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Tuesday, April 26, 2016
Valhalla, Cartwright Center
8:30am – 12:45pm

SCHEDULE OF ORAL PRESENTATIONS

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UNDERGRADUATE STUDENT ABSTRACTS

UNDERGRADUATE POSTER PRESENTATION ABSTRACTS

Poster Session A
Valhalla Hall: 9:00am-10:45am

U.1 **Migrations in Relation to Conflict**

Justine Bula

Mentor: Georges Cravins, Geography and Earth Science

The sudden and forced movement of people, due to conflict, can have long lasting effects on many countries as well as our society and world. I will be conducting a comprehensive analysis of the countries with the highest numbers of refugees leaving, in order to gain a better understanding of the push factors that are forcing people to leave their countries borders in large numbers today. By looking at a number of factors that lead to the forced migration of people I will evaluate the major push factors that are present today. To gain a better understanding of these I will be looking at the histories, political, societal, and economic structure of the top five refugee producing countries as of 2015. The methods for my research will include reading and analyzing current articles and compiling data for the countries of interest as well as for countries that have recently dealt with large scale forced migrations and have since stabilized.

U.2 **Multiplication Operators on Weighted Banach Spaces of a Tree**

Isaac Craig

Mentor: Robert F. Allen, Mathematics and Statistics

We study multiplication operators on the weighted Banach spaces of an infinite tree. We characterize the bounded and the compact operators, as well as determine the operator norm. In addition, we determine the spectrum of the bounded multiplication operators and characterize the isometries. Finally, we study the multiplication operators between the weighted Banach spaces and the Lipschitz space by characterizing the bounded and the compact operators, determine estimates on the operator norm, and show there are no isometries.

U.3 **No Pain, No Gain: The Influence of Gender Conformity and Priming on Pain Perception**

Kendall Doersch

Mentor: Ryan McKelley, Psychology

Previous research has indicated that several socially-related factors have been shown to have an effect on how people perceive painful stimuli. The current study explores how gender-role conformity and priming affect a female participant's pain tolerance in a cold pressor task. After providing informed consent, 120 female participants representing high and low masculinity scores, as determined by the BEM Sex Role Inventory (1974), will be randomly assigned to one of three conditions where they will receive a prime that reinforces the masculine higher pain tolerance view, the feminine lower pain tolerance view, or a control with no prime. Their physiological responses (heart rate variability and galvanic skin response) will be measured while they submerge their dominant arm in ice water up to the elbow for up to three minutes. They will remove their hand if/when the pain is unbearable and subjectively evaluate their pain using the Universal Pain Assessment Tool (ANOVA). I plan to use ANOVA to explore the main effects and interactions for gender conformity, priming, and pain tolerance. In a study conducted by Fillingim (2001), women who

self-described as more masculine reported lower pain intensity ratings. Data collection is still in progress; however, I hypothesize that women who score higher on traditional masculinity will report a higher pain tolerance than those that score lower. Additionally, researchers have found that priming plays a role in pain perception in that men reported being less sensitive to pain when primed with a feminine-favoring gender role, which researchers theorized challenged the men to behave in a more typical masculine way and report less pain (Fowler et al., 2010). Based on these results, I expect within-group differences whereby more masculine women faced with a masculinity-challenging prime will report the highest pain tolerance.

U.4 **Effects of Lattice Segmentation on Microtubule Mechanics**

Scott Erickson

Co-Authors: Naoto Isozaki, Jennifer Ross, and Taviare Hawkins

Mentor: Taviare Hawkins, Physics

Multiple cell functions including motility, intracellular transport, and mitosis depend on microtubules. Particularly during mitosis, microtubules must be long and rigid, a quality characterized by persistence length (Lp). Our previous work has shown that the stabilizer GMPCPP increases rigidity (Lp = 1.85 ± 0.5 mm) over Taxol alone (Lp = 0.65 ± 0.1 mm). When under the influence of both GMPCPP and Taxol, the effect of GMPCPP dominates and the microtubule is more rigid (Lp = 1.95 ± 0.7 mm). We investigate microtubules with variable stiffness along their length made from GMPCPP and Taxol segments. Segmented microtubules are polymerized by growing Taxol segments from a GMPCPP seed or annealing segments after each are polymerized separately. Annealing creates defects in the lattice structure, while growth from a seed reduces defects. Two experimental techniques are used to determine persistence length of: (1) individual, freely fluctuating microtubules and (2) microtubules with one fixed end. The use of two methods allows for a more accurate interpretation of the effects of segmentation on microtubule rigidity. We report the initial findings of this study.

U.5 **Two Cans Short of Six-Pack Abs: The Influence of Goal-Orientation on Mood in the Achievement of Physical Activity Goals.**

Jonathan Flinchum and Cienna Hopkins

Mentor: Alessandro Quartiroli, Psychology

Physical activity and happiness have been consistently correlated together, but there has been limited research concerning the influence of physical activity goals and their achievement on happiness. Added to this, people's unique characteristics such as goal-orientation (i.e., how an individual defines success) can affect how one reacts to achievement. This study attempted to answer the question of whether or not achievement of a physical activity goal could affect a person's mood based upon their goal-orientation. Participants in this study were given a goal to keep their average heart rate below a standardized value as they underwent a treadmill task. Each participant's happiness level and mood were assessed before and after the task using the Subjective Happiness Scale and Brunel Mood Scale. The Perception of Success Questionnaire assessed participant's goal-orientation, which measures both task-orientation and ego-orientation. The task fit both of these orientations as participants had to individually reach their goal (task-orientation) and they were also told that the average college student was able to achieve this goal (ego-orientation). Falsified results of the task were given to see how each participant was affected by their assigned achievement condition (achieve, not achieve, or control). Based upon previous studies, it was hypothesized that people with higher levels of goal-orientation categories (task and/or ego) would have higher fluctuations in mood as compared to their counterparts. Results from this study will provide

physically active people, such as athletes, with better knowledge concerning how they react to achievement and how they should cater this into what types of goals they should set.

U.6 **The Physiological Effects of Kinesiology Tape on Muscle Activation during Recovery Using Electromyography**

Tiffany Fohey

Co-author: Naoko Aminaka

Mentor: Naoko Aminaka, Exercise and Sport Science

Context: Kinesiology Tape (KT) is known for aiding in muscle recovery by reducing inflammation, and assisting in muscle support and relaxation. Studies have shown the psychological and physiological benefits of KT, but limited studies have been done looking at the effects of KT on electromyography (EMG) activities after localized fatigue. Objective: Determine if KT affects quadriceps muscle activity during the 72-hour recovery period after localized fatigue. Design: Randomized control trial. Setting: Research laboratory. Participants: Fifty college students volunteered, and were randomly assigned to KT (n=13), placebo (n=14), and control (n=23) groups. Interventions: For baseline data, subjects performed maximum voluntary isometric contractions (MVIC) on a Biodex machine to fatigue the quadriceps. Electrodes were placed using proper protocol on the rectus femoris (RF), vastus medialis (VM), and vastus lateralis (VL) prior to the MVIC. The EMG activities were measured during a single leg hop for distance (HopD), a two leg counter-movement jump (CMJ), and a star excursion balance test (SEBT) in posteriolateral (PL), posteriomedial (PM), and anterior (ANT) reaching directions. Subjects re-performed the tests immediately after fatigue, and specified tape was administered. The testing procedures, including the MVIC measurements, were repeated for all subjects at 48 and 72 hours post-fatigue. Main Outcome Measures: Independent variables were time (Pre, Immediate, 48hr and 72hr), muscles (RF, VM and VL), and group (KT, Placebo, Control). Dependent variables included EMG activities during each exercise (HopD, CMJ, SEBT tests). For each DV, repeated-measures ANOVA was utilized (α=0.05). Results: Overall, there were no group differences on muscle activity during each exercise ($p>0.05$). The effects of time were observed in several exercises (CMJ, ANT, PL and PM). There was a significant effect of muscles; however, the effects of groups on individual muscle activities were not observed. Conclusions: Muscle activity during recovery from fatigue was not affected by taping interventions.

U.7 **Building a Simulated Multi-Context Dataset to Test for Differential Methylation in Plants**

Michael Fuerte

Mentor: Douglas Baumann, Mathematics and Statistics

Methylation of DNA is a well understood epigenetic mechanism that influences gene expression and can trigger specific gene silencing in polyploid eukaryotes. Recent next-generation sequencing (NGS) techniques have allowed researchers to examine methylation rates across whole genomes and test for differential methylation across different biological conditions using newly developed analytical methods. Animals in general show methylation at cytosines preceding a guanine on the sugar phosphate backbone of DNA (CpG); however plant species are known to demonstrate methylation at context sites where a cytosine is neighbored by a nucleotide other than guanine. Biological variables in these cytosine contexts, such as uneven spacing between CpX dinucleotide sites (X = any nucleotide not cytosine) and correlation of methyl values for similar subsequently occurring dinucleotide and trinucleotide cytosine contexts, influence the rate of methylation at the individual cytosine level. In addition, standard methods of whole-genome sequencing are costly and produce a limited amount of working data sets per treatment condition, thus any

interplay between biological factors and methylation rates may not be fully observed in the data. To better understand the interaction of cytosine contexts and respective methylation rates, an algorithm in R (statistical coding software) will be used to develop simulated, but experimentally realistic, methylation data focused on plant species while incorporating a correlation factor of similarly occurring cytosine contexts.

U.8 **Does Embryonic Exposure to Triclosan Impair the Ability of Zebrafish Larvae to Capture Prey?**

Jyoti Gautam

Co-authors: Tisha King-Heiden and Ryan Paukert

Mentor: Tisha King-Heiden, Biology

Triclosan (TCS) is a chemical used widely in personal care products such as soaps, detergents, cosmetics, and pharmaceuticals. TCS is particularly toxic to aquatic organisms. Studies in our lab have shown that early exposure to relatively high concentrations of TCS impairs the development of craniofacial structures in larval fish. The purpose of this study is to examine whether embryonic exposure to environmentally relevant concentrations of TCS permanently impairs the development of craniofacial structures, and whether this is associated with functional deficits. Zebrafish were exposed to vehicle control, 0.4, 4.0, 40, or 400 µg TCS/L via static waterborne exposure with daily renewal from 3– 120 hours post fertilization (hpf). Following exposure, they were raised in clean water until they reached 21 dpf. We are using standard and geomorphometrics to evaluate impacts on skeletal structures associated with the head and lower jaw, and feeding assays to measure their ability to capture prey items. Ability to capture prey items will be correlated with impacts on craniofacial structures. Our preliminary findings suggest that functional deficits may not be linked to morphological malformations. This information will help us to better understand the environmental and developmental impacts of TCS.

U.9 **Expression and Functional Characterization of a Novel Calmodulin GFP Fusion Protein**

Zoey Good, Ruth Higbe-Harrah, and Katherine Berreau

Mentor: Jennifer Klein, Biology

Age-related muscle wasting, sarcopenia, has been linked to oxidative stress, which is an imbalance between the production of free radicals and the body's ability to counteract them. The exact mechanism of this is not known. We predict that calmodulin is integral to the skeletal muscle's response to oxidative stress. Calmodulin is an important signaling molecule involved in a variety of cell responses. Calmodulin has abundant methionine residues, which could be oxidized, and serve as a cellular signal. This current project focuses on mutating four different methionine residues on calmodulin into either a glutamine or a leucine. Glutamine resembles a shape similar to an oxidized methionine, while leucine resembles the shape of a reduced methionine. We predict a methionine to glutamine mutation (M to Q) may enhance the cell's ability in adapting to oxidative stress, whereas a methionine to a leucine mutation (M to L) would blunt a cell's oxidative stress response. We are making a total of eight calmodulin mutants that we will eventually express in zebrafish, an appropriate model system for muscle aging. In order to detect the presence of calmodulin in zebrafish muscle, we've fused the calmodulin gene to the green fluorescent protein gene (GFP). The first aim of the current project is to create and express the CaM-GFP fusion protein in bacteria and to determine whether the fusion protein folds correctly. The second aim is to develop assays that will be used to measure aging and oxidative stress response in zebrafish. Eventually, our research group will build on this work by measuring aging and oxidative stress in transgenic zebrafish that are expressing the mutant calmodulin fusion proteins.

U.10 **Effects of Hibernation on the Enteric Nervous System of the 13-Lined Ground Squirrel Stomach**

Katherine Haakana

Co-author: Katherine Busniewski

Mentor: Sumei Liu, Biology

The gastrointestinal tract is innervated by the enteric nervous system which controls gut motility, ion secretion, and local blood flow. During hibernation there are dramatic changes in the body including lowered core body temperature, lowered basal metabolic rate, decreased heart rate, respiration rate, and slowed gastrointestinal motility. To better understand this change in gut motility we examined the expression of multiple neurochemical markers on neurons in the enteric nervous system. The stomach was removed from five summer active, five winter torpor, and five interbout arousal ground squirrels. Myenteric plexus was dissected from the stomach specimen. Immunofluorescence staining was used to examine the neurochemical markers for enteric neurons. Human neuronal protein C/D (HuC/D) was used as a marker to label all enteric neurons. Choline acetyltransferase (ChAT) is an enzyme that is essential for the synthesis of acetylcholine (ACh), an excitatory neurotransmitter in the enteric nervous system. Nitric oxide synthase (NOS) is an enzyme that is essential for the synthesis of nitric oxide (NO), an inhibitory neurotransmitter in the enteric nervous system. The number of immunoreactivity neurons were counted from 30 ganglion on each myenteric plexus. There were no significant changes in total number of neurons as labeled by HuC/D. There was a significant decrease in the ChAT-immunoreactive neurons in winter torpor ground squirrels compared to summer active and interbout arousal. There was no significant change in the expression of NOS between summer active, winter torpor, and interbout arousal ground squirrels. In conclusion, there was a selective decrease of ChAT-immunoreactive neurons in the myenteric plexus of the torpid ground squirrel stomach, which may contribute to the slowdown of gastric emptying during winter torpor.

U.11 **Growth Capabilities of SK-03-92 Persister Strains Compared to the Parent Strain**

Elissa Harter

Mentor: William Schwan, Microbiology

Methicillin-resistant *Staphylococcus aureus* (MRSA) is an ongoing health threat in healthcare facilities and the general public due to the species increasing antibiotic resistance. We have previously identified a new drug, named SK-03-92 that has shown antibacterial killing activity against MRSA. We have determined that some MRSA bacterial cells can survive in the presence of high concentrations of SK-03-92 drug without an inheritable mutation in the genome. These bacteria are considered SK-03-92 drug persisters. In this study, we investigated the growth capabilities of the parent strain of these drug persisters in comparison to the drug persisters themselves through murine models and growth curves. Two drug persister strains were isolated by culturing *S. aureus* strain MW2 on trypticase soy agar with increasing concentrations of the drug SK-03-92. Two SK-03-92 drug persister strains were eventually isolated, named EHP1 and MW292P1, which grew in SK-03-92 drug concentrations as high as 32 mg/ml. In a murine thigh abscess model of infection, the parent *S. aureus* strain MW2 had higher colony counts in murine thigh abscesses as compared to the drug persister strain EHP1. However, strain MW2 had similar colony counts as compared to the drug persister strain MW292P1. Furthermore, the SK-03-92 drug persister MW292P1 grown in 8 μgl/ml SK-03-92 trypticase soy broth (TSB) reached the stationary phase at a lower optical density than the MW2 parent strain grown in TSB. These results show that the parent strain MW2 grows better than the two drug persister strains in vitro and in vivo.

