sprint start is a rapid, dynamic whole-body movement that relies on a set of predetermined instruction to be executed (motor program). Once initiated, such a program is carried out with little to no change. Verbal Instructions focusing on external cues rather than internal cues have been shown to improve reaction time (RT) in track and field athletes during a sprint start (Kovacs et al., 2018). **PURPOSE:** The purpose of this study was to determine if focus of attention manipulation influences RT at a central level during information processing, or at the peripheral level during the conduction of electrical impulses and muscle contractions. Of primary interest was also if these effects are influenced by the level of proficiency at a particular skill. **METHODS:** Twelve collegiate track sprinters (age  $20.8 \pm 1.7$ ), and twelve collegiate non-sprint athletes (age  $20.1 \pm 1.2$ ) completed three testing sessions under external (EF), internal (IF), and no focus instruction (NF) conditions. RT was recorded from the rear starting block. Electromyography (EMG) signal was recorded from the vastus lateralis of the rear leg, and was used to determine muscle activation time, pre-motor RT and motor RT. **RESULTS:** Mean RT was significantly shorter ( $p < 0.001$ ) for sprinters (227.7 ms) compared with non-sprinters (273.8 ms). Mean RT for sprinters was significantly shorter ( $p < 0.00$ ).

## O.G.22 Analysis of Seasonal Differences in Brain Anatomy in Hibernating Thirteen-lined Ground Squirrels (*Ictidomys tridecemlineatus*)

Grant Broeckel

Co-authors: Reid Johnson, Kadie Krzykowski, and Andrea Ruzicka

Mentor: Christine Schwartz, Biology

This study focuses on seasonal changes in brain anatomy in hibernating, thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*). The hibernation period is characterized by cyclical periods of rest (torpor) followed by a period of arousal (IBA). During torpor, heart rate, body temperature, and most cellular processes are reduced by up to 95%. In addition, neurons in non-vital regions in the brain, such as the cerebral cortex, disconnect from one another. Remarkably, the disconnected neurons reconnect within the first two hours of IBA, and most physiological processes return to near-normal functionality. This study examined neuron number and size across three seasonal collection points (summer, torpor, and IBA). Neuron number and size has been analyzed using fresh-frozen prepared brain slices with

Cresyl Violet staining. We examined seven different brain regions across the forebrain. We observed a significantly greater number of neurons present in the somatosensory cortex during torpor compared to both summer and IBA ( $p = 0.031$ ), but no difference in neuron size. No differences in neuron number or size were found in any other brain region analyzed. This observation suggests that there may be an increase in the number of neurons during torpor in non-vital regions, serving as a neuroprotective mechanism throughout hibernation. Further research will include the examination of glial cell number and size, as well as cell proliferation rates between all three seasons.

# **FACULTY & STAFF ABSTRACTS**

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Poster Session A  
The Bluffs: 9:00 am-10:20 am

**A.F.58 Ridged Field Agricultural Systems in Onalaska, Wisconsin: Putting It All Together 37 Years Later**

Cynthia Kocik, Christina Yuen, and Constance Arzigian  
Mississippi Valley Archaeology Center (MVAC)

MVAC excavations from 1982 to 1986 exposed a unique series of late prehistoric Oneota ridged field agricultural systems in Sand Lake Coulee, Onalaska, Wisconsin. Deep unit excavations revealed a series of planting ridges rebuilt periodically as silting from the uplands buried them. The ridge tops reveal corn planting hills, and the structure of the ridged system itself is suitable for the Native American "three sisters" garden of corn, beans, and squash, with the corn plants on the top of the ridge, the beans spiraling up the corn stalks, and the broad leaves of the squash covering the soil to prevent weed growth and evapotranspiration. The ridges may have facilitated agriculture within soils that experience periodic flooding; they may also have helped ameliorate the effects of early or late frosts. This is the most important stratified ridged field system that has been identified in the region. Although highlights of the excavations from 1982 and 1984 have been published, the 1986 work has not yet been written up, and no complete report summarizes the investigations. A recent grant from CLS is helping to synthesize the results of the excavations, digitize the slides and records, and prepare the material for final publication.

**A.F.59 Protect the Megakaryocytes! Stop the Bleeding! Rap1 is the Answer!**

Jaelyn Wisinski, Tam Nguyen, Alexis Grover, Carter Veleke, Payton Bjorkman, Annika Wille, and Regan McElfresh  
Biology

Platelets are specialized cell fragments that circulate in the bloodstream and aggregate to prevent blood from leaving damaged vessels. The number of circulating platelets is governed by the balance of platelet production by mature megakaryocytes and clearance of platelets from the bloodstream by the liver. Normal platelet function requires the small GTPase, Rap1b, whose protein abundance also increases as megakaryocytes mature. The importance of Rap1b in megakaryocyte survival and maturation remains unclear. To identify the role of Rap1b in megakaryocytes, students in the Fall 2017 Molecular Biology Lab course used CRISPR/Cas9 DNA editing technology to specifically disrupt the rap1b gene in the human megakaryocyte cell line, DAMI cells. The disruption of the rap1b gene was confirmed at the protein level. Cells lacking Rap1b had a slower rate of proliferation than normal cells, suggesting that Rap1b promotes DAMI cell survival. Follow up experiments have been conducted to determine if Rap1b alters entry into the cells and DNA replication and/or the rate of cell death by apoptosis. By understanding the role of Rap1b in megakaryocyte survival, we aim to develop treatments to maintain platelet numbers and promote overall health.