U.12 **Comparison of American Hmong and Caucasian Undergraduate Students on Measures of Depression, Loneliness, and Executive Control**

Dylan Jester and Morgan Timmerman

Co-Author: Ellen Rozek

Mentor: Ellen Rozek, Psychology

Loneliness, a subjective interpretation of one's social connections, or a lack of social support both have the potential to negatively impact cognitive functions. Experiences of loneliness and lack of social support may be exacerbated for individuals in the minority in a primarily Caucasian environment. Research indicates that bilingual individuals have enhanced executive control which may buffer the possible risks for cognition. The goal of the present study is to compare American Hmong and Caucasian students, (1) on measures of depression and loneliness levels, on a predominantly white campus, and (2) to assess the relationship between bilingualism and executive control. Participants completed questionnaires about demographic characteristics, social support (MOS Social Support Survey), loneliness (de Jong Gierveld Loneliness Scale; UCLA Loneliness Scale, single item measure), depression (Beck Depression Inventory), and cognitive tasks (MMSE, Stroop). Participants are young adults aged 18 to 25 years old on a mid-sized, Midwestern, campus consisting of Hmong-American students (25%, n = 17) and Caucasian students (69%, n = 46). The first hypothesis is that Hmong-American students will have higher rates of depression and loneliness compared to Caucasian students. The second hypothesis is that bilingual Hmong-American students will have greater inhibitory control compared to non-bilingual peers. By identifying whether or not this group has particular risk for experiencing loneliness or depression, targeted outreach programs could be developed to combat perceived or real isolation.

U.13 **Creating a Ribavirin-Resistant Influenza Virus to Study the Effects of Viral Genetic Diversity**

Carli Johnson and Alyce Addesso

Mentor: Peter Wilker, Microbiology

This work aimed to generate high-fidelity influenza virus mutants in order to identify molecular determinants that affect error rates during genome replication and evaluate the biological importance of viral genetic diversity. Ribavirin is a guanosine analog that is thought to inhibit influenza virus replication in part by inducing lethal mutagenesis. Ribavirin-resistant influenza viruses were hypothesized to have higher fidelity viral polymerase activity as compared to wild type virus. A/Victoria/361/2011 (H3N2) influenza virus was serially passaged for six rounds in the presence of 12.5 μM ribavirin. Virus was recovered at low, but detectable, levels after each successive passage. The replication kinetics of the wild-type virus and virus recovered after three and six rounds of passage were assessed in MDCK cells in the presence and absence of ribavirin. Viruses recovered after three and six passages in the presence of ribavirin replicated with kinetics comparable to the wild-type virus in the presence of ribavirin. Therefore, despite repeated passage in the presence of ribavirin, there was no evidence to support the emergence of a ribavirin-resistant virus. Surprisingly, viruses recovered after three and six passages in the presence of ribavirin also replicated as well as wild-type virus in the absence of ribavirin, suggesting that recovered virus may not have accumulated deleterious mutations as anticipated. The genomes of wild-type and passaged virus populations will be sequenced to assess the mutagenic effect of ribavirin on influenza viruses.

U.14 **Versatile, Mild, and Selective Reduction of Various Carbonyl Groups using an Electron-Deficient Boron Catalyst**

Adam Kleman and Katherine M. Lucas

Co-authors: Luke R. Sadergaski, Caitlyn L. Jolly, Brady S. Bollinger, Brittany L. Mackesey, and Nicholas A. McGrath

Mentor: Nicholas McGrath, Chemistry and Biochemistry

A mild and selective new method was discovered to reduce acetanilides and other carbonyl compounds. Unlike sodium borohydride, which is selective in reducing aldehydes and ketones, this new protocol is uniquely selective in reducing amides and nitriles over other carbonyl containing functional groups. Alternatively, beta-ketoamides were shown to be reduced at the ketone preferentially over the amide.

U.15 **Evaluation of Caffeine Consumption Compared to Aminophylline on Patients Experiencing Headaches during a Lexiscan Stress Test**

Greg Lanik

Co-authors: Amy Bell and Carlyn Johnson

Mentor: Aileen Staffaroni, Health Professions

Many patients undergoing a myocardial perfusion imaging study are unable to achieve the target heart rate necessary to produce quality stress images; therefore, administration of a pharmaceutical stress agent, such as Lexiscan (Regadenoson), is often utilized. Lexiscan binds to the A2A adenosine receptors; however, caffeine in a patient's system can counter act its effectiveness by interfering with those binding sites. If a patient normally consumes large amounts of caffeine, withdrawal from it can often cause headaches which patients can misinterpret as a side effect of Lexiscan. Therefore, Aminophylline may be administered to treat these adverse reactions. The purpose of this study is to determine if giving caffeine, in the form of coffee, to patients who regularly consume caffeine can treat headaches without administering Aminophylline. METHODS: Data was collected from questionnaires on 176 patients that underwent a Lexiscan sestamibi procedure. The questions were used to determine the patient's caffeine consumption and any headache symptoms prior to the administration of Lexiscan, as well as other symptoms prior to and after the stress test. Patients who had indicated headaches prior to the stress test were given coffee after the stress test, to determine if caffeine was effective in alleviating their headaches. If the headaches were not resolved with caffeine, they were then given Aminophylline. RESULTS: Of the 34 patients reporting headaches prior to and after Lexiscan administration, 17 were given nothing, eight received coffee, seven were administered Aminophylline, and two were given both coffee and Aminophylline. Of the eight patients who were provided only coffee, seven stated that their headache dissipated. Another 30 patients reported headaches post Lexiscan only. Of those, 18 were given nothing, six coffee, and six Aminophylline. Of the six patients receiving coffee, five indicated that their headache went away. CONCLUSION: Giving caffeine to patients reporting a headache after Lexiscan administration proved effective in reducing their headaches. Therefore, caffeine consumption post-Lexiscan administration could aid in the treatment of headache symptoms caused by both caffeine withdrawal and Lexiscan administration. This can be beneficial to the patients and staff alike, reducing both the cost and the time associated with Aminophylline administration.

U.16 **Targeting the *Mycobacterium tuberculosis* Thioredoxin Reductase through Docking and MIC Analysis**

Lauren Lipker

Co-authors: Katie Engel, Daniel Sem, Terrence Neumann, and William R. Schwan

Mentor: William Schwan, Microbiology

Mycobacterium tuberculosis causes tuberculosis, afflicting hundreds of millions worldwide. Within *M. tuberculosis* an enzyme called thioredoxin reductase is involved in redox homeostasis, preventing damage to mycobacterial cells. Because of rampant drug resistance among *M. tuberculosis* strains, new drugs are needed to treat patients with tuberculosis. One approach to discovering new anti-mycobacterial drugs utilizes a docking software program, where the X-ray crystal structure of *M. tuberculosis* thioredoxin reductase is docked to small molecular structures. It is thought that by binding to the active site, the compounds may be able to kill or inhibit the growth of *M. tuberculosis*. Six small molecules were identified by the docking analysis and screened for antibacterial activity using an MIC analysis. The MIC data shared that none of the compounds had anti-mycobacterial activity against *Mycobacterium smegmatis* and *Mycobacterium marinum* (MIC >128 µg/mL). However, three of the compounds had MIC results that ranged from 16-64 µg/mL against *Staphylococcus aureus*, and one compound had an MIC of 32 µg/mL against *Enterococcus faecalis*. None of the compounds had activity against *Escherichia coli* and *Pseudomonas aeruginosa*. The failure of all the compounds against mycobacteria may be due to the lipid-rich cell wall of mycobacterial species. Activity against *S. aureus* shows some promise though.

U.17 **Investigating the Mechanism of Action of CL-5, a Potential New Drug for Parasitic Worms**

Alexis McKeever and Courtney McKeever

Mentor: Jennifer Miskowski, Biology

It is estimated that 2 billion people in the world are infected by helminths, or parasitic worms (Holden-Dye and Walker, 2014). Helminths also infect animals, and therefore, are taking their toll on the livestock industry. One complication is that helminths are becoming resistant to the drugs that treat them, called anthelmintics, and the number of drug-resistant strains are growing rapidly. With this in mind, a multi-departmental effort at UW-L and partners at WiSys Technology Foundation are striving to address this issue by exploring a novel collection of chemicals as potential new anthelmintic treatments for drug-resistant strains. Previous work in the Miskowski lab used the non-parasitic worm, *Caenorhabditis elegans*, as a model to screen this chemical library for anthelmintic activity, and CL-5 was identified. Further work on CL-5 has suggested that it induces cellular stress mechanisms in animals exposed to it, including elevated reactive oxygen species (ROS) production. This project aims to study the mechanism by which CL-5 kills worms in more detail.

U.18 **Violence in the Midcontinent: A Comparative Analysis of Oneota Interactions with Mississippian and Central Plains Populations**

Eric Nordstrom

Mentors: Constance Arzigian and David Anderson, Archaeology and Anthropology

Oneota is a name given to groups of Native Americans with a shared material culture originating in the upper Midwest around AD 900 (Hollinger 2005:28). Within a few hundred years, objects representing Oneota culture extended from Indiana to Kansas and from Missouri to Canada (Hollinger 2005:29, 45). This expansion led Oneota peoples to come into contact with those inhabiting the Central Plains, an area with less evidence for prehistoric violence than in the Mississippi River valleys where the Oneota developed (Blakeslee 1994; Hatch 2015; Hollinger 2005; Milner 1999; Pugh 2010; Steadman 2008). This thesis examines direct and indirect evidence of prehistoric violence from archaeological sites in Illinois and Nebraska that show evidence of intergroup conflict and habitation by Oneota, Mississippian, or the Central Plains populations, or some combination thereof. Differences in political systems as well as subsistence

and settlement practices may have contributed to varying incidence of violence between cultural groups in these areas.

U.19 **Co-Infections of HIV-1 and *Porphyromonas gingivalis* Predisposed Macrophages to Persistent HIV-1 Infection**

Kingsley Ozongwu

Mentor: Andrew Henderson, Department of Medicine, Boston University School of Medicine

HIV-1 increases the body's susceptibility to opportunistic infections by targeting cells necessary for immune function, such as T cells and macrophages, which leads to a general immune dysregulation and to a number of secondary diseases in a variety organ systems including the oral cavity. An opportunistic oral pathogen that has been shown to infect many people who suffer from HIV, is *Porphyromonas gingivalis* (*P. gingivalis*). This study sought to determine the effects of *P. gingivalis*, on the susceptibility of macrophages to HIV infection. By co-infecting monocyte-derived macrophages with HIV-Luc, an HIV clone that includes the luciferase reporter gene, and heat killed *P. gingivalis*, and measuring luciferase expression, we were able to determine the level of HIV gene expression. We found that macrophages that were co-infected with *P. gingivalis* decreased HIV expression. However, this decrease in HIV gene expression was not due to impaired proviral transcription as the levels of HIV transcripts were not affected. We concluded that co-infection with *P. gingivalis* reduced HIV-1 replication in macrophages at a point after proviral transcription. Our results suggest a novel mechanism for establishing and maintaining HIV persistence within macrophages.

U.20 **Investigating Student Methods of Scaling in Minecraft: A Case Study**

Jordan Pellett

Co-author: Joshua Hertel

Mentor: Joshua Hertel, Mathematics and Statistics

In this poster we present a case study of two students as they work through scaling tasks in the game Minecraft. The publication of Seymour Papert's (1980) Mindstorms suggested an alternative vision of mathematics teaching and learning wherein a virtual micro-world environment could serve as a means to teach mathematical ideas. The notion of a micro-world has undergone changes with advancements in research and technology (Healy & Kynigos, 2010), but an enduring challenge has persisted: What role can virtual environments play within the teaching and learning of mathematics? To address this question, we designed a five-day instructional sequence to engage sixth-grade students in investigations of scale factor within the game Minecraft. Students worked in pairs through a series of tasks that focused on scaling two-dimensional and three-dimensional shapes. We will focus on the strategies that the pair of students used, describe obstacles that emerged, and outline the challenges they faced in understanding scale factor in real-world and virtual-world contexts. Healy, L., & Kynigos, C. (2010). Charting the micro-world territory over time: Design and construction in mathematics education. ZDM Mathematics Education, 42, 63–76. Papert, S. (1980). Mindstorms: Children, computers and powerful ideas. London, United Kingdom: Harvester Press.

U.21 **Gender Differences in Achilles Tendon Loading during Running**

Rachel Schornak, Justin Davis, Gabrielle Mark, and Samantha Kohnle

Mentor: Thomas Kernozek, Health Professions

Recreational running has many reported health benefits, but risks of injury to the Achilles tendon are common. Previously, it has been reported that males are at a higher risk of Achilles tendon injury during running. Our research examined the difference between 15 male and 15 female subjects' running at a medium speed. Reflective markers, motion capture, and force plates, were used in a musculoskeletal model to estimate Achilles tendon (AT) stress. AT stress was determined using inverse dynamics and HBM static muscle force optimization. The AT cross-sectional area was obtained using ultrasound and the AT moment arm was determined from published cadaver data. Independent samples t-tests were used to compare between genders. Our comparison revealed that neither the peak stress nor the integrated stress differ significantly between the males and females.

U.22 **Comparing Parasitic Infections between Invasive Lionfish (*Pterois volitans*) and Native Fish in a Belizean Reef Ecosystem: Does Enemy Release Facilitate Invasion Success?**

Claire Simpson, Katrina Fuchs and Courtney Purcell

Mentor: Greg Sandland, Biology

Invasive species pose an increasing threat to biodiversity around the world. There are a number of factors that can facilitate the invasion process, including reduced parasitic infection levels within invaders. We attempted to test this idea by assessing parasite communities in both invasive lionfish (*Pterois volitans*) and various native fish species from tropical reef habitats. Fish were collected from three habitats near South Water Caye, Belize. Gastrointestinal and gill parasite loads were determined using standard necropsy procedures which included stomach, intestine, and liver dissections. Mean parasite abundance was lower in lionfish (0.59 parasites/ fish) than native fish (2 parasites/ fish). These findings support the idea that invasive lionfish have fewer parasites than native fish, which may contribute to their invasion success in the Caribbean. The ecological implications of these findings will be discussed.

U.23 **A Comparison of Muscle Activation during Crossover Symmetry and Traditional Thrower's Ten Exercises**

Allison Susa and Sarah Costello

Co-authors: Joel Luedke and Naoko Aminaka

Mentor: Naoko Aminaka, Exercise and Sports Science

Thrower's Ten (TT) has been a traditional shoulder rehabilitation program and crossover Symmetry (COS) is a recently developed program with the aim of enhancing muscle functions for rehabilitation. The objective was to compare the two exercise programs on activation of supraspinatus (SS), infraspinatus (IS), middle trapezius (MT), and serratus anterior (SA) muscles, in a healthy population (18 individuals with experience in overhead sports). Subjects performed three exercises in random order from each program (COS, TT), while electromyography (EMG) data was collected bilaterally for the selected muscles. TT exercises included Scaption with dumbbell, External Rotation (ER) at 90° shoulder abduction with resistance band, and Prone Row with weight. COS exercises included COS Row, COS 90-90, and COS Scaption. Exercise sessions were separated by at least one week. The independent variable was the exercise program (COS, TT). Dependent variables included EMG activity (%MVIC) of eight muscles (SS, IS, MT, SA on right and left sides). Data was normalized, and for each exercise pair, a separate repeated measures ANOVA was utilized (α=0.05). Regardless of muscles, TT Scaption demonstrated a higher activation compared to COS Scaption. Post-hoc pairwise comparison revealed TT Scaption yielded higher activation of left MT, and bilateral SS, compared to COS Scaption. There was more overall muscle activity during COS Row compared to TT Row. Post-hoc comparison indicated that bilateral MT and SS were more active during COS than during TT. Post-

hoc comparison revealed that COS 90-90 demonstrated higher activity of MT bilaterally, compared to TT ER. Based on the results select COS exercises may be beneficial for more comprehensive activation of multiple upper extremity muscles. However, some TT exercises may be able to isolate activation of specific muscles. Clinicians may choose different exercises depending on the goals of activating multiple muscles simultaneously or targeting a specific muscle.

U.24 **Identity under Attack: Threatened Masculinities Effect on Gender Related Attitudes**

Tanner Taylor

Mentor: Casey Tobin, Psychology

Individual men vary on the extent to which they display and endorse traditional masculinity; however, the extent to which gender roles help explain behaviors has become an important factor in psychological research. Research has been done in many areas including violence, sexual activities and threatened identity. Self-completion theory states that a threat to identity will result in a response that compensates and assures recognition of that identity. Studies that have threatened masculinity have found compensatory behavior in men relating to consuming male targeted products, violence and aggression towards women, and body dissatisfaction. This study will look at the relationship among a threatened gender role, aggression towards women and appeal of sexual acts. Ninety college aged men will disclose self-reported sexual demographics and complete a masculinity scale. Participants will be randomly assigned to receive bogus results of being either above or below average for masculinity purportedly based on the information they provided or receive no results. Following bogus feedback, the participants will take the Appeal of Sex Scale, as well as the Violence against Women scale. I hypothesize that men whose masculinity is threatened will show more negative attitudes towards women and hold a higher appeal of sexual acts, desires and intimacies.

U.25 **Better Writers, Not Just Better Papers: The Impact of Perceived Competence and Goal Orientation on the Writing Performance of ESL and Native English Speakers**

Katelin Traffie and Alayna Stein

Mentor: Jessica Sim, Psychology

Previous literature indicates that individuals can be categorized into one of two general goal orientations: performance or mastery, which determine approaches to learning, effort expenditure, and persistence. A performance goal orientation reflects a need to demonstrate competence, especially in competition with others. In contrast, a mastery goal orientation reflects the belief that competence develops over time through practice and effort. For college writers, differences in goal orientations often manifest in the writing process itself. Mastery-oriented writers often take advantage of learning resources such as university writing centers and online writing help, while performance-oriented writers tend to focus on the assignment grade rather than improvement as a writer. We hypothesized that priming mastery (vs. performance) orientations will result in stronger (vs. weaker) writing performance and retention, and we expect this effect to be moderated by perceived competence. We are collecting data from native English speaking and English as a Second Language (ESL) students. The study consists of a perceived competence scale to measure their confidence as English language writers, either a mastery- or performance-orientation prompt, a series of guided writing tasks, and an Internal Motivation Inventory to measure reactions to the task. Next, to measure if knowledge was retained, participants completed the same writing task, but without any guidance. We expect the results to show mastery-oriented participants did better on both tasks than performance-oriented participants. Additionally, we predict that both native English and ESL

students will perform better and retain more with mastery prompts. While we expect native speakers with mastery goals to show the highest level of performance overall, we expect the impact of the mastery (vs. performance) prompt to be greatest on ESL students. If our hypotheses are supported, we will have evidence to recommend mastery orientation for writers.

U.26 **Evaluation of Radiation Exposure to Echo Technicians from MPI Procedures**

Kathryn Van Schyndel (Prahl)

Co-authors: Carlyn Johnson and Shari Mask

Mentor: Aileen Staffaroni, Health Professions

Objectives: Patients undergoing myocardial perfusion imaging (MPI) are often scheduled for an echocardiogram study the same day. Some technicians have expressed concerns regarding their radiation exposure potential while imaging these patients. Since echo technicians' exposure to radioactive patients is not well described in current literature, the primary objective of this study was to evaluate the whole body radiation exposure that technicians receive from patients undergoing an echocardiogram post MPI. The secondary objective was to identify the necessity of dosimetry badging for employee safety in order to address technician concerns of exposure. Methods: This was an observational study at Ministry Saint Joseph's Hospital and Marshfield Clinic in Marshfield, WI, that included 129 patients receiving both a 99m Tc-Sestamibi MPI and an echo procedure the same day. A lead pig containing two badges labeled "Upper" and "Lower" were placed in each of six echo labs. Echo technicians were instructed to place the "Upper" badge on the left collar of their shirt and the "Lower" badge on their right side, approximately six inches below their armpit, ensuring that it would come into contact with the patient during imaging. The badges and related documentation were collected and rotated approximately every two weeks. Results: Of the 129 patients in the study, 111 were excluded as a result of scheduling the MPI after the echo study. This scheduling was found to be incidental. Echo technician exposures were recorded utilizing the badge exposure data from the 18 remaining patients. Preliminary results demonstrate that technician exposures varied from non-detectable to 10 mrem with the "Upper" badges, on average, recording a lesser exposure rate than the "Lower" badges. Conclusion: Most patients receiving an echo were unintentionally scheduled in a way that minimized technicians' exposure, either by having the study prior to MPI or after the patient's radioactivity had decayed. Despite this, 2 week badge exposures still collected to up to 10 mrem. In the absence of a standardized scheduling protocol, there is a risk that the 111 (86%) patients excluded from this study would add to the radiation exposure if they had received the MPI prior to the echo study. Conservative radiation badging for whole body dose begins at 100 mrem in order to ensure compliance with regulations that require badging begins at 500 mrem. Exposures of this level would indicate a necessity to badge and adjust radiation safety education requirements of employees in the echo department.

U.27 **Ancient Medicine Viewed through a Contemporary Lens: Mediation of Gene Expression in Breast Cancer Cells Using an Edible Mushroom Extract**

Amanda Walsh

Mentor: Todd Osmundson, Biology

Shiitake mushrooms *(Lentinula edodes)* contain polysaccharides, including lentinan, previously shown to display antitumor properties. These polysaccharides are generally believed to modulate immune responses in the body to promote tumor death; however, a direct negative effect on cancer cells has also been noted. The purpose of this research is to test the in vitro effect of shiitake polysaccharides on breast cancer cell

lines and to identify the genetic mechanism of inhibition, if it occurs. Ten previously-characterized cell lines were treated with polysaccharide extracts from shiitake mushrooms for 72 hours. Their amount of cell death was assessed and dose-response curves were created. A direct negative effect of shiitake polysaccharides on breast cancer cell lines: HMLE-shEcad, HMLE-Snail, T47D, MDA.MB.436, and MCF-7 was found. However, control cell line HMLE-shGFP also displayed a negative effect. Cell growth assays and migration assays were performed without significant results. The preliminary results of this study have shown that there is not a significant direct effect of polysaccharide extracts on breast cancer cell lines. Research has shown that these extracts will possibly display an up-regulation on immunomodulated responses in macrophages leading to an inhibition of breast cancer cell growth. These effects will be tested at a later date.

U.28 **Mapping Instances of Mountaineering Fatalities in the Himalaya between 1950-2006**

Evan Weis

Mentor: Gargi Chaudhuri, Geography and Earth Science

The use of maps has long been a tool in the effective synthesis of information. Whether undertaking something as complicated as navigating the globe or tracking the progression of desertification, or something as simple as finding your way in an unfamiliar city, maps are paramount in the quick and succinct understanding and identification of unique information. Maps can help us find things when we are lost or, when applied, understand critical information that details large scale activities and provides accurate and timely information to help improve the safety and cost effectiveness of an operation. The function of my research in not only to educate others on mountaineering expeditions in the Himalaya, the aim of which is to assist in the improvement of existing mountaineering expeditions and to provided interested parties with valuable information. This will be achieved through the development of existing data into GIS Static and Interactive web maps which will, upon completion, be made publicly available for the benefit of all. The scope of the study includes all major mountaineering peaks in the Nepal Himalayan range. Through mapping the instances of fatalities we are not only able to determine the risk level associated with a particular mountaineering route but are similarly able to identify the underlying patterns within individual peaks, the greatest risk factor associate with fatal events and gain the ability to concisely track geospatial locations of mountaineering fatalities within the region.

U.29 **Antiviral Effects of Highbush Cranberry Extracts**

Katrina Fuchs

Mentor: Michael Hoffman, Microbiology

Viburnum trilobum is a native shrub to Wisconsin also known as the highbush cranberry (HBC). Native tribes once used this shrub for medicinal purposes, leading some to believe that it may have antiviral properties. Past work has shown that organic extracts from dried HBC fruit did contain antiviral activity. In this project, we tested extracts from several different cultivars of HBC to determine if there were significant differences in their antiviral activities. To test this hypothesis, luciferase-expressing human *parainfluenza* virus type 3 (HPIV3-luc) was exposed to varying concentrations of four different HBC cultivar extracts. HeLa cells were then infected with the HPIV3-luc and HBC extract combination, and after 24hrs of infection the cells were lysed, and virus replication was assessed by measuring luciferase activity. Some cultivars appeared to have greater antiviral activity than others. Such cultivars will be the focus for further development of HBC antiviral activity.

U.30 **Influence of Antibiotics on Mouse Intestinal Smooth Muscle Contraction**

Madison Hardman

Co-authors: Morgan Katzenmeyer and Erin McCauley

Mentor: Sumei Liu, Biology

Mammals and gut micro biota coevolved in a symbiotic relationship. The gut micro biota is necessary for the well-being of the mammalian host. To better understand the relationship between the host and gut micro biota we did a preliminary observation in mice and we found that by treating the animal with broad-spectrum antibiotics for 2 weeks the gastrointestinal transit decreased. However, we are unsure if the decrease in gut motility is due to the decrease in gut bacteria or the direct effect of antibiotics on gut smooth muscle. The aim of this study was to investigate if antibiotics have a direct effect on intestinal smooth muscle contraction. Three C57BL/6 mice were used in the study. A segment of ileum was removed and incubated in an organ bath. The organ bath was filled with 10 ml of Krebs solution and maintained at 37C, with continuous supply of 95% O2/5%CO2. Ampicillin, vancomycin, neomycin, or metronidazole was added to the organ bath. The intestinal smooth muscle contraction was recorded before and after the addition of the antibiotic, each individually or in a cocktail of all four antibiotics. We found that the antibiotics had no direct effect on the amplitude and frequency of the intestinal smooth muscle contractions. The results suggested that the decrease in gut motility is due to the decrease in gut micro biota.

U.31 **Display Densities of a Bioluminescent Polychaeta, *Odontosyllis luminosa*, across Three Marine Habitats**

Mitchel McCloskey and Josh Scheil

Mentor: Gretchen Gerrish, Biology

Bioluminescent organisms are common and important components of tropical-reef ecosystems around the world. Due to the challenges of working in the ocean at night, very little is known about many bioluminescent marine species. *Odontosyllis luminosa (Annelida: Syllidae)* is a bioluminescent worm which has a restricted distribution around Southwater Caye, Belize. Studies in the waters surrounding Southwater Caye indicate that the luminescent displays of *O. luminosa* are dependent on the lunar cycle but little else is known about the basic biology of this organism, including its habitat preferences. Gaining a better understanding of where *O. luminosa* resides may provide further insight into its importance within 1) reef ecosystems in general, and 2) the nocturnal reef community. In order to begin addressing this question, we quantified *O. luminosa* displays for three successive nights across three different habitats (grass bed habitat, rubble habitat, and coral habitat). Our results showed that, although *O. luminosa* occurred in all three areas, the greatest number of displays occurred above coral habitats, suggesting that this may be their primary habitat. Results from this study could spearhead a series of investigations into *O. luminosa* ecology and behavior, and offer new insights into the composition and importance of tropical bioluminescent communities.

U.32 **Quantifying Temperature-Dependent Interactions of DNA Functionalized Surfaces by Temperature-Gradient SPR Measurement**

Erin Miller

Mentor: Aric Opdahl, Chemistry and Biochemistry

The goal of this project is to develop a new analytical tool for identifying single nucleotide mismatches, in short, DNA strands. Chip-based sensors that are functionalized with short single-stranded DNA probes are widely used in genetic diagnostics. In the past, one challenge in using these sensors has been quantitatively distinguishing DNA targets that have a single-nucleotide defect in them from those that are perfectly matched to the nucleotide sequence of the probe strands. We have developed a new measurement technique that allows distinguishing these types of DNA based on the temperature stability of the resulting hybridized structures that form. The measurement technique is an adaptation of a surface plasmon resonance (SPR) imaging spectrometer that has been modified to create a spatial temperature gradient across the length of the sensor chip surface. The results show how SPR temperature gradient measurements can differentiate between different types of DNA structures that form on the sensor as well as how the spacing of the probe layer impacts the temperature stability of these DNA structures.

U.33 **Impact of Oxidative Modifications on Calmodulin Binding Interactions with Target Proteins**

Ryan Pitney, Ruth Higbe-Harrah, Jenna Randolph, and Matthew Hoogland

Mentor: Jennifer Klein, Biology

Oxidatively damaged proteins are a result of aging and play a role in many disease states, yet the molecular process by which proteins respond to oxidative stress is still poorly understood. Using isothermal titration calorimetry, we have unraveled how CaM methionine oxidation influences CaM's interactions with calcium and its cellular target proteins. In this study, we have mutated CaM at M109 and M124 to Q to simulate the oxidation of CaM at methionine residues, as occurs during the natural aging process. The thermodynamic details of oxidized CaM and apoCaM (without calcium) binding to ryanodine receptor (RyR) were determined by titrating CaM or CaM mutants into the CaM binding domain of RyR while monitoring the heat released or absorbed (enthalpy). With this data, the change in enthalpy (ΔH), change in Gibbs energy (ΔG), change in entropy (ΔS), binding affinity (Ka), and binding stoichiometry (n) for each of the protein-protein interactions can be described. Preliminary data suggests that the interactions between CaM and calcium are disrupted by methionine oxidation. Understanding the impact on the oxidation of a single amino acid is the first step in resolving a clear explanation of protein oxidation and its role in aging and diseases.

U.34 **The Effect of Negative Valence on Recall**

Robert Whitehead

Mentor: Bianca Basten, Psychology

What exactly affects how well information is remembered? Past research has indicated that emotion can play a large role in the encoding of information. Researchers found that there was improved memory for certain events when retrieval was associated with emotional contexts (Smith, Henson, Rugg, & Dolan, 2005). Particularly, negatively perceived and aversive stimuli are recalled with greater accuracy than neutral stimuli. The purpose of the current study was to examine how individuals remember neutral and negative words as well as the source of those words. To test this, participants were presented with a mix of neutral (e.g., table) and negative (e.g., homicide) terms presented by one of four individuals. After a brief distractor task participants were shown both new words as well as the same words they saw previously. Participants were asked to identify if the word was new or old and, if it was old, to indicate which of the four individuals had presented the word. It was predicted that the more negative terms and their sources would be more accurately remembered. This research may shed light on how to improve memory as well as provide insight into the accuracy of recall in highly emotional situations such as eye-witness memory References: Smith,

A. R., Henson, R. A., Rugg, M. D., & Dolan, R. J. (2005). Modulation of retrieval processing reflects accuracy of emotional source memory. Learning & Memory, 12(5), 472-479. doi:10.1101/lm.84305 Warriner, A., Kuperman, V., & Brysbaert, M. (2013). Norms of valence, arousal, and dominance for 13,915 English lemmas. Behav Res Behavior Research Methods, 1191-1207.

U.35 **Rest in (Virtual) Peace: A Content Analysis of Grief Messages on Facebook**

Derek Zimmerman

Mentor: Linda Dickmeyer, Communication Studies

After experiencing the loss of a loved one, many people turn to Facebook as a tool to express the grief they are feeling. Grief is defined as the emotional and behavioral reaction that occurs after the loss of a loved one. Often, public memorial pages are created as a common place for friends, family members, and even strangers to come together and share the grief they are feeling. Having this social outlet for grief serves as an effective tool in the coping process for those who are grieving by allowing effective communication and emotional expression. This research study aims to identify how individuals express their grief on public Facebook memorial pages.

U.36 **The Effect of Physical Appearance on Memory for Sources**

Lisa Smith

Mentor: Bianca Basten, Psychology

The effect of physical appearance on memory for sources people frequently make character judgments based on personal appearances. Whether conscious or not, these judgments play a part in how opinions about a person and the person's ideas are formed. If we judge someone's ideas based on their appearance, is it possible that our memory for their ideas is affected by their appearance as well? And do we better remember who presented an idea if the idea matches what we expect to hear based on the person's appearance? Remembering who provided information is what researchers refer to as source memory. Individuals are better at remembering the source when the information received from them is congruent with the source's facial appearance (Nash, Bryer, & Schlaghecken, 2010). Studies also show that when sources' behaviors contradicted their appearance, the sources were remembered in light of their appearances and not their behavior (Cassidy, Zebrowitz, & Gutchess, 2012). In the current study, participants viewed attractive and less attractive individuals making either neutral, positive, or negative statements about themselves, such as, "I host game nights for seniors in my community" or "I shoplift small items occasionally". After a brief distractor task, participants were presented with the same statements and some new statements and were asked to identify which individual made each statement. Based on the existing research, it was predicted that a person perceived to have less attractive facial features would be more likely to be falsely recalled as the source for the negative statements. If results indicate that source appearance does affect source memory based on perceived attractiveness this would be relevant to areas such as eyewitness memory, news reporting, hiring committees, and politics. Appearance might be one of the more salient characteristics in determining a source's statements and possibly their perceived credibility. Recognition of this could help prevent unintentional biases. References Cassidy, B. S., Zebrowitz, L. A., & Gutchess, A. H. (2012). Appearance-based inferences bias source memory. Memory & Cognition, 40(8), 1214-1224. / Nash, R. A., Bryer, O. M., & Schlaghecken, F. (2010). Look who's talking! Facial appearance can bias source monitoring. Memory, 18(4), 451-457.