**B.F.56 Comparison of Colonic Baseline Ion Secretion and Responses to Stress-related Peptides between Male and Female Mice**

Sumei Liu

Biology

Co-authors: Aaron Karo, Sita Agterberg, and Howard Hua, Summer Research Fellow, Wheeler High School Marietta, GA

Background and Aims: Sex plays an important role in the symptoms of irritable bowel syndrome (IBS) and responses to treatment. Constipation-predominant IBS (IBS-C) is more prevalent in women, whereas diarrhea-predominant IBS (IBS-D) is more common in men. Stress has been shown to increase intestinal ion secretion and may exacerbate symptoms in IBS-D. Most of the previous preclinical studies investigating the effects of stress on gut function were performed in male animals. The aim of the present study was to determine if there was a sex difference in baseline ion secretion in the mouse colon and/or its responses to stress-related peptides, including corticotrophin releasing factor (CRF), urocortin 1 (Ucn1), Ucn2, and Ucn3. Methods: Adult C57BL/6J mice (47 males and 20 females) were used in the present study. Mucosa/submucosa preparations from the proximal colon were mounted in Ussing flux chambers for measurement of short-circuit current (Isc) as an indicator of mucosal ion secretion. Results: Male mice were found to exhibit a significantly ( $p < 0.05$ ) higher baseline Isc ( $70.90 \pm 4.84$  mA/cm<sup>2</sup>,  $n = 47$ ) in the proximal colon than females ( $52.92 \pm 4.40$  mA/cm<sup>2</sup>,  $n = 20$ ). In addition, male mice exhibited a greater increase in colonic Isc (DIsc) than did female mice in response to 1 mM of CRF ( $10.26 \pm 1.31$  mA/cm<sup>2</sup> vs.  $4.59 \pm 1.21$  mA/cm<sup>2</sup>,  $n = 5$ /group,  $p < 0.05$ ), 1 mM of Ucn1 ( $16.65 \pm 2.23$  mA/cm<sup>2</sup> vs.  $6.80 \pm 1.16$  mA/cm<sup>2</sup>,  $n = 5$ /group,  $p < 0.01$ ), 1 mM of Ucn2 ( $21.76 \pm 4.58$  mA/cm<sup>2</sup> vs.  $6.72 \pm 0.57$  mA/cm<sup>2</sup>,  $n = 5$ /group,  $p < 0.05$ ), or 1 mM of Ucn3 ( $41.41 \pm 8.91$  mA/cm<sup>2</sup> vs.  $7.86 \pm 1.47$  mA/cm<sup>2</sup>,  $n = 5$ ,  $p < 0.01$ ). Colonic Isc response to the selective CRF1 receptor agonist, stressin I (1 mM) was similar in male and female mice ( $10.19 \pm 2.19$  mA/cm<sup>2</sup> vs.  $7.08 \pm 5.16$  mA/cm<sup>2</sup>,  $n = 4-5$ /group,  $p > 0.05$ ). In male mice, Ucn3 caused a significantly higher DIsc than stressin I, CRF, Ucn1, or Ucn2. Contrastingly, female mice displayed a similar and weaker DIsc response to these peptides. Conclusions: Marked sex differences were observed in colonic baseline ion secretion and responses to stress-related peptides. Male mice demonstrated a significantly higher baseline ion secretion in the proximal colon when compared with their female counter parts. In addition, CRF, Ucn1, Ucn2, and Ucn3 evoked a greater increase in colonic ion secretion in male mice than female mice. Ucn3 is more efficacious than the other stress-related peptides to evoke ion secretion in the male mouse colon, suggesting a predominant role of the CRF2 receptors in stimulation colonic ion secretion in males. Female mice, however, exhibited low level responses to these stress-related peptides, and no significant differences were seen between these peptides-evoked responses. The results suggest that the greater colonic baseline ion secretion and responses to stress-related peptides in male mice may contribute to the high prevalence of IBS-D in males. Acknowledgement: NIH R15 DK097460-01A1 (SL) and UWL graduate research service and educational leadership grant (AK). Howard Hua is a summer research fellow from Wheeler High School, Marietta, GA



## FACULTY AND STAFF ORAL PRESENTATION ABSTRACTS

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### **O.F.1 Examining the Influences of Innovative Nature and Forest Therapy Walks on Nature Connection and Well-being Outcomes**

Namyun Kil, Emily Simmerman, and Emily Bartig  
Recreation Management & Therapeutic Recreation

The session presenters will address how nature and forest therapy (NFT) influences nature connection, mood states, place meanings and satisfaction with life for participants on NFT walks, as conceptualized within specific psychological theories (e.g., stress reduction theory). Few previous studies have examined the effects of NFT on these constructs, employing a NFT walk with its standard sequences established by Clifford (2018). The presenters implemented a NFT walk with 15 university students for about 2.6 hours on a weekday in September 2018 as part of nature and forest therapy class learning goals, following the standard sequence of NFT walks. The variables were assessed before and after the walk and a total of 11 complete responses were retained for paired samples t-tests. Results reveal empirical evidence on the positive health and well-being outcomes of NFT walks including an increase in level of nature connections, decreases in levels of negative mood states (e.g., anxiety, fatigue, confusion), increases in levels of place meanings, and increases in levels of life satisfaction. Innovative NFT-based activities and settings (e.g., therapeutic mindful immersion or sensory stimulation activities in natural environments) should be provided to enhance favorable outcomes. Future research could verify such beneficial NFT outcomes across various populations including individuals with special needs regardless of age, gender and other socioeconomic factors.