U.76 **Does Marriage Affect Women's Opportunities Later in Life? Peering into Retrospective Accounts of Middle-Aged and Elderly Middle Class Women on Marriage**

Christie Lauer

Mentor: Carol Miller, Sociolology

The relationship between marriage and women's perspectives of their social and economic mobility is reviewed and analyzed from women's retrospective accounts of past experiences in marriage to understand the impact on outside opportunities. The information is derived from answers from a sample of middle-aged and elderly women through in-depth qualitative interviews. Women assess their marriages and opportunities through the lenses of other institutions and factors, such as family, education, religion, and economy. Women's perceived level of autonomy, choice availability, historical circumstances, internal perceptions of self-efficacy and self-worth, perceived level of opposition from valued other, and sense of belonging greatly influence one's perceptions and attainment of outside opportunities. The results reveal a relationship between marriage and women's perspectives of themselves and their marriages as their understanding of themselves and the world changes according to the construction of marriage.

U.77 **Studying the Use of Peptides as Antibiotics**

Riley Larson

Mentor: Adrienne Loh, Chemistry and Biochemistry

Peptide antibiotics offer promise as robust alternatives to conventional small molecule antibiotics. While the details of how these peptide antibiotics function remains an active area of research, it is generally understood that these peptides will interact with and disrupt cell membranes. We are studying the interactions of model peptide antibiotics with large unilamellar vesicles (LUVs) in order to understand how the shape of the peptides (helical in nature) influences the peptide-membrane interaction. Our model antibiotic peptides are octamers, meaning they consist of 8 amino acids per peptide. They are composed of mainly of Aib (α -aminoisobutyric acid), which imparts a strong 3_{10}-helical bias due to steric hindrance at the α-carbon. Positively charged lysine residues are placed in either adjacent positions (KK45) or separated by one helical turn (KK36) in the sequence. Circular dichroism experiments indicate that KK45 remains largely in a kinked 3_{10}-helical conformation when bound to DMPG LUVs, while KK36 undergoes a transition from largely a-helical in water to largely 3_{10}-helical when bound to DMPG LUVs. The binding constants can be estimated from these experiments, indicating a larger Kd for KK45 binding to DMPG LUVs ($K_{d,KK36}$=0.077 +/- 0.018 mM versus $K_{d,KK45}$~1.1 mM). Kd represents the binding affinity with the bilayer, where a higher the Kd indicates a lower its desire to bind to the lipid. Using NMR spectroscopy, we are measuring the binding constant for these two peptides with anionic (DMPG) LUVs by measuring the disappearance of the amide ^{1}H NMR signal as LUVs are added to peptide solution. The large size of the peptide-LUV complex results in NMR line widths that are too broad to observe. Preliminary experiments are consistent with the CD results, indicating that KK36 has a greater affinity for DMPG LUVs than KK45 ($K_{D, KK36}$=0.035 +/- 0.014 mM versus $K_{D,KK45}$=0.38 +/- 0.08 mM). These results together suggest that both charge and structure are important factors in peptide-lipid association.

UNDERGRADUATE POSTER PRESENTATION ABSTRACTS

Poster Session B
Valhalla Hall: 11:00am-12:45pm

U.37 **Knowledge and Attitudes of Individuals Attending a Faith Based Sexuality Education Program Compared to Individuals in a School Based Sexuality Education Curriculum**

Kristen Wanta and Sam Havrilla

Mentor: Keely Rees, Health Education and Health Promotion

Comprehensive sexual education is important to ensure students receive information regarding all areas of sexuality. More often than not, people engage in risky sexual behaviors because they are not educated enough about the consequences. Our research looks at the differences in knowledge and sexual behaviors between students who merely received school based sexual education and students who received sexual education through Our Whole Lives (OWL). Our goal is to show the importance of comprehensive sexual education, and the benefits of a faith-based sexual education program, specifically OWL. We do this by surveying students who were previously enrolled in OWL and compare their answers to students who were not. We hypothesize this research will show a positive correlation between the OWL program and healthy sexual behaviors, as well as high levels of knowledge regarding sexuality.

U.38 **On or Off the Clock: The Influence of Occupational Prestige on Helping Intentions**

Sarah Sorensen

Mentor: Katherine Kortenkamp, Psychology

Research has found that people are more likely to help someone who they perceive to be deserving of help. Individuals are also likely to be more helpful to people who they perceive to not be responsible or have little control over the situation. The purpose of the present study is to apply these ideas to an examination of how knowing the present work situation of an individual, either 'on duty' or 'off duty', will affect people's willingness to help as well as their perceived need to help the individual. I will also assess how occupational prestige influences these helping intentions. One hundred and sixty participants will be randomly assigned to one of four conditions (dentist, mail carrier, restaurant server, or the control of a non-working individual). All participants will read a short vignette that describes someone in need of low-severity help and then answer questions regarding helping intentions, deservingness of help, and empathy felt towards the target. I hypothesize that participants will be more likely to help someone who is off duty. I also hypothesize that people will report that the person 'on duty' is less deserving of help. Finally, I hypothesize that people will report higher helping intentions for the targets that represent more prestigious occupations. One of the benefits of exploring factors that affect willingness to help is the potential for using the results to encourage helping across multiple situations.

U.39 **Using Fluorescence in Situ Hybridization to *Localize Buttiauxella* Species from the Intestinal Tract of *Arion fasciatus***

Eric Schuh

Mentor: Bonnie Bratina, Microbiology

The genus *Buttiauxella* represents a group of gram negative rod shaped bacteria most commonly found in water, soil and the intestinal tracts of various fish and snails. It has been found in the intestinal tract of *Arion fasciatus*, an aquatic slug found in La Crosse area streams. Using bioinformatics, 16S ribosomal RNA sequences of known *Buttiauxella* species were examined to look for two short portions of sequence unique to the genus. Two short sequences were found and while not completely unique to *Buttiauxella*, represent a large portion of the genus when used together. Short pieces of DNA complementary to these portions of sequence can be made and fluorescently labeled for use as probes in fluorescence in situ hybridization (FISH). For the FISH procedure, a cross section cut of *Arion fasciatus* was applied to each of three wells on a treated slide. The slide was fixed overnight in a *paraformaldehyde* solution before being decolorized with 6% hydrogen peroxide and hybridized in hybridization buffer with the two *Buttiauxella* probes and one bacterial control probe for 24 hours. Slides were examined with a confocal microscope to determine the initial presence of *Buttiauxella*, and where it is located within the intestinal tract. Once the use of the probes has been optimized, they will be used in various combinations to look at the interaction of *Buttiauxella* with the intestinal tract of *Arion fasciatus* and with the other bacterial inhabitants.

U.40 **That's So Trashy: Studying Refuse Pits at the Tremaine Site (47LC95)**

Jacob Poppe

Mentor: Constance Arzigian, Archaeology and Anthropology

Humans are repetitive beings. These repetitive behaviors affect the space and cultural material of the people who utilize them. This repetition of behaviors form into larger patterns which can be seen culturally, and archaeologically. Archaeology uses cultural material and remains of these patterns to better understand the people and culture they came from. For my research, I am studying refuse pits at the Tremaine Site (47LC95). The Tremaine Site was largely occupied by the Oneota, a cultural complex that existed in the La Crosse area from around A.D. 900 to A.D. 1600. I will use the combined analysis of ceramics, lithics, floral, and faunal data to further our understanding how three refuse pit's' locations and formations represent the past activities of the Oneota. My data so far suggests that there are differences among the features, illuminating possible cultural activities.

U.41 **Axiomatizing an Information Theoretic Approach to Quantum Gravity**

Aaron Vesey

Mentor: Mary Krizan, Philosophy

The seemingly irreconcilable physical and metaphysical issues endemic to quantum gravity theories originate, we argue, with the problem of time. For the quantum theory, time is an absolute, globally available parameter which drives the theory's machination. For the general relativity theory, time is a relational, non-invariant quantity in which observers will generally disagree as to simultaneous events. We propose to axiomatize an information theoretic approach to quantum gravity, that is, a quantum gravity theory in which ontological priority is given to the information expressed by the theory. By axiomatizing the postulates of quantum gravity, a program laid out by Hilbert at the beginning of the 20th century, we construct not a quantum gravity theory proper, but instead place constraints on the form of the theory, and identify its necessary statements. A hypothetical quantum gravity theory should then be constructed as a solution to these axioms. Motivation for an information theoretic approach to quantum gravity is indicated by recent developments in especially the traditions of the thermal time hypothesis, the correspondence

between conformal field theories and anti-de Sitter space, and schemes of gravitation from quantum information.

U.42 **Modern English Language Use in Belize and Its Colonial Implications**

Rachel Tidwell

Mentor: Elizabeth Peacock, Archaeology and Anthropology

Belize was a British colony until 1981. Thus with independence there is a lot of decolonization that is left to do there. English is the official language of Belize while Spanish is the most commonly spoken language. Through studying language attitudes in Belize I suggest that there are specific attitudes and social norms about English and Spanish use. I have collected linguistic data through ethnographic field work conducted in the summer of 2015 in Orange Walk, Belize. With the assistance of transcription and coding programs several patterns emerged, such as insecurity with English and norms such as speaking Spanish at home. These patterns and opinions of English are part of the influence colonial powers has had over Belize. By better understanding how modern Belizeans use English more information about how colonial rule effected Belize can be uncovered.

U.43 **Structure and Demographics of Pastoralist Livestock Herds from the Site of Luxmanda, Tanzania**

Gemma Zahradka

Mentor: Katherine Grillo, Archaeology and Anthropology

Pastoralism, a subsistence strategy that centers on the herding and management of livestock, has been a key way of life in eastern Africa for thousands of years. It is a flexible strategy that allows groups to quickly adapt to environmental changes. The site of Luxmanda is the southernmost Pastoral Neolithic site in eastern Africa, and the largest. As such the site provides an ideal opportunity to examine the way that pastoralists structured their herds in a context of expansion and possible environmental change. This study builds mortality profiles of the cattle and caprine remains recovered from Luxmanda, using dental wear to determine the approximate age-at-death of livestock. These mortality profiles are then compared to the practices of pastoralists in the present day, as well as assemblages recovered from other Pastoral Neolithic sites. This information helps us to better understand the choices that pastoralists, past and present, make in terms of herd management, and the way those choices reflect environmental conditions.

U.44 **Study of Stability of Immature Red Blood Cells in Ground Squirrels**

Heather Willems

Co-Author: Julianne Pekol

Mentor: Scott Cooper, Biology

The proposed experiment examines changes in reticulocytes (immature red blood cells) in thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*), throughout their hibernation cycle. While mature red blood cells stay constant, counts of reticulocytes showed a lot of variation throughout the hibernation cycle. With our current technique we can detect reticulocytes in the blood, but cannot understand the stability of the cells while in hibernation. In order to investigate red blood cell maturation, we will be looking at hemoglobin levels. We will need to run a 2, 3-Diphosphoglycerate assay to test the oxygen levels and measure the concentration of protein using a nano-drop spectrophotometer. By studying the stability of immature to 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

U.45 **Transition Metal Complexes with Promising Applications in Molecular-Based Materials**

Justin Wedal

Mentor: Kendric Nelson, Chemistry and Biochemistry

Molecular-based compounds have shown promising applications in the materials and electronics industries as a solution to rapidly approaching size boundaries in the specific fields. Using the current approach of the "top-down" method, industries attempt to miniaturize their components. However, there is a limit to how small current technology can be manufactured on a large scale. Our research proposes six novel transition metal complexes of 9'-(4, 5-dimethyl-1, 3-dithiol-2-ylidene)-4', 5'-diazafluorene (L), which show promising magnetic, optical, and light absorption and emission properties. Single crystals of [(TPyA)MII(L)](SbF6)2 (where TPyA=tris(2-pyridylmethyl)amine and MII=MnII, FeII, CoII, NiII, CuII, ZnII) have been isolated and characterized by UV-Vis absorption and fluorescence emission spectroscopies, as well as electrochemically by cyclic voltammetry. These complexes have shown fluorescence properties in the visible region of the electromagnetic spectrum. Additionally, complex multi-electron redox properties were observed. Fluorescence from these molecular complexes suggest potential applications in molecular-based materials. Further studies involving different transition metal ions and ligands are underway to synthesize new molecules that possess a multitude of desired properties.

U.46 **A Bioorthogonal Approach to Reacting Diazo Compounds with Coumarin Double Bonds**

Christopher Unterberger and Alexandra Schwarz

Mentor: Nicholas McGrath, Chemistry and Biochemistry

Bioorthogonal chemistry is a termed used to describe any chemical reaction that can occur in living systems without causing toxicity or interfering with other biochemical processes. This benefit allows for the study of biomolecules in real-time, living systems. In order for a reaction to be considered bioorthogonal, it must not drastically change the structure of its substrate (target) nor change its bioactivity. Effective bioorthogonal reactions have been devised to label substrates in biomolecules. One such example is copper-free click chemistry. This approach is a variation of a previous reaction developed to create a link of three nitrogen atoms (an azide) to other molecules. But, due to its mild nature, this reaction is often catalyzed using copper (I). Carolyn Bertozzi first developed a bioorthogonal approach to this reaction by eliminating the need for the potentially toxic copper (I) in the mix. However, the copper-free click chemistry finds its limitations when trying to react with coumarins, an organic compound found in plants and characterized by its sweet odor. A new method has been found to react with coumarins using diazo (two nitrogen atoms) compounds. Research will be conducted to explore alternative or even cooperative biological labeling strategies by taking advantage of the reactivity of Bertozzi's azides and that of the diazo compounds that have been found to react with coumarins. By combining the results of both of these reactions, a new bioorthogonal approach can be devised to link biological molecules.

U.47 **Carnocin Production in Antarctic Carnobacterium**

Dylan Smith

Mentor: Bonnie Bratina, Microbiology

Carnobacterium are ubiquitous lactic acid bacteria (LAB) that can be isolated from meat, dairy, and cold/temperate environments. These gram-positive, aerotolerant bacteria produce carnocins, proteinaceous toxins that can kill or inhibit related bacterial strains. Carnocins, a subclass of bacteriocins, possess the ability to inhibit some foodborne pathogens such as *Listeria monocytogenes* and could potentially be used as a food preservative that would replace harmful chemical preservatives. Carnobacterium strain LV66, isolated from Lake Vanda, Antarctica, was used in this study to screen for levels of carnocin production by quantifying inhibition of *Listeria monocytogenes* in a microtiter assay. The main objective of this study is to determine ideal growth conditions that will increase levels of carnocin production and facilitate LV66 becoming a commercially viable strain for industrial carnocin production. More specifically, the parameters being studied are oxygen concentration, manganese and magnesium concentrations, incubation in tubes vs. flasks, and also amending with different volatile fatty acids. Preliminary studies show that there is a greater amount of carnocin production when incubated in tubes than flasks. Since flasks provide greater aeration than tubes, studies are currently underway to test the effects of incubation in anaerobic environments and low oxygen environments to see if we can better understand the differential effects of the incubation vessel.

U.48 **You Are What You Eat: Diet Preferences of Marine Ostracods in Belizean Reef Formations**

Anna Rowe and Azure Kremer

Mentor: Gretchen Gerrish and Gregory Sandland, Biology

Ostracods are small crustaceans sometimes referred to as the ants of the sea. In the Caribbean, certain groups generate and release plumes of bioluminescent mucous for mating and defense purposes. Like ants in a terrestrial environment, ostracods are believed to be important components of reef ecosystems; however, their actual role in the tropical food web is poorly understood. To begin filling in this information gap, we initiated a study investigating the food preferences of three species of bioluminescent ostracods (SVU, MSH and *Photeros morini*). To do this we collected ostracods from the reef and starved them for 24-48 hours before introducing various food types. In order to determine whether or not the crustaceans consumed any food, gut measurements were recorded before and after exposure to selected food items. Although results were mixed, there was some suggestion of preference for certain food items. The importance of this finding as it relates to ostracod biology and their role in reef ecosystems will be discussed.

U.49 **Describing a New Genus of Marine Bioluminescent Ostracods**

Nick Reda

Mentor: Gretchen Gerrish, Biology

While luminescent ostracods can be found in oceans all over the world using light for defense, species-specific mating displays are only observed in the Caribbean Sea. Over 70 different display types have been observed but less than 25% of the observed species have been named and described scientifically. By describing a new genus of these ostracods (*Photophilus*), based around a new species description (*Photophilus chicoi*), we will create a new classification that will include over 25 of the newly described species. Visualization of key morphological features using different mechanisms of microscopy is the foundation to describing a new genus. We use scanning electron microscopy (sem), computed tomography (ct), light microscopy, and scientific illustrations to compare major morphological characteristics. The integration of taxonomy, illustrations, and microscopy imaging has helped link the morphology of *Photophilus* with functions and identify distinct differences among this subfamily of ostracods. Through

these methods we have identified key morphological characteristics of *Photophilus* that include the length to height ratio of the valve, keel, second limb, and the male copulatory limb which distinguish *Photophilus* from other genera. Through taxonomy and natural history, a small feat in the cataloguing of biodiversity helps preserve the legacy each species leaves on Earth.

U.50 **Steric Hindrance versus Electronic Effects in Haptotropic Rearrangements of N-ethylaminobiphenyl Tricarbonyl Chromium**

Damien Rasmussen

Mentor: Curtis Czerwinski, Chemistry and Biochemistry

The reaction that is known as "haptotropic rearrangement" is a phenomenon in which a metal, such as chromium, iron, or copper, moves from one site of an organometallic molecule to another. These rearrangement reactions could prove to be valuable in the development of new nanoscale technologies and machineries. Dr. Czerwinski's research group has previously synthesized a series of "biphenyl chromium tricarbonyl" compounds and measured the rates of their haptotropic rearrangements. The results of this research, along with previously published data, suggests that these rearrangements are dependent on both size ("steric") and electronic properties of substituents in the molecule. The focus of the current proposal is to study the interplay between steric and electronic effects in haptotropic rearrangements of chromium tricarbonyl (Cr(CO)3) that contains the N-ethylamine substituent. In this target molecule, the large size of the N-ethyl substituent would be expected to inhibit the rate of rearrangement, while its strong electron donating characteristics would be expected to enhance the rate of rearrangement. Studying this rearrangement requires synthesis of the previously unknown compound (N-ethyl-2-aminobiphenyl) chromium tricarbonyl. This proposal seeks to develop synthetic conditions, including a new reduction reaction, to synthesize the molecule. Once the molecule is successfully synthesized and characterized, the rate of its haptotropic rearrangement will be studied by NMR spectroscopy, to determine whether steric factors or electronic factors are more important.

U.51 **Serum Advanced Glycation End-products (AGE) of Humans Before and After Consumption of an AGE-rich Meal**

Hayley Powers, Anton Breunig, and Courtney Young

Co-Authors: Aline Rosa Oliveira, Francielle, Morganne Verissimo, Alves de Oliveira, Mariane Helen de Oliveira, Sarah Jhayse de Araújo Lima, Talitha Silva Meneguelli

Mentors: Margaret Maher, Biology

Advanced glycation end-products (AGE) are products of non-enzymatic reactions between free amino groups and the carbonyl groups of reducing sugars in foods cooked at high temperatures. They are also formed in the body during normal cellular metabolism. Previous studies in humans and other animals have linked elevated blood AGE to vascular damage, oxidative stress, inflammation, aging, and/or chronic diseases, such as diabetes. The purpose of this study was to examine the relationships among metabolic syndrome risk factors and serum AGE levels after consumption of an AGE-rich meal of fried ham, scrambled eggs, toast, butter and ultra-high temperature (UHT)-pasteurized milk. ELISA was used to quantify serum AGE values. Metabolic and cardiovascular risk-related parameters (mean ± SEM) examined included fasting blood glucose (89 ± 2 mg/dL, range 76-107 mg/dL), total cholesterol (197 ± 8 mg/dL, range 139-282 mg/dL), HDL (60 ± 4 mg/dL, range 35-99 mg/dL), LDL (113 ± 7 mg/dL, range 64-211 mg/dL), triglycerides (123 ± 11 mg/dL, range 50-213 mg/dL), blood pressure (SBP = 120 ± 2 mmHg; DBP = 76 ± 2 mmHg, range SBP 106-140 mmHg; DBP 62-92 mmHg), and BMI (25.5 ± 1.1, range 20.3-36.6). Blood samples were

collected prior to (fasted) and two hours following consumption of the AGE-rich meal. Of twenty-two participants, ranging in age from 18-58 years, eight showed increased AGE levels, fourteen showed decreased AGE levels, and eight exhibited a change of less than five units following the meal. The average pre-meal serum AGE level was 81.5 ± 4.8 μg/mL (range 35.9-135.3 μg/mL), while the average two hour post-meal serum AGE level decreased to 78.3 ± 4.9 μg/mL (range 14.0-125.3 μg/mL). No correlation between metabolic syndrome risk factors and serum AGE (pre-meal, post-meal, or pre-post difference) was found, possibly related to a low number of subjects exhibiting more than one risk factor for metabolic syndrome. However, it was observed that two hours post-meal consumption, mean serum AGE levels were lowered, which is consistent with other studies at two hours post consumption. In other longer studies of the effects of dietary AGE, increases in AGE levels peak later following AGE-rich meals. The reason for the decrease of serum AGE at two hours post consumption in this and other studies is unknown and warrants further examination and explanation.

U.52 **The Influence of Acute Stress on Utilitarian Moral Judgment**

Madalyn Melbye

Mentor: Ellen Rozek, Psychology

Emotion affects moral judgment by decreasing utilitarian decisions (i.e. those in which the outcome produces the greatest good to the most possible people). Stress and emotion are processed in similar areas of the brain. Due to this, the study investigated the influence of acute stress on utilitarian moral judgment. Participants were recruited from the introductory psychology participant pool and randomly assigned into either the experimental (acute stress) or control (no acute stress) group. Informed consent was obtained before baseline measurements of stress were collected using self-reports. Participants then completed a demographics questionnaire and the College Chronic Life Stress Survey to assess for chronic stress. Next, the Trier Social Stress Test was administered to the experimental group. In this stress-inducing test, participants prepared and presented a speech on provided subject material and verbally completed an arithmetic task. The control group browsed the same subject material, but did not complete the test. Additional self-reports of stress were then taken from all participants before presenting them with non-moral, impersonal moral, and personal moral dilemmas. Participants provided a yes/no response to each dilemma, indicating a utilitarian or non-utilitarian response. Upon completion of this task, participants were fully debriefed. The data was analyzed using a 2x3 mixed ANOVA. The type of moral dilemma (non-moral, impersonal moral, or personal moral) is the dependent variable and the type of stress (acute stress or no acute stress) serves as the independent variable. Chronic stress levels of the participants were analyzed as a covariate. Those self-reports were used to assess whether acute stress was adequately induced in participants within the experimental group. I hypothesized that acutely stressed individuals would produce reduced utilitarian decisions compared to unstressed individuals.

U.53 **Bone Blood Vessels Suggest Rapid Growth and Probable Hunting Behavior in Hatchling Carnivorous Dinosaurs**

Kayla Litwin and Tegan Ziegler

Mentor: Eric Snivley, Biology

Synchrotron imaging of small fossilized dinosaur bones (~3 cm long) reveals that they were hatchlings when alive. These small foot bones were discovered in Saskatchewan and Alberta, Canada. Derived characteristics indicate that they were middle metatarsals (foot bones) of carnivorous dinosaurs, including a tyrannosaur. By using the x-rays from the Canadian Light Source Synchrotron, we are able to see into the bones and

reconstruct them with computed tomographic (CT) software. Thin 2D sections (x-ray images) indicate lots of blood vessels, suggesting that the bone was growing fast. Thicker sections confirm fast growth histology (tissue structure), like that of fast growing baby birds. 3D reconstruction of blood vessel canals show that ligaments were pulling on the bones during active movement. This evidence shows that the animals were less than a year old. We conclude from their active movement that they were hunting, and that their parents did not have to nurture them because they could independently feed themselves right out of the nest.

U.54 **Investigation of the Effect of Gating Window Width on MPI results**

Abby LeBrun

Co-authors: Carlyn Johnson, Abigal Grancorvitz

Mentor: Aileen Staffaroni, Health Professions

Objectives: Gated myocardial perfusion imaging (MPI) collects cardiac information over multiple cardiac cycles using a patient's R wave on the EKG to accept or reject heart beats. In order to reject the irregular beats, a window or gate must be set. If the window is too narrow, good beats may be rejected, however, if the window is too wide, irregular beats may be accepted which can skew the results of the study. The purpose of the study was to determine the effect on the images and left ventricle ejection fraction (LVEF) results of a gated stress cardiac study acquired using an eighty percent versus a forty percent window. Methods: Ten patients with irregular heart rates underwent a stress Tc-99m sestamibi (30 mCi) gated stress test on a SPECT/CT (Siemens Symbia T) system that utilized a smart zoom collimator and IQ- SPECT technology. Each patient was first imaged using an eighty percent gating window followed by an additional study employing a forty percent gating window. All of the studies were processed identically and evaluated using 4DMSPECT. The gated MPI images and LVEF results from each study were presented to two nuclear medicine physicians for review in a side by side blind read. Each physician's preference was documented along with their reasoning. Results: In 60% of the studies, the two physicians preferred the results obtained from using the narrower 40% versus the wider 80% gating window when evaluating gated MPI results of a patient with an irregular heart rate. On average, the majority of the patients demonstrated a 5% variation in their LVEF values when the acquisition gate window was decreased from 80% to 40%. Additionally, in eight of the ten patients, the physicians both preferred the images acquired with an 80% gating window over those with a 40% window. Conclusion: Overall, there seems to be no definitive agreement between the two gating window widths when evaluating image quality and LVEF values. The physicians' preference of the wider gating window when viewing the images was related to image clarity. When asked why the physicians preferred the narrower gating window for functional evaluation, they felt the computer software program tracked the motion of the chamber better, therefore, providing more realistic LVEF results.

U.55 **Chemical Analysis of Fatty Acid Residues on Archaeological Pottery of Pastoralist Communities in Northern Tanzania**

Jennifer Keute

Mentor: Katherine Grillo, Archaeology and Anthropology

In the semi-arid climate of eastern Africa, mobile cattle pastoralism has been an essential way of life for at least the past 5000 years (Prendergast et al. 2013). On the Mbulu Plateau of northern Tanzania, Research on the Archaeology of Pastoralism in Tanzania (RAPT) has discovered the largest "Pastoral Neolithic" site in the country, which dates to about 3000 years ago. Archaeologists have interpreted animal bones and ceramics found at the site as evidence of an occupation by groups of mobile people who herded cows,

goats and sheep. My project focuses on carefully selecting pottery samples to be tested for fatty acid residues left through the storing or cooking of materials. With the assistance of a Gas Chromatograph/Mass Spectrometer (GC-MS), it has been determined the majority of the pottery was used for storing dairy products or cooking meat. This research will aid in understanding prehistoric modes of pastoral subsistence, cooking practices, and the importance of pottery to mobile herding populations.

U.56 **A Logistic Regression Analysis of Antipsychotic Medication Administration and the Determinants for Older Adults in a Nursing Home Setting**

Dylan Jester

Mentor: Ellen Rozek, Psychology

Antipsychotic medication is often over-administered to older adults in response to behavioral, psychological, or physical manifestations of neurodegenerative processes in the brain. Those with dementia, a psychiatric diagnosis, behavioral disturbances, and/or psychosis are significantly greater at risk of prescription. However, nursing facilities have been known to prescribe antipsychotic medication to non-psychotic patients as a means to mediate unwanted behaviors tied to underlying cognitive impairment. Greater risk of mortality, cerebrovascular accidents, and falls are highly associated to the use of typical or atypical antipsychotic medication use in older adult populations. The goal of the present study is to highlight determinants of antipsychotic medication administration to prevent non-psychotic prescriptions. Falls, subjective pain (moderate or severe), behavioral disturbances, and depressive symptoms will be analyzed. A binomial dataset of the prearranged variables will be analyzed from approximately 200 older adults at a regional care facility. Using logistic regression, the count data from the Certification and Survey Provider Enhanced Reports (CASPER) System subset of the Minimum Data Set (MDS) 3.0 Resident Level Quality Measure will determine the optimal model for predicting administration of antipsychotic medication to older adults in a nursing-home type facility. In order of significance, it is hypothesized that behavioral disturbances, moderate or severe pain, falls, and depressive symptoms are statistically significant in predicting antipsychotic medication administration.

U.57 **Evaluating the Effects of a Neonicotinoid Pesticide, Clothianidin, on the Early Development of an Aquatic Snail (*Physa gyrina*).**

Anna Holman

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

Neonicotinoid insecticides are among the most widely used pesticides in the world, with global use expected to more than double by 2050. Neonicotinoids were first introduced in the early 1990s and were favored over other pesticides because their high toxicity to invertebrate organisms and their relatively long half-lives in soils meant they could be used in lower quantities; this was predicted to reduce their contribution to environmental pollution. Moreover, it is currently believed that these chemicals are less harmful to vertebrates such as mammals and birds because they bind to specific receptors in the insect nervous system. However, the degree to which neonicotinoids influence non-target invertebrates is not well understood. The ease of neonicotinoid application, combined with their high solubility in water and extended persistence in the environment, has resulted in their widespread occurrence in aquatic habitats and growing concern over their potential toxicity to non-target organisms. Research on neonicotinoids has centered on imidacloprid (IMI) as it was one of the first chemicals of this type to be used. However, it is a neonicotinoid called clothianidin (CLO) that is most frequently detected in aquatic environments. Unlike IMI, there is little information on the toxicology of CLO even though its concentrations in water bodies are,

on average, 10 times higher than IMI. This project will begin to address a shortcoming in the understanding of CLO toxicity by exploring this pesticide's effects on a non-target aquatic species, the snail *Physa gyrina. Physa gyrina* is found across North American ponds and lakes that are susceptible to CLO contamination via agricultural run-off. By examining the development of *P. gyrina* eggs in the presence and absence of CLO, this study will evaluate the potential for this systemic pesticide to impact an important non-target freshwater species at one of its most sensitive life stages.

U.58 **Does TMAO Promote Microtubule Stability over DMSO?**

Adrienne Hester

Co-author: Tegan Marianchuk

Mentor: Taviare Hawkins, Physics

Trimethylamine N-oxide (TMAO) is a natural osmolyte that stimulates the polymerization of tubulin dimers and counters destabilizing stresses. In this study, we investigated the mechanics-specifically the persistence length-of Taxol-stabilized microtubules in varying concentrations of TMAO. We employed thin chambers (<3µm) in vitro assays to restrict microtubule movement within two dimensions and used fluorescence microscopy to acquire footage. Each frame underwent image analysis using Fourier decomposition written in Matlab. A commonly used alternative to TMAO is Dimethyl Sulfoxide (DMSO). In conjunction with Taxol, it promotes the stability of microtubules. In vivo, DMSO is used as a vehicle to transport Taxol through the cell membrane, and in vitro it is used as a cosolvent due to the poor water-solubility of taxanes. While studies show that the use of Taxol diluted in DMSO decrease the persistence length to stabilize microtubules, our study using TMAO investigates further into the relationship between persistence length and stability.