### **O.F.4 The Role of AXL Signaling in Breast Cancer Stem-like Cells**

Sierra Colavito  
Biology

Recently targeted therapies, those that attack a property of a specific tumor and not merely any rapidly growing cell, have been developed for the treatment of breast cancer. Unfortunately, many patients that initially respond to targeted therapy experience tumor recurrence due to the development of resistance. Recently my laboratory has identified a susceptibility of highly aggressive breast cancer cells to a drug that inhibits a protein called Checkpoint Kinase 1 (CHK1). While this drug could potentially be a valuable targeted therapy for patients with claudin-low breast cancer, resistance to this treatment could develop. To identify possible resistance mechanisms, cancer cells were generated that have acquired resistance to CHK1 inhibition. In preliminary efforts we have observed increased signaling through the AXL pathway in resistant cells. We have confirmed that AXL is upregulated in resistant cells compared to parental lines, and have shown that AXL is upregulated in claudin-low patient tumors compared to other tumor types. We also have preliminary evidence that treatment with an AXL inhibitor restores CHK1 inhibitor sensitivity and DNA damage, as well as increases programmed cell death of these cancer cells.

### **O.F.5 What I See Is What I Want: Top-down Attention Biasing Choice Behavior**

Marco Vriens  
Marketing  
Co-author: Judith Schomaker, Social and Behavioral Sciences, Section, Health, Medical and Neuro-  
psychology, Leiden University, The Netherlands

When making a purchasing decision, people typically scan the available options before making a decision. Previous studies have shown that bottom-up stimulus-driven factors can influence choice behavior through their effect on attention, but studies that investigate the effect of top-down attention are scarce. Here, we investigated the role of top-down attention in a choice task using fixation behavior as a proxy of attention. On each trial, participants chose a preferred food item among two similarly valued options. Attention was manipulated using directional, and neutral cues. Although the cues were task-irrelevant, participants viewed cued items longer than non-cued ones. This attentional effect also translated into a choice effect: Participants were faster and more likely to choose a cued versus non-cued item. In conclusion, task-irrelevant cues effectively impacted top-down attention and choice behavior as a result, suggesting that cues can be used to guide attention to consumer products and affect purchasing decisions.

## **O.F.8 Implementation of Security and Privacy Aspects of a Healthcare Social Network**

Kasi Periyasamy  
Computer Science  
Co-author: Saleh Alsyefti

A recent medical survey indicates that healthcare social networks are very helpful in promoting awareness of health issues, discussing related health problems with other patients and healthcare providers, and finding quick solutions for some of the health problems. Social media and advances in mobile technology make healthcare information accessible to many patients. Healthcare providers are also able to gain more benefits from healthcare networks by exchanging information with other providers and disseminating valuable health related information. The two major problems in using healthcare networks as reported in the literature are security of information stored and passed through the network, and privacy of patients' health information. This presentation describes the design and implementation of a healthcare network focusing on the two aspects - security and privacy. The implementation of the network used the theoretical models published earlier by one of the authors. The current implementation used Nephrology, the study of kidney diseases, for illustration. However, the design and implementation of the network has been made sufficiently generic so that it can be used for other health domains such as gynecology and psychiatry.

## **O.F.11 Open-Mindedness and Closed-Mindedness: Virtue or Vice?**

Eric Kraemer  
Philosophy

The terms “open-minded” and “closed-minded” are typically used positively and negatively respectively in ordinary discourse, being employed to describe either the nature of a person’s thought or aspects of a person’s character. Open-mindedness is regarded as an intellectual and moral virtue, while closed-mindedness is taken to be an intellectual and moral vice. Since these terms pick out features relevant to one’s role as a knower and moral actor, it is appropriate that philosophers have lately been investigating the nature of open-mindedness and closed-mindedness. And, it turns out that the concepts are not as straight forward as one might have initially supposed. In this presentation, I examine views on open- and closed-mindedness recently advanced by several philosophers [including Jason Baehr, Jeremy Fantl and Heather Battaly]. While I find much to agree with, I also raise objections and problems for their respective views and propose an alternative which I attempt to show to be superior to its current competitors. I also examine the striking claim recently put forward by several philosophers that in some circumstances closed-mindedness can in fact be virtuous and open-mindedness vicious. I raise concerns for this claim, arguing that open-mindedness is always both morally and intellectually superior to closed-mindedness.