U.59 **An Initial Investigation into the Association between Cleaning Station Size and the Prevalence of Black Ich Infections in Reef Fish From Belize.**

Megan Hess, Alisha M. Saley, Phoenix A. Rogers

Mentor: Greg Sandland, Biology

Marine reef ecosystems are incredibly diverse environments containing numerous symbiotic interactions. Cleaning station mutualisms, involving cleaner fish and their clients, are crucial for maintaining healthy fish communities within these ecosystems, as cleaners can remove harmful ectoparasites from the surfaces of their clients. Turbellarian flatworms are relatively common ectoparasites of tropical fish communities (such as *Acanthurus* sp.). Establishment of these worms in the epidermis of their hosts can result in localized immunological reactions, necrosis and secondary infections generating a condition known as Black Ich. The degree to which cleaning stations influence the occurrence of turbellarian infections within the reef habitats of Belize is not well-understood. To address this shortcoming, we developed a study examining the relationship between cleaning station size and the prevalence of parasitic turbellarian infections across two patch reefs surrounding South Water Caye, Belize. Using 30-m transects, we determined 1) the number of cleaner fish per observed cleaning station, and 2) the prevalence of turbellarian infections in reef fish (*Acanthurus* sp.) within these areas. Results revealed a negative association between the proportion of turbellarian-infected fish and the size of cleaning stations (= #fish/station). Our results suggest that cleaning-station size can modulate ectoparasitic infection levels in reef fish from tropical regions. The implications of this for fish communities and overall ecosystem health will be discussed.

U.60 **Is Microtubule Rigidity Proportional to Protofilament Number?**

Brandon Harris

Co-author: Taviare Hawkins

Mentor: Taviare Hawkins, Physics

Microtubules are cytoskeletal filaments that participate in key cellular processes by providing structural support, intracellular transportation, and cell division. Despite having been measured for the past 20 years, there are still open questions regarding the mechanical stiffness of microtubules and their persistence length, Lp. The persistence length is a measure of stiffness, proportional to the flexural rigidity, EI, defined as the elastic modulus and the second moment of area. In vitro, GMPCPP (a slowly hydrolyzable form of GTP) microtubules produce 14 protofilaments, taxol-stabilized microtubules produce 12-13 protofilaments, and microtubules polymerized in high-sodium (580 mM NaCl) concentration produce 9-10 protofilaments and lattice shifts resulting in numerous "seams." Persistence lengths of single microtubule filaments were measured. Microtubules were formed in respective buffers and stabilized with the chemotherapeutic drug Taxol. After formation, microtubules were confined to oscillate within a thin, 2-D chamber (≤ 3 μm). Fourier mode analysis was used to fit images of fluorescently labeled microtubules. From each individual fit, a respective persistence length was determined. Bootstrapping statistics was then applied to produce a more accurate measure of filament rigidity. Our prior measurements for GMPCPP microtubules have lognormal distributions with average Lp of 1.8 ± 0.5 mm and 1.9 ± 0.7 mm (with taxol) respectively. Similarly, Taxol stabilized microtubules have a lognormal distribution but with a smaller Lp of 0.65 ± 0.1 mm. Preliminary results show high-sodium polymerized microtubules with an Lp of 0.61 ± 0.1 mm.

U.61 **Peptide Antibiotics: Peptide Charge Placement Effect on Lipid-Peptide Binding**

Brianna Haight and Ellen Arndt

Co-Authors: John Weirich, and Adrienne Loh

Mentor: Adrienne Loh, Chemistry and Biochemistry

With rising disease rates and decreasing effectiveness of conventional antibiotics, there is an immediate need for new antibiotics. One promising solution is through positively charged antimicrobial peptides, which act by perturbing bacterial membranes. We are investigating model peptide antibiotics composed primarily of the hydrophobic, branched amino acid Aib (α-aminoisobutyric acid), which is found in bacteria and induces helical structures due to crowding at the α-carbon. Positively charged lysine residues were placed in adjacent locations in the center of the helix (KK45) or one full turn apart (KK36). Micelles composed of sodium dodecyl sulfate (SDS) and vesicles made of 1, 2-Dimyristoyl-sn-glycero-3-phosphorylglycerol (DMPG) were used as negatively charged membrane models. The interaction of model peptides with micelles and vesicles can provide valuable information about the role of helical structure and peptide charge distribution on peptide-membrane interactions. Here we present thermodynamic and spectroscopic data characterizing the peptide-vesicle and peptide-micelle interactions. Binding enthalpies for the interactions of KK36 and KK45 with SDS micelles and DMPG vesicles were measured using isothermal titration calorimetry (ITC). It was determined that binding to SDS micelles is favorable, or exothermic, suggesting that charge interactions dominate the binding enthalpies. Interestingly, binding to DMPG vesicles is endothermic at 10 C, but the reaction still occurs because it is entropically driven, meaning that it increases disorder in some way, which is favorable. In both cases, KK45 binds with a higher affinity than KK36, suggesting that charge distribution (and not just total charge) is also important. NMR measurements that indicate which regions of the peptides are buried in the micelle suggest that KK45 is more buried than KK36 in SDS micelles. These results suggest that the peptide-vesicle and peptide-micelle

interactions are enhanced with KK45, due to greater charge density and/or a more favorable helical structure. The experiments will be repeated at room temperature and above to determine the role of bilayer fluidity on binding.

U.62 **Effect of Cold Water Immersion on Metabolic Rate in Humans**

Austin Greenwood

Mentor: Cordial Gillette, Exercise and Sports Science

Even with the wide use of cryotherapy in orthopedic injury, comparatively little research has investigated its physiological effects. Cold water immersion may be the least understood treatment contained with cryotherapy. This study looked to determine the effect of cold water immersion on metabolic rate. Understanding this phenomenon will help determine the appropriate clinical applications of cold water immersion and lead to a better understanding of cryotherapy in general. 10 participants from the student population of the University of Wisconsin-La Crosse volunteered and completed a 15 minute treatment of cold water (9 degrees C) immersion up to the umbilicus. Metabolic rate measurements were taken for 5 minutes prior to treatment, 15 minutes of treatment, and 5 minutes post treatment for a total of 25 minutes. Cold water immersion resulted in elevated metabolic rates for 8 of 10 participants during the first 5 minutes of treatment and for 6 of 10 in the 5 minute post treatment ($P < 0.05$). These results indicate that cold water immersion should not be used as a measure of reducing secondary hypoxic injury, but instead may have potential benefits in exercise recovery.

U.63 **An Assessment of a Camp-Based Psychosocial Intervention to Promote Healing in Grieving Adolescents**

Michael Gonzales

Mentor: Alessandro Quartiroli, Psychology

Founded on the mission that individuals alone do not get cancer, entire families do, Angel on My Shoulder (AOMS) is an organization that provides cancer support services for all family members. The purpose of this study is to assess the current level of perceived effectiveness of the grief camps provided by AOMS and to understand the individual experiences of campers within the current implemented format of the camp. Based on an explanatory sequential mixed-method design, the initial phase of this project will quantitatively assess the self-reported level of perceived effectiveness of the camp. Quantitative results will inform the development of a semi-structured interview protocol, aimed to explore the personal experiences of current campers. This study aims to provide updated information to support data-driven decisions to be made in order to enhance the quality of future camp evolution. Research outcomes will demonstrate ways in which AOMS camp council can adapt to best facilitate an environment where campers feel most comfortable in sharing experiences to better promote normalization and optimal healing experiences.

U.64 **Effects of Stress on the Expression of Urocortins in the Rat Stomach**

Elijah Germo

Co-author: Sumei Liu

Mentor: Sumei Liu, Biology

Stress profoundly influences gut function. Physical and psychological stressors inhibit gastric motility and emptying, which makes one feel full and bloated after eating. Corticotropin-releasing factor (CRF) has been

implicated in stress-evoked inhibition of gastric emptying by activating the CRF2 receptors in the brain and the stomach. It is becoming increasingly evident that urocortins (Ucn 1, Ucn 2, and Ucn 3), members of the CRF family of neuropeptides, are involved in stress-evoked changes in gastrointestinal function. Urocortins exert their biological actions via interaction with members of the G-protein coupled receptors – CRF1 and CRF2. Previous studies found that stress elevates CRF mRNA levels in the brain regions involved in regulation of gastric function and in the stomach. However, CRF has a much weaker affinity for the CRF2 receptors compared to the three urocortins. The purpose of this project is to determine whether stress also upregulates Ucn 1, Ucn 2, and Ucn 3 expression in rat stomach. Male adult Sprague Dawley rats were placed under restraint stress for 1 h. Controls were allowed to move freely in their cages without restraint. Rats were euthanized immediately after stress. The stomach was removed and stored at -80°C. The peptide levels of Ucn 1, Ucn 2, and Ucn 3 will be measured by enzyme-linked immunoassay. We hypothesize that stress will upregulate Ucn 1, Ucn 2, and Ucn 3 peptide levels in the rat stomach. Higher levels of urocortins will act on the CRF2 receptors in the stomach to slow down gastric emptying. The results are expected to provide evidence for the importance of Ucn 1, Ucn 2, and Ucn 3 in the regulation of gastrointestinal motor function in stressful events. Understanding this process will provide insight into how the negative effects caused by stress can be controlled.

U.65 **Evaluating CHEK1 Knockdown Constructs in Claudin-Low Breast Cancer Cells**

Jyoti Gautam, James Groh and Alex Reyes

Co-authors: Felipe Campos de Almeida

Mentor: Sierra Colavito, Biology

Breast cancer is the second leading cause of cancer-related death in women in the United States. Recently targeted therapies have been developed for some subtypes of breast cancer, but for other subtypes, such as the claudin-low subtype, no effective treatments exist. The claudin-low breast cancer subtype is extremely aggressive and highly metastatic, and patients with this subtype of breast cancer have a very poor prognosis. Our lab has recently discovered that claudin-low breast cancer cells are more sensitive to a drug that inhibits Checkpoint Kinase 1 (CHK1) than are normal cells. We have detected enhanced levels of DNA double-strand breaks in claudin-low cells in response to treatment with a CHK1 inhibitor, via immunoblotting and immunofluorescence for markers of DNA double-strand breaks. Control cells are relatively unaffected by this treatment. Currently the lab is investigating this sensitivity further, by generating knockdown constructs against CHK1, examining the cell-cycle response to CHK1 inhibition in claudin-low cells, and developing cell lines that are resistant to CHK1 inhibition.

U.66 **Impacts of Early Exposure to Triclosan on Growth, Maturation, and Reproduction in Zebrafish**

Cole Fuchs

Co-author: Tisha King-Heiden

Mentor: Tisha King-Heiden, Biology

Triclosan (TCS) is an antimicrobial agent found in many personal care products. It is one of the most frequently found personal care products in surface waters, and has been found to bioaccumulate in aquatic organisms. TCS is an endocrine disruptor in fish, and at high concentrations can alter sex differentiation and reproductive capacity. Here we examine the effects of exposure to environmentally relevant concentrations of TCS during larval development on growth, maturation, and reproductive capacity in zebrafish. Zebrafish were exposed to vehicle control, 0.4, 4, or 40 [illegible] days post fertilization via static

waterborne exposure with daily renewal (50%). Fish were raised in TCS-free water until they reached adulthood, when we evaluated impacts on reproduction. While survival was not impacted, growth was slightly reduced, and we found that TCS-exposed fish matured slower. Preliminary findings suggest that sex ratios are altered, as well as reproductive success. The results of our study will aid in understanding conflicting hypotheses regarding the mechanisms that TCS disrupts the endocrine system, and help us to better understand the potential risks of TCS to wild fish populations.

U.67 **Examination of Genetic Divergence across Bioluminescent Ostracod Species from Varying Habitats**

John Frawley and Sarah Schulz

Mentor: Gretchen Gerrish, Biology

While ostracods have been observed in marine habitats across the globe, *Photeros*, a genus of bioluminescent ostracods (Crustacea, Arthropoda), have only been discovered within the benthic zone of Caribbean coral reefs. Two species, *Photeros annecohenae* and *Photeros morini*, can be found in the same geographic area but specialize in habitat. *Photeros annecohenae* is a grassbed-dwelling species where *Photeros morini* is a coral-dwelling species. Prior research tested the hypothesis that because coral habitats are more variable and discontinuous, genetic divergence would be greater between the coral-dwelling *P. morini* populations than between the grassbed-dwelling *P. annecohenae* populations, but initial analyses rejected that hypothesis and actually showed the opposite. The genetic markers used for population genetics (microsatellites) generally only work for one species. Therefore the genetic regions used to estimate population divergence within each species were different. This introduces an element of variability to the results of microsatellite analysis because of regional genomic variability. In order to further and more accurately explore the previous hypothesis, a shared set of microsatellite primers were developed to compare regions of DNA and further analyze genetic divergence over distance between populations of *P. annecohenae* and *P. morini*. The comparison of shared genetic regions across species has rejected earlier interpretations that relatedness between populations was different between species. Our data support that at maximum geographic distances, genetic distance is similar across the two species but that at smaller geographic distances, the reef-dwelling *P. morini* has greater genetic differentiation.

U.68 **Further Examination of the Adams Instability Using N-body Simulations**

Evan Dowling

Mentor: Eric Barnes, Physics

In the model with the most widespread observational support, the majority of mass in the universe is in an exotic form, referred to as “dark matter”, which surrounds all galaxies. Unlike normal matter (atoms, humans, stars, etc.), dark matter does not interact with light (it cannot glow or cast a shadow) and its ultimate identity remains unknown. Dr. Barnes and I are interested in studying the gravitational interactions of dark matter to gain better insight into the behavior of this important, but basically unconstrained, form of matter. A studied orbital instability causes non-spherical orbits within dark matter halos to exponentially diverge into more spherical orbits. Through this project we examined the instability in a new regime, analyzing N-body computer simulations whose discreteness effects and incorporated cosmological expansion more closely resemble a physical dark matter halo then past efforts.

U.69 **Effects of Sunscreen Exposure on Golf Ball Corals (*Favia fragum*) from South Water Caye, Belize.**

Cayla Carden

Co-authors: Alexa Aguirre, and Victoria Read

Mentor: Gregory Sandland, Biology

Coral reefs are one of the most important ecosystems in the world due, in large part, to their organismal diversity. In Belize, this diversity attracts hundreds of thousands of tourists annually. Although the influx of tourists enhances the Belizean economy, it also leads to environmental costs associated with increased human activity in marine areas. Unfortunately, the anthropogenic factors associated with changes in reef dynamics are not well resolved. To begin addressing this question, we undertook a study investigating the effects of commonly used sunscreens on both the activity and the color patterns of corals. To do this we first acquired eighteen golfball coral colonies (*Favia fragum*) from the local marine environment around South Water Caye (Belize) and either exposed or sham-exposed colonies to different sunscreen treatments. We then observed polyp responses and coloration using a dissecting microscope. Results suggested an association between sunscreen exposure and the proportion of closed polyps on a coral colony. In addition, sunscreen-exposed polyps became pale in color relative to those that were sham exposed. Together, these results provide initial support for the idea that sunscreens may negatively influence corals in the marine ecosystems of Belize.

U.70 **Effect of Heel Lifts on Achilles Tendon Stress during Running**

Kayla Bushweiler and Eric Ulry

Co-authors: Alisha Boerner and Thomas Reina

Mentor: Robert Ragan, Physics

Orthotic heel lifts, used for Achilles tendon (AT) pain, injury, etc., are thought to lower tension in the Achilles (calcaneal) tendon, though some studies show an increase. To further explore this relationship, 7 subjects participated in running at medium speed with and without 10 mm in-shoe heel lifts. Reflective markers were adhered to their bodies and 180 Hz motion capture tracked the subjects as they ran across 2 force plates. The effect of AT stress was determined using inverse dynamics and HBM static muscle force optimization. The AT moment arm was determined from published cadaver data and the AT cross-sectional area was obtained via ultrasound. A paired t-test of peak stress found the peak AT stress to be 37-52 mPa with a test statistic of $p=0.014$. The peak AT stress was higher (~40%) with heel lift which is in concurrence with a similar study which estimated AT force from ankle moments.

U.71 **Child Labor on the Costa Rica - Panama Border**

Emma Brosinski

Mentor: Emily Whitney, Health Education and Health Promotion

Child labor is an important global issue that is associated with poverty, gender inequality, insufficient educational opportunities, and a range of health risks. A worldwide consensus exists that it is in the best interest of both the children and the country as a whole that child labor be eradicated. However, despite the efforts to combat this issue, we continue to see an increase in child labor in developing countries, such as Costa Rica and Panama. In order to effectively eradicate child labor it is necessary to understand the multiple factors: social, economic, and cultural, that contribute to child labor. This study utilized observations and interviews to gain an understanding of the attitudes, behaviors, and factors that surround child labor in rural Costa Rica and Panama from the viewpoint of the children workers themselves.

U.72 **The Effect of Web Interface Design on the Parallel and Distributed Computing Concepts Learning Process**

Christa Brehm

Mentor: Samantha Foley, Computer Science

As parallel machines become increasingly common in our daily lives, it is critical for computer science students to understand how to leverage the multitude of multiprocessing machines around them. Students encounter a barrier to entry for learning how to become productive in most parallel computing environments, as the systems are often unfamiliar and complex. The OnRamp project provides an interactive web portal that allows students to launch parallel applications and explore parallel and distributed computing (PDC) concepts. In this Human Computer Interaction study, we created two alternative user interfaces for OnRamp to determine which interface is more user friendly, yet maintains educational efficacy. The first is a "quiet" design where the student chooses what information to display, and the second a "busy" design which floods the user with information. Each student will be given a pre-test and post-test consisting of the same PDC questions to compare knowledge gained before and after using OnRamp. Using SPSS, an Independent t-Test will be ran to compare the means of the two groups in order to determine if there was a significant difference between scores. System usability will be measured using the System Usability Scale, which consists of a ten item questionnaire with five response options ranging from strongly agree to strongly disagree. SPSS will be used to determine if a correlation exists between system usability and the PDC learning process.

U.73 **Regulation of Cold-shock Proteins in Hibernating Ground Squirrels.**

Jaclyn Barrette, Laura Wells, Matthew Petersen, and Abigail Scaffidi

Mentor: Scott Cooper, Biology

This project focuses on the function of "cold-shock" genes in thirteen-lined ground squirrels. A "cold-shock" gene is characterized by an increased expression when exposed to cold temperatures, as experienced by hibernating animals like ground squirrels. Ribosomal-binding motif three (RBM3) is a versatile gene that is known to have diverse functions throughout the body. Initial gene analysis found that RBM3 expression increased significantly in bone marrow during hibernation, when compared to brown adipose, heart, skeletal muscle, and brain. RBM3 was also found to increase during interboutal arousal (IBA) stage and even more in the torpor stage of thirteen-lined ground squirrel hibernation. Bone marrow is the site of blood cell production, and increased concentrations of RBM3 protein have been detected in a variety of immunity related organs. No research has been done comparing the role of RBM3 in these organs throughout the different hibernation stages. The goal of the project is to determine how RBM3 protein levels vary during the non-hibernating, torpor, and IBA hibernation stages of thirteen-lined ground squirrels. The organs tested include spleen, liver, lung, small intestine, thymus, and skin. After samples were collected, RNA was isolated and concentrations determined using a NanoDrop. The sample RNA concentrations were used to standardize the amount of RNA added when cDNA (complementary DNA) was synthesized. Following cDNA synthesis, quantitative PCR (qPCR) was conducted, allowing for comparison of gene expression levels across each sample. Another cold-shock gene of interest was cold-inducible mRNA binding protein (CIRBP). This gene did not show differential expression in immunity related organs and cells and was used as a control. Glyceraldehyde 3-phosphate dehydrogenase was used as an internal loading control. Preliminary results show that of four spleen samples show that RBM3 and CIRBP decreased five and two-fold, respectively as compared to GAPDH. More samples will be run on spleen, thymus, and lung.

U.74 **Warning! No Cliff Jumping! An Analysis of Outdoor Risk Prevention Strategies**

Emily Ahrens and Daniel Sheridan

Co-Authors: Colleen Moore and Katherine Kortenkamp

Mentor: Katherine Kortenkamp, Psychology

Outdoor recreation in wild areas has psychological and health benefits, but also poses risks of injury and illness. Most research has focused on descriptions and causes of injury and illness, and paid less attention to prevention. For the current study, we collected 54 peer-reviewed publications on outdoor recreational accidents in the U.S. Four coders read the abstract, discussion, and results sections of the articles and, using an agreed upon definition of prevention, extracted the prevention recommendations given by the researchers. All extracted prevention strategies were then categorized using a modified Haddon Matrix (adapted from Runyan and Yonas, 2008) for organizing accident prevention strategies based on whether the strategy was an intervention designed to change the victim's behavior, the agent of harm, the equipment, the physical or social environment, or the relationships/groups the victim was involved in. Strategies were categorized by multiple coders to assess inter-rater reliability. Recent research on accident and prevention analysis in other areas has noted the prevalence of prevention recommendations focused on changing the victim's behavior, while at the same time highlighting the importance of taking a systems approach to prevention and making recommendations for changes at all levels (e.g., physical, social, institutional; Goode et al., 2015). Following this trend, we predicted that the outdoor risk prevention strategies would primarily be targeted at changing the behavior of the participant in the outdoor activity.

U.75 **Out with the Old, in with the New? : How Discipline Techniques and Attitudes Differ by Maternal Age**

Arianna Abel and Megan Engelhardt

Mentor: Tesia Marshik, Psychology

Previous research suggests that parents use and have widely varying attitudes towards various child discipline strategies. Unfortunately, few studies have examined the differences among four distinct maternal age groups, specifically addressing the emerging adult mother group. The current study explores mothers' use of and attitudes towards child discipline techniques and how they differ according to maternal age. We compared four maternal age groups: adolescent (under 18), emerging adult (19-24), middle adult (25-34), and older adult (35 and up). Based on previous research, we hypothesized that adolescent mothers would most likely use power assertive discipline techniques (e.g. spanking) and middle adult mothers would most likely use inductive discipline techniques (e.g. reasoning). A total of 227 mothers with one child aged one to six years old completed an online self-report questionnaire that assessed their attitudes towards different discipline techniques, their perceptions of the effectiveness and appropriateness of different techniques, and the likelihood that they would use similar techniques. The two specific forms of discipline that were assessed by the Parenting Dimensions Inventory (PDI) and several vignettes included power-assertive and inductive-reasoning. Results showed that there were no significant differences between maternal age and discipline technique indicated by the PDI. However, results from the vignettes found that emerging adults rated power-assertive techniques as more appropriate and reported being more likely to use those techniques compared to the middle-aged adults. In addition, both teen and emerging adult mothers rated power-assertive techniques as more effective compared to the middle adult group. These results may further distinguish the emerging adult stage and inform society how maternal age may affect one's discipline style and the upbringing of future generations.

U.78 **A Brief History of the Pre-Holocene Giants and Their Predator-Prey Relationships**

Peter Roth, Julianna Cruz, and Emily Schneider

Mentor: Eric Snively, Biology

This study presents mass properties of several different organisms throughout time using 3D-modeling techniques. We selected the largest predators and herbivores from several time periods to test relativity in mass. Observations of physical characteristics and relationships between models will allow us to predict the patterns of physical behaviors and compare between species. Our results include the first computerized mass estimates for several extinct animals for the, including the long-necked dinosaurs Sauroposeidon and a large Apatosaurus (about 40 tonnes each), and the saber-toothed cats animal Barbourofelis and Smilodon populator. We found that the largest herbivores are often an order of magnitude larger than the biggest predators in a given environment.

UNDERGRADUATE ORAL PRESENTATION ABSTRACTS

UR.1 **A Permutation Test for the Spread of Three-Dimensional Rotation Data**

Marissa Eckrote

Mentor: Melissa Bingham, Mathematics and Statistics

Statistical inference procedures that require no distributional assumptions make up the area of nonparametric statistics. The permutation test is a nonparametric test that can be used to compare measures of spread for two data sets, but is yet to be explored for three-dimensional rotation data. A permutation test for such data is developed and the statistical power of this test is considered under various conditions. The test is then used in an application comparing movement around the calcaneocuboid joint for a human, chimpanzee, and baboon.

UR.2 **Grace Chisholm Young: A Front-Runner in Women's Higher Education**

Marissa Eckrote and Shelby Graham

Mentors: Susan Kelly and Karl Kattchee, Mathematics and Statistics

Dr. Grace Chisholm Young was the first woman to earn a Ph.D. from a German university, earning a doctorate in mathematics in 1895. The study of Young's life arose from the goal of discovering significant accomplishments and experiences of female pioneers in mathematics. Research on the life and contributions of Young was conducted by examining various biographical materials and by looking at her work in mathematics, specifically a book on geometry intended for young mathematics students published by Young and her husband. During her youth, Young was taught by her mother and a private tutor. She attended Girton College at Cambridge at the age of 21 where she studied Mathematics. After attending Girton she traveled to Germany to study under Felix Klein, an internationally known mathematician, who played an instrumental role in bringing the first three females to Germany for graduate level studies. In 1895, Young published her thesis "Algebraic Groups of Spherical Trigonometry." After leaving Germany she married Henry Young, her former tutor from Girton, and they had six children. Together they published over 200 papers on a wide array of topics in mathematics including set theory and differential calculus. She also wrote three books for children about mathematics and science. Much of their work was published solely under her husband's name since women were given few professional options and the publications benefited her husband's professional career more. Young played a large part in allowing women to gain more respect in the classroom and professionally through the dedication and perseverance she showed at Girton and throughout her life. This research revealed some of the struggles and accomplishments in Young's career, and we hope to disseminate our work to help illustrate some of the roles women have played in mathematics.

UR.3 **Towards a Better Understanding of Using Parent Beliefs to Improve Social Justice for Exceptional Learners: A Review of the Literature**

Alyssa Nelson

Mentor: Leslie Rogers, Educational Studies

The purpose of this research is to explore how school professionals can promote social justice by better understanding the views of parents of children who have been historically marginalized - children with exceptional learning needs. To do so, one must first understand the underlying view of social justice that has permeated this investigation of parental participation in education. First, not every student succeeds in

school. In the state of Wisconsin alone, there exists an achievement gap in which certain groups of students (e.g., students without disabilities) continue to excel more than others (e.g., students with disabilities). Second, much research has been done to examine the extent to which parent involvement improves this achievement gap. Researchers have found that, within the general education population, students with parents who are more involved are achieving more in school. This study aimed to extend these results to better understand the beliefs of parents of children with exceptional learning needs. The investigation involved identifying studies in which parents of exceptional learners were interviewed and asked about their view of their child's education. The search resulted in the inclusion of three studies in which a total of 46 parents were interviewed. The results were analyzed and used to answer the following questions: 1. Are parents of exceptional students being asked whether their children are receiving an adequate education? 2. If parents are being asked, do these parents represent parents who have historically been marginalized? 3. What are the major findings from these studies? 4. What action plans were recommended based on this parent input? 5. What direction should future research on improving the social justice for students and parents of exceptional children take in order to address the disparity in achievement levels found between students with and without exceptional learning needs?

UR.4 **Patterns of Neolithic Transition at Ifrie Oudadane, Morocco and the Dhar Tichitt Region of Mauritania**

Alleyce Somerville

Mentor: Heather Walder, Archaeology and Anthropology

This paper focuses on two archaeological locales in western Africa. The first is Ifri Oudadane, a rock shelter located in northeastern Morocco. The second is the Dhar Tichitt region, located in southcentral Mauritania. Both sites show signs of the transition towards an agricultural-based subsistence pattern. Through the comparison of these two sites, it may be possible to discern common cultural trends in Africa that accompany a changing subsistence. Ifri Oudadane, inhabited 11000-5700 calBP, shows a transition from a hunter-gatherer based subsistence pattern to a reliance on cultivated plant materials, which were introduced through cultural contact. Dhar Tichitt was inhabited by pastoralists who shifted towards agro-pastoralism and independently domesticated a variety of millet between 4000 and 2300 BP. These areas underwent differing means of transition, though through comparison, underlying patterns that accompany a shifting cultural economy should be observable in the archaeological record.

UR.5 **Branding Kwik Trip's Corporate Wellness Program**

Carly Reinke, Alyson Statz, and Jen Eversoll

Mentor: Samatha Samreth, Management

The purpose of this project is to develop and execute a branding image to Kwik Trip's current Wellness Program at the corporate headquarters in La Crosse, Wisconsin. The problem is that the wellness program is not cohesive, which leads to it being overlooked by employees. The assumption is by creating a corporate wellness program brand image and marketing it appropriately will help increase employees awareness about its program's events, benefits and opportunities, and expand employees' future participation. Corporate wellness programs are necessary in order to promote healthy lifestyles and advocate for preventative care. This project will be successful if employees' responsiveness and participation is increased from the prior year. The overall approach to this project is, first we will send out an online survey to the current employees to measure their knowledge and awareness of the wellness program. Next, we will analyze the data and determine a more effective method of communication to inform and educate the

employees about Kwix Trip's Wellness Program. Finally, branding its corporate wellness program image, which will consist of implementing a new logo, slogan and color scheme to create a more cohesiveness and recognizable program.

UR.6 **River States Truck and Trailer Employee Benefits Satisfaction Survey**

Alex Schramm, Jacob Erickson and Dylan Schroeder

Mentor: Samantha Samreth, Management

The purpose of this project is to identify and describe River States Truck and Trailer employee benefits satisfaction as well as its employee benefits competitiveness amongst their competitors in their business industry. A final report of employee benefits satisfaction, its benefits competitiveness, and recommendation will be addressed. The problem is River States doesn't know how their current benefit package compares to their competitors' benefit packages or how satisfied their employees are with the current benefit package. The approach to this project is to conduct a survey of River States Truck and Trailer employees on their satisfaction with the current benefits package, and analyze it compared to competitors' benefits. We will survey employees belonging to five departments which include service, parts, body shop, sales, and other at six different locations in the Midwest United States including River States La Crosse, River States Eau Claire, River States Roberts, La Crosse Truck Mack, La Crosse Truck Ford, and Minnesota Truck and Trailer in Eagan MN. After the data is collected we will need to analyze the results we get from the survey and compare them to River States' competitors. We are hoping for a 50% return rate on the survey from the 200 employees that we are sampling. The intended result for this project is to produce the product-related deliverables to the project's sponsor which includes administering a survey to measure employee satisfaction with the benefits package, and comparing the current benefits package to their competitors (i.e., Kenworth, Peterbilt, Freightliner, Volvo, I-State Truck). This project will be successful if we are able to accurately gauge River States Truck and Trailer's employee satisfaction on their benefits package.

UR.7 **La Crosse Juvenile Justice Arrest and Disproportionate Minority Contact Inter-Agency (Jjadmc) Task Force: A Case Study**

Kelsie Bolstad

Mentor: Lisa Kruse, Sociology

In 2008, the Carey Group released a report indicating that La Crosse County had a juvenile arrest rate higher than not only the Wisconsin juvenile arrest rate, but also three like sized counties (Kruse and Foegen 2014). In hopes to change the statistics, the Juvenile Justice Arrest and Disproportionate Minority Contact Inter-Agency (JJADMC) Task Force has collaborated to discuss different methods to help the at-risk youth in the city of La Crosse avoid contact with the juvenile system. This task force is a collaboration of key stakeholders including the Juvenile Justice Supervisor, the Health and Human Services Supervisor, school administrators, school resource officers, and youth program implementers. In this mixed methods case study, qualitative methods will be used to assess the effectiveness of the JJADMC Task Force as it redefines arrest for the city of La Crosse, and implements new diversionary programs. Interviews with the La Crosse School District School Resource Officers (SROS), the Sergeant who oversees their work, and the key stakeholders of the task force will help to gain an understanding of specific stakeholders' views of the process and buy in to changes. Further, observations of monthly meetings will help to evaluate the progress of the task force. Quantitative methods will be used to assess arrest and suspension data for La Crosse. This

research will be beneficial for the community of La Crosse and others in understanding the most effective ways to address juvenile delinquency and disproportionate minority contact.