## **O.F.13 Where Do Honey Bees Sleep?**

Barrett Klein  
Biology  
Co-author: M. Kathryn Busby, University of Arizona

Sleep is important. To understand how and why, it's necessary to identify sleep and to know when and where it occurs. Philosophers to researchers have long pondered the societal marvels of honey bee colonies, and making visible their activities is a pursuit that has changed our understanding of what nonhumans are capable of. Viewing otherwise obscured bees in their nests would be necessary to calculate the total quantity and quality of sleep and sleep’s relevance to the health and dynamics of a honey bee and its society. We sought to create our own window into the lives of worker bees to discover if what can be seen outside honeycomb cells (tips of honeybees' abdomens) can give us reliable indicators of what is going on with the rest of the body. Is a bee feeding, heating other bees, cleaning.... or sleeping? Watching respiratory movements and using thermography allows a viewer to noninvasively answer this question.

### **O.F.18 Using "Pence Rule" to Avoid #MeToo: Another Excuse for Gender Discrimination**

Yeonka Kim  
Management

Co-authors: Si Ahn Mehng, School of Business, University of North Carolina at Pembroke, and Christine Bell, School of Business, University of North Carolina at Pembroke

This paper seeks to understand a worldwide social phenomenon regarding sexual harassment through people's responses to #MeToo and Pence rule in the U.S. and South Korea. Unlike the original intention of the Pence rule to prevent sexual harassment, its unexpected behavioral outcome is limiting opportunities for women in both cultures. Without considering the cultural and religious origin of the Pence rule and reasoning behind it, the simple behavioral outcome of the Pence rule can be appealing to many people across cultures for different reasons. To better understand the phenomenon and its implications, we aim to qualitatively explore the following research questions: (a) What are the major perceptual similarities or differences in using the Pence rule between the U.S. and Korea? (b) What are the relevant cultural aspects that may influence those perceptions? We conduct the content analysis of people's responses to the use of Pence Rule from major newspapers in the U.S. and South Korea. Our results provide similar and distinct perceptions between two countries and unique factors from each country's cultural context. This paper advances diversity literature and provides practical implications by showing that people's different perceptions from their ideologies can influence their attitudes and behavior in the workplace.

### **O.F.24 The Fragile Nature of Harmony in Confucian and Neo-Confucian Philosophy**

Sam Cocks  
Philosophy

The purpose of this presentation is to give an overview of the different ways that some Confucian and Neo-Confucian philosophers have understood social harmony, focusing on its fragility. We will accomplish this through an overview of their beliefs on the structure of reality (metaphysics), human nature, and the formation of value. What we will discover is a wide array of suggestions for why it is that social existence is "primed" for harmony, and why nonetheless harmony is indeed fragile. We will end by discussing some of the Wang Yangming's more radical views on this topic.

### **O.F.25 Nonparametric Statistical Inference for Comparing Multiple Measures of Center in 3-Dimensional Rotation Data**

Melissa Bingham  
Mathematics & Statistics

Although there have been fairly recent advances regarding statistical inference techniques for 3-dimensional rotation data, there are still many areas of interest yet to be explored. One such area involves comparing multiple measures of center. In this talk, a nonparametric statistical test for comparing means of multiple 3-dimensional rotation data sets is developed by pulling ideas from a traditional Analysis of Variance. The validity of the developed test is then examined by considering its statistical power under various conditions.

**2018  
RECIPIENTS OF  
STUDENT  
RESEARCH  
GRANTS**

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**2018 RECIPIENTS OF  
UNDERGRADUATE RESEARCH AND CREATIVITY GRANTS**

<b>Name</b>	<b>Department</b>	<b>Mentor</b>	<b>Title</b>
Sita Agterberg	Biology	Sumei Liu	The Effects of Corticotropin Releasing Factor and Related Peptides on Intestinal Epithelial Permeability in Mice
Rachel Alderton	Art	Joel Elgin	Social Interaction in the Barbizon Region through the Lens of Art: Then and Now
Abbie Anderson	Chemistry & Biochemistry	Kelly Gorres	Inhibition of the Epstein-Barr Virus by an Atypical Antipsychotic
Erin Anderson	Exercise and Sport Science	Cordial Gillette	Randomized Control Trail Comparing Four Way Leg Exercises in Anatomical vs. Turned Out Position on Gluteus Medius Strength.
Jordan Appel, Samuel Friederichs	Health Professions	Thomas Greiner	Investigation of Lower Limb Kinematics in Humans, Chimpanzees, and Baboons
Caitlyn Atchison, Brea Stanton	Exercise & Sport Science	Naoko Giblin	The Effects of Molded vs Metal Cleats across Playing Surfaces on Baseball Biomechanics
Jacob Auman	Chemistry & Biochemistry	Kelly Gorres	Functional Role of dUTPase in Kaposi's Sarcoma-Associated Virus (KSHV)
Courtney Baker	Biology	Eric Strauss	Microplastics in the Upper Mississippi River: Fact or Fiction?
Dylan Baldassari, Daniel Reinhardt	Biology	Barrett Klein	Y-Maze Learning in Sleep Deprived Honey Bees
Anna Baumgartner	Psychology	Alessandro Quartiroli	The Exploration of the Meaning Attributed to Their Professional Quality of Life by the Women Officers within the UW-La Crosse Reserve Officers' Training Corps (ROTC)
Samantha Beckett, Hailey Wierzba	Psychology	Jocelyn Newton	How Education can Impact the Perception of Individuals with Disabilities and Integrated Classrooms
Tyler Bennett	Psychology	Alexander O'Brien	Correlations Between Perfectionistic Tendencies and Mental Health Outcomes
Nicholas Berg	Chemistry & Biochemistry	John May	DcrB: Salmonellas' Defense to Toxic Metals
Tyler Besaw	Sociology	Dawn Norris	Exploring the Relationship between Mental Illness Stigma and Attitudes on Gun Control Policy
Kaitilyn Bestor	English	Bryan Kopp	An Analysis of Advocacy Methods of Animal Rights Organizations: Toward a Global Campaign for the Meat Tax
Zachary Biehn	Psychology	Alessandro Quartiroli	Student Athletes' Perception of Value and Effectiveness of Sports Psychology Services as Influenced by the Practitioners' Training and Gender: A Quantitative Approach

Name	Department	Mentor	Title
Abby Bishop, Cassidy McCann	Health Education & Health Promotion	Karen Skemp	The Effects of the Ketogenic Diet on Body Composition and Performance in Resistance Training Women.
Steven Bonin	History	Víctor Macías- González	Determining Patterns of Southwestern Indian Policies among the Spanish, Mexican, and United States Governments
Kylee Britton	Sociology & Criminal Justice	Nicholas Bakken	Teacher's Attributions: Systematic Racism within the Education System
Elenor Brown	Chemistry & Biochemistry	John May	Key Role of dcrB in Bacterial Copper Resistance
Jaycelin Chan, Allison Quartaroli, Emily Thorpe	Educational Studies	Leslie Rogers	Towards a Better Understanding of Parent-Teacher Partnerships during Individualized Education Program Meetings: A Mixed Methods Evaluation
Aaron Christensen	Geography & Earth Science	Niti Mishra	Examining the Potential of Unmanned Aerial System (UAS) Imagery for Genus Level Mapping of Native Prairie Vegetation in Wisconsin
MacKenzie Christy	Health Education & Health Promotion	Karen Skemp	Effects of a Ketogenic Supplement on Body Composition and Performance in Resistance Training Women
Zachary Cigich	Microbiology	Peter Wilker	Measuring genotypic and Phenotypic Changes Associated with Influenza Viruses Subjected to Serial Bottleneck Events
Melissa Clement	Economics	Mary Hamman	Allostatic Load: Job Stability's Impact on Health Outcomes
Nate Conley	Sociology & Criminal Justice	Dawn Norris	At Home Genetic Tests and Their Psychosocial Effects
Kaisa Crawford- Taylor	Physics	Shauna Sallmen	Investigating Optimizing Mirror Orbits for Darkside Illumination
Vanessa Czeszynski	Biology	Eric Strauss	Comparative Analysis between Empty vs Full Fish Gut Contents and Stable Isotopes to Place Trophic Position
Ellie Dahms, Monica Bertucci	Microbiology	Paul Schweiger	Engineering Microbes for the Efficient Biomanufacturing of Vitamin C and Acetoin
Nicholas Domanico	Biology	Anita Baines and Todd Osmundsun	Effects of Land Usage on Microbial Composition in Urban Wetlands
Olivia Dorscheid	Sociology & Criminal Justice	Carol Miller	Impact of Relationships on Contraceptive Use amongst American and Ghanaian Students

Name	Department	Mentor	Title
Alydia Downs	Art	Brad Nichols and David Anderson	Recreating the Art of the Past
Emily Farebrother, Carly Boles	Theatre Arts	Gregory Parmeter	The Tragedy of Macbeth: An Actor Collaborative Production
Benjamin Finley	Geography & Earth Science	Niti Mishra	Semi-automatic Detection of Wild Rice ( <i>Zizania palustris</i> ) on an Indian Reservation Using Satellite and Drone Derived Imagery
Sydney Flannery	Archaeology & Anthropology	Katherine Grillo	Pottery Characteristics and Techniques of the Iraqw of Luxmanda, Tanzania
Mary Franitza	Global Cultures & Language	Omar Granados	Gender Identity in the Language Classroom: the Central Role of Salient Identities in Multicultural Education and Mentorship
Cullen Gaffy	Chemistry & Biochemistry	Kelly Gores	GABA and Its Effects on the EBV Lytic Cycle
Alexandra Galbraith	Chemistry & Biochemistry	Nadia Carmosini	Assessing the Novel Pesticide, EarthTec QZ, as a Potential Measure for Controlling the Invasive Snail, <i>Bithynia tentaculata</i>
Samuel Gowan	Psychology	Michael Wong	Comparing Action Video Games and Mediation as Interventions for Improving Attention
Brady Grapentine	Philosophy & Environmental Studies	Mary Krizan	Belief, Meaning, and Database Revision: An Interpretive Semantic Theory for Natural Languages According to Davidsonian Constraints
Julian Grosskopf	Chemistry & Biochemistry	Todd Weaver	HpmA TPS Domain Templating Function following Sequential Amino Acid Extensions
Andres Guerrero	Chemistry & Biochemistry	Valeria Stepanova	Expansion of the Synthetic Approach to Curcumin and Curcuminoids
Austin Haas	Psychology	Christa Kiersch	Learner Characteristics: The Effects of Internal Locus of Control and State Anxiety Levels on Training Outcomes
Taylor Hackel	Chemistry & Biochemistry	Nicholas McGrath	Generation of Novel Bioorthogonal Reactions between Coumarin and Diazo Compounds
Chase Hackner	Biology	Scott Cooper	Practicality of Residential Sustainability in the Midwest
Samantha Harding, Brianna Reeder	Psychology	Alessandro Quartiroli	Involvement in Organized Competitive Sports and its Effects on Overall Mental Well-Being
Emily Hauri	Mathematics & Statistics	Barbara Bennie	Statistical Methods for Analyzing Non-Normal and Correlated Data

Name	Department	Mentor	Title
Megan Hein	Biology	Tisha King-Heiden	Effects of Sublethal Exposure to Thiomethoxam on Behavior of Zebrafish Larvae
Ciara Herman	Archaeology & Anthropology	Christine Hippert	Creating Community in a Community Garden
Colin Jackson	Mathematics & Statistics	Huiya Yan	Locating a Business Distribution Center by Graph Theory
Kaytee Johns	Sociology & Criminal Justice	Enilda Delgado	An Analysis of Factors Relating to Student's Perceptions of a Supportive Environment at UWL
Jacob Kailing	Biology	Jennifer Klein	Oxidation of Calmodulin through the AMPK Pathway as a Means of Disrupting Myogenesis
Adam Kain	Microbiology	William Schwan	Screening <i>Staphylococcus aureus</i> Two-component Regulatory System Mutants for Their Role in Protein A Presentation.
Laura Kaiser	Chemistry & Biochemistry	Aric Opdahl	Developing Temperature Gradient SPR to Quantify Single Nucleotide Variability in DNA
Aidan Karlsson	Biology	Barrett Klein	From Isolated to Aggregated: Does Denser Nest Aggregation in Solitary Bees Result in Reduced Parasitism?
Sophia Kero	Chemistry & Biochemistry	Valeria Stepanova	Development of Green Catalytic Heterogeneous Synthesis of Curcuminoids
Bo Kim	Geography & Earth Science	Gargi Chaudhuri	Slum Classification Map in Mumbai with OBIA and CNN
Bradley Koehler	Psychology	Ryan McKelley	Zero-Sum Gender Beliefs: Examining Conformity to Masculine Norms as a Moderator
Rachel Kragenbrink	Biology	Jennifer Klein	Modeling Changes in Calcium Regulation in Oxidatively Damaged Muscles Cells
Nathaniel Krueger, Anna Bower	Biology	Alder Yu	Research on the Relationship between Shift Work and Cancer
Kadie Krzykowski, Andrea Ruzicka	Biology	Christine Schwartz	Investigation of Seasonal Changes in Glial Cells in the Hypothalamus, Hippocampus, and Cerebral Cortex of the 13-Lines Ground Squirrel
Olivia Kulaszewicz	Biology	Tisha King-Heiden	Histological Assessment of Liver Damage in Female <i>Pimephales promelas</i> (Fathead Minnows) Following Exposure to Known Hepatotoxicants
Nico Lang	Chemistry & Biochemistry	Valeria Stepanova	Microwave-assisted Conventional and Green Synthesis of Curcumin
Mara Limbeck	Psychology	Bianca Basten	Effects of Masculinity on Intimate Partner Violence in Honor and Non-Honor States



Name	Department	Mentor	Title
Milena Maldwin	Chemistry & Biochemistry	Valeria Stepanova	Study of Microwave-Assisted Syntheses of Small Biologically Important Molecules
Lucas Mathson	Biology	Bradley Seebach	Chronic, Low Level Amphetamine Effect on Neurophysiology in the Medicinal Leech
Cassidy McCann, Shivani Kulkarni	Chemistry & Biochemistry	Nicholas McGrath	A Concise Synthetic Route to Lactone-Containing Natural Products
Michael McKelvey, Bria Theodore, Ethan Larsen	Microbiology	Michael Hoffman	Creating and Characterizing a Human Parainfluenza-3 M-Knockout Virus
Avery McLain	Archaeology & Anthropology	Katherine Grillo	Ceramic Sourcing and Pastoralism in Prehistoric Africa
Glory Melotte	Archaeology & Anthropology	Amy Nicodemus	Assessing Seasonal Mobility of sheep in Bronze Age Romania: A Strontium and Oxygen Isotope Analysis of Teeth
Julia Mielke	Art	Joel Elgin	Barbizon Printmaking
Ellie Miller	Psychology	Tracie Blumentritt	Preschool Blues (and Pinks!): The Relationship between Time Spent in Child Care Arrangements, Social-Emotional Behavior, and Gender Role Development
Maxwell Molls	Geography & Earth Science	Gargi Chaudhuri	Developing a Social Deprivation Index for Socially Equitable Planning
Sam Mosiman	Sociology	Nicholas Bakken	Impacts of Mental and Physical Health Issues on Post Release Outcomes: The Ability to Return to Life Outside of Prison
Kali Moublow	Communication Studies	Sara Docan-Morgan	Using Relational Dialectics Theory to Examine Communication between Adult Siblings of Divorce
Abigail Multerer	Microbiology	William Schwan	The Importance of GadE in <i>fliC</i> Expression in Uropathogenic <i>Escherichia coli</i>
Maria Nelson	Exercise & Sport Science	Naoko Giblin	The Effects of Hamstring Flexibility on Countermovement Jump Performance in Those with and without History of ACL Reconstruction
Tam Nguyen	Biology	Jaelyn Wisinski	Regulatory Activity of the Small G-protein Rap1b in Human Megakaryocytes and Platelets
Matthew Peck	Geography & Earth Science	Gargi Chaudhuri	University of Wisconsin-La Crosse Campus Map Creation and Utilization of ADA Building Guidelines around Campus
Rebekah Peplinski	Biology	Anne Galbraith	RT-qPCR Analysis of Genes Involved in the Response to SK-03-92 Treatment in Yeast

Name	Department	Mentor	Title
Charlotte Peters	Geography & Earth Science	Joan Bunbury	Continued Analysis of a Sediment Core as a Basis for Understanding Climate Change and Its Effects on the Settlement, Habitation, and Subsequent Abandonment of the Aztalan Site in Southeastern Wisconsin
Ryan Potter, Kathryn Aukerman	Psychology	Ellen Rozek	The Effect of Repetitive Head Impacts on Cognitive Functions in Contact and Non-contact Sport Athletes
Lydia Reilly	Art	Joel Elgin	Barbizon Printmaking: A History and Revitalization of French Architecture
Rachael Reis	Theatre Arts	Benjamin Golden	Acoustical Analysis of the Frederick Theatre
Benjamin Ringham	Exercise & Sport Science	Attila Kovacs	Omega-3 Fatty Acids Modify the Learning and Performance of a Balancing Motor Skill in Healthy Young Adults
Alexander Robbins	Chemistry & Biochemistry	Kelly Gorres	Enzymatic Activity of dUTPase from Epstein-Barr Virus
Megan Roddy	Theatre Arts	Laurie Kinckman	Theatre Arts Publicity Research Project
Victoria Salerno	Biology	Barrett Klein	Sleep in an Ecologically and Agriculturally Relevant Herbivore and Its Parasitoid
Olivia Schauls	Archaeology & Anthropology	Christine Hippert	Examining the Community Supported Agriculture Program at Old Oak Family Farm and How It Changes Eating Behaviors
Roman Schlimgen	Chemistry & Biochemistry	Daniel Grilley	Segmented Disruption of the Nonpolar $\beta$ -Helix of HpmA and its Effect on Protein Structure, Function, and Secretion
Taylor Schroder	Biology	Christine Schwartz	Investigating Seasonal Changes in Neuron Number in the Hibernating Ground Squirrel
Lillian Schulte	Microbiology	William Schwan	Role of MW2284 and MW2285 Proteins in Regulating <i>S. aureus</i> Biofilm Production
Natalie Sims	Communication Studies	Ayesha Patnaik and Tony Docan-Morgan	Arranged Marriages in India: An Analysis of Generational Perceptions and Family
Harold Soeder	Biology	Alder Yu	Understanding Metabolic Effects of Circadian Rhythm Disruptions in Fruit Flies
Ross Soens	Chemistry & Biochemistry	John May	Interactions between Divalent Cations and a Lipoprotein Found within a Family of Infectious Bacteria
Lucas Spellman	Chemistry & Biochemistry	Dan Grilley	Determination and Analysis of Protein Kinetics of Hemolysin A
Alexander Steil	Biology	Jennifer Klein	Oxidation of Calmodulin as a Mechanism of Muscle Degeneration

Name	Department	Mentor	Title
Gage Stuttgen	Chemistry & Biochemistry	Todd Weaver	The Quantitative Link between Non-Polar Core Stability and Secretion of Gram-Negative Virulent Proteins
Michaela Thielen	Chemistry & Biochemistry	John May	Screening for Drug-Like Inhibitors of Salmonella Virulence
Marina Tingblad	Archaeology & Anthropology	Constance Arzigian	Understanding the Construction of Oneota Vessels through Experimental Archaeology
Tevin Trinh	Biology	Alder Yu	Measuring Circadian Gene Expression in <i>Drosophila</i> Adipose Tissue
Brandon Tristano	Educational Studies	Roi Kawai and Ann Yehle	How an Immersion Program in a Majority Black School Impacts White Pre-Service Teachers' Perceptions of the Black-White Achievement Gap
Brandon Tristano	Library	Teri Holford	The Big Ideas Club: An Introduction to Philosophy for 4th and 5th Grade Students Through Picture Books and Facilitated Conversations
Daniel Walgenbach	Biology	Jennifer Klein	Methionine-Aromatic Interactions and Calmodulin Conformational Change
Daniel Walgenbach	Chemistry & Biochemistry	Nick McGrath	A Bioorthogonal Approach to Reacting Diazo Compounds with Coumarins
Hannah Watkins	Microbiology	William Schwan	The Role of Global Regulatory Proteins in <i>Staphylococcus aureus</i> Superantigen-like Protein Gene Expression
Sandra Weiss	Archaeology & Anthropology	Amy Nicodemus	Metal, from Prestige to Utilitarian: An Analysis of Butchery Marks During the Bronze Age Occupation of Pecica Șanțul Mare, Romania
Hannah Wheaton	Chemistry & Biochemistry	Kelly Gorres	Protein Expression and Purification of ORF48 H146A Found within the Kaposi's Sarcoma-Associated Herpesvirus
Danielle Whitish, Laura Harper	Psychology	Tesia Marshik	The Effect of Self-Efficacy on a Simulated Rehabilitation Task
Emiko Wilks	English; Art	Darci Thoune and Kate Hawkes	Challenging Perceptions: The Layering of Truth in the News and Contemporary Photography
Leah Williams	Theatre Arts	Greg Parmeter	Telling the Traumatic Story
Lucas Wyrembeck	Philosophy	Samuel Cocks	Nietzsche's Heroic Suffering in Western Literature: A Contemporary Life-Affirming Imperative

**2018 RECIPIENTS OF THE GRADUATE RESEARCH,  
SERVICE, AND EDUCATIONAL LEADERSHIP AWARDS**

<b>Name</b>	<b>Program or Department</b>	<b>Faculty Sponsor</b>	<b>Title</b>
Douglas Appel	Biology	Gretchen Gerrish	Comparative Study of Four Common Zooplankton Sampling Gear for Use in Big River Habitats
Sabrina Aspenson	Biology	Thomas Volk and Todd Osmundson	A Twenty-Year Morphological and Molecular Study of Macro Fungi in the Driftless Region of Southwestern Wisconsin, USA
Joshua Barbara	Cell & Molecular Biology	Jennifer Klein	An Observation of Spontaneous Activity Differences in Neurons as a Response to Oxidative Stress
Grant Broeckel	Biology	Christine Schwartz	Analysis of Seasonal Changes in Brain Anatomy and Cell Proliferation in Hibernating Thirteen-Lined Ground Squirrels
Elista Fisher	Biology-Aquatic Science	Gretchen Gerrish	Assessing Zooplankton Community Dynamics and Evolutionary Adaptations to Asian Carp Invasion in the Upper Mississippi River
Anna Hilger	Microbiology	Bonnie Bratina	Effects of Oil Contamination on Microbial Community and Function in the La Crosse River Marsh
Christopher Kalinka	Microbiology	William Schwan	Does the <i>yicll</i> Operon Contribute to Uropathogenic <i>Escherichia coli</i> Fitness When Cultured in Human Urine?
Logan Keding	Biology	Tisha King-Heiden	Effects of Liver Toxicity on Vitellogenesis in Fathead Minnows
Logan Lasack	Clinical Exercise Physiology	Salvador Jamie	Diabetes Prevention Study
Christopher Martinson & Jessica Nagel	Clinical Exercise Physiology	Salvador Jamie	The Effects of Short-term L-citrulline Supplementation on Arterial Stiffness and Muscle Oxygenation in Prediabetic and Non-Diabetic Adults
Dustin McHenry	Biology	Eric Strauss	Phosphorus Uptake in the Streams of the Fox River Basin
Abraham Packard	Biology	Barrett Klein	A Study in Forensic Ichnology: The Effects of Blattidae, Dermestidae, and Tineidae Exposure on Bone

<b>Name</b>	<b>Program or Department</b>	<b>Faculty Sponsor</b>	<b>Title</b>
Samantha Petite	Therapeutic Recreation	Namyun Kil	Professional Association of Therapeutic Horsemanship, International (PATH Intl.) Certification
John Schimenz	Human Performance	Glenn Wright	Optimizing the Internal: External-Load Ration in NCAA Division III Women's Soccer Practices
Jacob Schmidt	Clinical Microbiology	Michael Hoffman	Characterization of HPIV3 Matrix Protein Mutants with Budding Deficiencies
Aaron Simoni	Clinical Microbiology	Anne Galbraith	Effect of the Antimicrobial Drug SK-03-92 on melosis and Meiotic Genes in <i>Saccharomyces cerevisiae</i>
Sara Stepanik	Rec Management	Brian Kumm-Schaley	Ward or Winterfell? The Impact of Game of Thrones Tourism on Irish Historic Sites
Marcia Taddy	Human Performance	Glenn Wright	USA Track and Field Coaching Education Level 2 Program
Blaire Thielen	Clinical Excercise Physiology	Kimberley Radtke	Diabetes Prevention Program

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A,B,C= Poster/Exhibits; O=Oral Presentations;  
F=Faculty & Staff; G=Graduate Students; U=Undergraduate Students

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Grosskopf, Julian	A.U.16; C.U.16	Kreienbrink , Kendra	A.U.22
Grover, Alexis	A.F.59	Krueger, Nathan	C.U.4
Guerrero, Andres	C.U.17	Kulaszewicz, Olivia	B.U.16
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Kolbe, Abigail	C.U.22	Mlsna, Mikayla	B.G.46
Kontny, Mitch	C.G.49	Molls, Maxwell	C.U.46

<b>NAME</b>	<b>ABSTRACT(s)</b>	<b>NAME</b>	<b>ABSTRACT(s)</b>
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Picel, Hannah	A.G.55	Sweetman, Mari	O.U.19
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<b>NAME</b>	<b>ABSTRACT(s)</b>	<b>NAME</b>	<b>ABSTRACT(s)</b>
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### **COMMENTS OR SUGGESTIONS?**

We welcome your comments and suggestions about the Symposium.  
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