UR.8 **Life on the Shoulders of the Earth: Archaic Hunter-Gatherer Settlement Patterns in the Driftless Area of Southwestern Wisconsin**

Harley Soerfass

Mentors: George Christiansen and Constance Arzigian, Archaeology and Anthropology

From approximately 6000 to 3500 years ago hunter-gatherers from the middle-to-late Archaic Tradition occupied the diverse landscape of the Driftless Area in southwest Wisconsin (Pleger and Stoltman 2009). The Maple Ridge archaeological site (47Sk509) is one such occupation. Through an analysis of the Maple Ridge lithic assemblage, I define the site occupation period, establish the purpose of the occupation, and compare Maple Ridge to other Archaic sites. I use these data to propose a middle-to-late Archaic Tradition settlement model of the Driftless Area in southwest Wisconsin. Factors of analysis and observation include topography, hydrology, soil, and occupation. Through this research, I have identified patterns in how middle-to-late Archaic peoples utilized the landscape in the Wisconsin Driftless region. This model may be used to help define human behaviors at existing sites found in the Driftless Area such as rockshelters, open air sites, procurement areas, quarry sites, and rock art sites, and in the future to find new Archaic Tradition sites in southwest Wisconsin.

UR.9 **Discovery Project: CROPP Member Phone Access and Voice Response Unit System**

Austin Simonis, Maddie Hagar, and Keely Rau

Mentor: Samantha Samreth, Management

Over the past 25 years the number of dairy farms that are of the “plain folk” community has grown to greater than 45% of the total according to CROPP, but the membership information development has been geared towards mail distribution and internet-based web access for production, quality, payroll, equity and other organizational information. As such, the non-internet members have been underserved and with mail delivery service continuing to deteriorate this has become a membership satisfaction and retention issue. Organic Valley of La Farge, WI is tackling this issue with the implementation of a phone access voice response unit. This system will provide non-internet users from Dairy and EMPS Pools access to account and organizational information similar to that displayed on Farmers.coop any time of the day. In addition, this system will enable the use of untapped communication pathways between Coulee Region Organic Produce Pool (CROPP) and Organic Valley allowing their members continuous access to real time data.

UR.10 **Historical Portrayals of Social Justice**

Zoe Hodges

Mentor: J. Baker, Educational Studies

I give quotations from famous actors, actresses, musicians, authors, and other celebrities and explain how these quotes apply to social justice and multicultural education. I also change and modify each of the quotations so that the quotations are inclusive of all people in spite of race, gender, sexual orientation, and other socioeconomic factors.

UR.11 **[art]ifact: Where History Meets Art**

Ariel Reker

Mentor: Ariel Beaujot, History

"[art]ifact: where history meets art" is an exhibit at the Pump House Regional Arts Center that showcases local historical objects that were made in La Crosse from the La Crosse County Historical Society's collection alongside new original artwork inspired by these objects and their stories. The purpose of this exhibit was to help visitors understand material culture and why humans need things. Students in the class responsible for mounting [art]ifact chose objects from the La Crosse County Historical Society and researched the their histories and stories to help artists create a new interpretation of the objects. The students were also split into four groups that had their own set of responsibilities: Public and Artist Relations, Curatorial, Education Coordination, and Interactive/Assessment. There will be presentations about each group and their duties. With the collaboration of these groups not only was an exhibit created, but programming and interactive activities were also created to go along with the exhibit to involve the La Crosse community in their local history and art.

UR.12 **The Impact of School-Based Family Engagement Strategies on Student Learning Outcomes: A Review of Literature**

Sarah Mehring

Mentor: Leslie Rogers, Educational Studies

The purpose for this research is to examine the relationship of family engagement programs on pre-kindergarten – twelfth grade student learning outcomes, particularly students with exceptionalities. Nationwide, approximately six million students with disabilities attend primary and secondary schools (National Center for Education Statistics 2013). In 1975, Public Law 94-142 Education for All Handicapped Children's Act—later reauthorized as the Individuals with Disabilities Education Act (IDEA)—intended to service all students with disabilities access to free and appropriate public education and ensure protection of student and parental rights. The 2001 No Child Left Behind Act (NCLB) required states, districts, and schools be held accountable for the performance of students with disabilities. Despite the renowned policy reforms, the learning outcomes for students with exceptionalities have remained unchanged. For example, the percent of students with and without disabilities performing proficient in eighth grade mathematics was 16.4 and 53.6 respectively (Wisconsin Student Assessment System 2012). As parental involvement in education has increased – ninety percent attend school meetings; eighty percent attend school events; and sixty percent volunteer in the classroom, this research study investigated the correlation of family engagement on student learning outcomes (National Center for Education Statistics 2008). Research substantiates higher academic outcomes of 0.5-0.6 standard deviations (Jeynes 2005) and improved social behavior of 0.22 standard deviations (Nokali 2010) for prevalence of family engagement in education. This research aimed to answer the following questions: 1. Is there a statistically significant difference in exceptional student learning outcomes based on differing levels of family engagement? 2. What types of family engagement programs appear to have the greatest positive impact on exceptional student learning outcomes? 3. What additional information have parents shared and how can this inform future research efforts?

UR.13 **Race and Gender Bias in Perceptions of Punishment: An Examination of Academic Misconduct and Illicit Prescription Drug Use**

Dane Berres

Mentor: Nicholas Bakken, Sociology

In a modern society, laws are created to promote understanding and equal punishment among all individuals. However, a thorough investigation of current data suggests that punishments are not necessarily equal for everyone. While a vast amount of research has been dedicated to examine the rationale used to determine the punishments that are provided for specific criminal offenses, little research has examined how an individual's perception of punishment for an offense may vary depending on ascribed factors such as the race/ethnicity and/or gender of the offender. This study aims to investigate student perceptions of punishment concerning academic misconduct and illicit prescription drug use while directly controlling for the race/ethnicity and gender of the offender in question. This area of research is important when evaluating how those operating within the criminal justice system, such as judges, prosecutors, or jury members, may allow these implicit biases to affect the level of punishment an offender may receive or result in a presumption of guilt or innocence. Using vignettes and structural equation modeling depicting realistic criminal behaviors, the current study will test the hypothesis examining student perceptions on perceived punishment as it relates to academic misconduct and illicit prescription drug use, and discuss the policy implications stemming from the results.

UR.14 **Reverse That TIF: An Analysis of Reverse TIF Methods in Wisconsin**

Rachel Ramthun

Mentor: John Kovari, Political Science and Public Administration

Tax incremental financing, or TIF, has become a hot topic in the world of public economic development for professionals, politicians, and academics. TIF occurs when a municipality offers what is essentially a loan to a private developer to increase the property value on a blighted property, thus creating economic development. When the property value increases, the property tax revenue increases. This future tax revenue will then repay the loan. Since TIF is considered a subsidy, researchers and policymakers disagree over the methods that should be used, and, sometimes, whether TIF should be used at all. An alternative method, reverse TIF, has been studied little (if at all) but could save a municipality from financial destitution in the event of a failed TIF district since the developer takes out a private loan that is repaid through the future increased tax revenue. This study will analyze the success and failure rates of Wisconsin municipalities utilizing reverse TIF and compare them to those using "regular" TIF. I will administer a self-designed email survey to each of the 431 municipalities in Wisconsin that currently utilize any type of TIF (since the State of Wisconsin Department of Revenue does not differentiate between "regular" and reverse TIF). I will statistically analyze my results, though the exact test I will use will depend partially on survey results. Upon completion of this study I hope to be able to make policy recommendations to municipalities around Wisconsin (possibly in other states, as well) about how to implement a TIF district with the most chance for success.

UR.15 **Studying Nuclear Structure to Understand Stellar Processes**

Marcus Lowe

Mentor: Shelly Lesher, Physics

What are we made of? And how are we here? These are two big questions to be asked, which are exactly what we have the possibility to understand in the field of nuclear astrophysics. Fully understanding how elements form within stars is heavily dependent upon understanding how nuclei within them interact with each other. To do this, we must understand how each nucleus “looks” in terms of its quantum-mechanical structure. In general this can be achieved by exciting a nucleus and then watching it decay back to stability. The goal of this project is to more fully understand the structure of the nucleus Erbium-170. At the University of Kentucky, neutrons were produced through a (p, n) reaction induced by a proton beam on a Hydrogen-3 gas cell. These were then used in a (n, n’γ) reaction, leaving the nucleus in an excited state allowing it to decay via gamma rays. The method of developing an understanding of the structure is through high resolution gamma-ray spectroscopy, utilizing a high-purity germanium detector to collect data. In this experiment, an angular distribution was investigated, by moving the detector at angles between 40- and 152-degrees with respect to the incident beam to identify the angular dependency of the decay. This also allows us to extract lifetime measurements of excited states by identifying Doppler shifting effects in the gamma spectra. This talk will present current results.

UR.16 **Shinto Symbolism of Water in "Princess Mononoke"**

Katherine Habrel

Mentor: Susan Crutchfield, English

Japan has a long, proud history, rich in tales both real and mythological. If we want to understand their culture and the themes carried through their media, we must first understand how the stories and beliefs passed down by the practitioners of Shintoism have permeated the whole of Japanese society. For this project, I chose to use the movie Princess Mononoke, directed by Hayao Miyazaki, to demonstrate just how much influence Shintoism has on Japanese culture. There were several segments to my research. I spent a little under a month living in Japan with a host family in the summer of 2012. I then read through several articles and databases, including the United Religions Initiative and Kokugakuin University's Encyclopedia of Shinto. I decided to use Princess Mononoke as an example because it is rich with Shinto symbolism and many different interpretations of its use. I read interviews with the director about the movie, viewed it in both English and Japanese, analyzed its symbolism myself, and read others' reviews. From this research, I found almost every facet of this film, from character names to settings, takes a great deal of inspiration from Shinto practices. Because this is a highly visual form of media, I chose to include many photos - both still shots from the movie, and pictures from my own travels - in the presentation to highlight Shintoism's representation in all its forms.

UR.17 **Detecting Exoplanets with Linear Algebra**

Kelly Emmrich

Mentor: Chad Vidden, Mathematics and Statistics

Detecting planets in our solar system has been a pursuit of astronomers for thousands of years. However, infinitely many more remain at large, yearning to be discovered. With the use of advanced linear algebra concepts and applications, along with the programming language R, the lofty pursuit of unearthing exoplanets becomes an attainable goal. Throughout this presentation, we'll discover methods of exoplanet detection involving Fourier Series and Fast Fourier Transform signal processing techniques. Clever use of the Doppler effect also aids this process, leading to an encounter with planets not yet discovered and a greater appreciation for applied mathematics.

UR.18 **La Crosse—Dubna: People to People Diplomacy**

Rebecca Schnabel

Mentor: Shelley Sinclair, History

My paper, La Crosse—Dubna: People to People Diplomacy, is not about war, but instead describes and analyzes the importance and creation of international relations after major conflict. La Crosse Wisconsin, USA and Dubna, Russia became official sister cities over the last several years of the Cold War, and have been named twice times over the last 25 years the best and most productive sister city connection by Sister Cities International. Through thousands of cultural and informational exchanges, this organization has fostered friendship and love on a personal level between two counties whose political past has been far from trusting or collaborative. My sources are based in primary research done both here in La Crosse and over the course of a ten-day trip to Dubna Russia this past summer, 2015. Over the course of around twenty oral histories in both English and Russian, ages ranging from the eighties down to the twenties, this project reveals the complex conclusion of the Cold War. Ordinary people from both sides of the globe overcame a psychological conflict once based in utter fear to instead embrace strangers as family.

UR.19 **Automating Schedule Optimization**

Jack Meyers and Daniel Morrison

Mentor: Song Chen, Mathematics and Statistics

Our project was to implement and compare two approaches to creating an optimal class schedule for the UW-L Math Department. The department currently schedules all of the classes by hand requiring many hours of work and years of experience. Scheduling problems are a class of optimization problems, which means there is no way to find the optimal solution efficiently, but we tasked ourselves with creating a program that could complete this process faster and more effectively. We chose to use the two most common methods, a genetic programming model and a linear integer programming model, to solve this problem. Our results were two separate schedules that had been optimized and organized into a convenient format for the math department and that could be computed in minutes.

UR.20 **Understanding Women's Representation in Chile**

Lisa Roemhildt

Mentor: Cecilia Manrique, Political Science and Public Administration

Chile represents an interesting dichotomy on the role of women in politics and government. Although Chile's president is female and serving her second term, relatively few women serve elsewhere at the national and local levels. This study reports on the findings of a survey that looked at the views of women in politics and the views of Chileans about women in government. The data was collected using both ethnographic research and a cross sectional survey of Chileans. The results of this study suggest Chilean's favor and support women's representation in government, but many acknowledge the low levels of women's representation and barriers faced by many women historically and currently. Often, women's representation in government is considered in the context of candidate selection, gender quotas, and dominating political parties, but with the comparison between the public's perspective and current data of women serving in government, this research combines those barriers with the possibility of a gender bias existing within the Chilean society.

UR.21 **UWL Students' Philanthropy: Community Partnership for Kids' Sake**

Jacob Duarte, Fernando Duarte, and Randy Krypel

Mentor: Samantha Samreth, Management

The purpose of this project is to aid in the planning of the 2nd Annual Big Brothers Big Sisters (BBBS) 'Golf for Kids' Sake' fundraiser. For the purpose of this project, aiding will be defined as securing hole sponsors and creating a marketing plan in order to make this event successful. The event will take place on June 8th, but our portion of the project with securing hole sponsorships and marketing plan will be completed by April 15th. The success of this event is crucial in raising funds for BBBS to be able to continue to serve the seven rivers region which includes La Crosse and Winona. This project will be successful if we secure three hole sponsors, or $1500.00 in donations for the event and BBBS. Success will also be defined as getting a verbal commitment from three teams that will play in the event. Therefore, the first deliverable for the project is securing three hole sponsors during the life of the project. This will be done through face-to-face meetings with local businesses, explaining about the event, the mission of BBBS, and benefits for the business that come with sponsoring the event. The other deliverable is to develop a marketing plan with creative tools to raise awareness of the event, increase the number of participants, and spread the story about BBBS as a whole. The marketing plan will include print materials to distribute at local businesses, a Facebook event, and drafts of various "posts" and "tweets" that BBBS can use to publicize about the event. As well as flyers to be posted on local event bulletin boards including UW-L.

UR.22 **Garbage Bag Fashion Show - Salvation Army**

Lauren Carr and Devon Holtegaard

Co-author: Michael Ulmen

Mentor: Samantha Samreth, Management

Our purpose for this project is to create awareness of the Salvation Army in the La Crosse community so that they can continue to actively help the families and individuals in need. We will partake in initiating an annual fundraiser in order to increase publicity and longevity of the Salvation Army. The major problem at the local Salvation Army is a lack of resources, such as human resources, monetary support, or facility-related needs and services. The success of this project will depend on our ability to acquire sponsors, reach our fundraising goal of $10,000, satisfy the attendees' expectations of the fundraiser, and encourage the younger generation to get involved in helping their local community. The approach to this project will involve marketing on and off campus to students, getting sponsorship from local businesses wanting to help, and successfully coordinating the event. We will also be providing a budget for the entire project. The intended result for this project is to produce deliverables such as: money raised, venue, food and beverage provider for the event, marketing materials and strategy, date options, budget for the event, sponsorships from the La Crosse community, and a strategy to actively involving the community in the Salvation Army's efforts.

UR.23 **A Night for Kid's Sake**

David Overgard and Caleb Finn

Co-author: Nicole Gostomski

Mentor: Samantha Samreth, Management

The purpose of this project is to create, coordinate and implement a new fundraising event for Big Brothers Big Sisters of the 7 Rivers Region (BBBS) in spring of 2016. BBBS is a local and international nonprofit mentoring program that provides children facing adversity with strong and enduring, professionally supported one-to-one relationships. The current problem is that BBBS lacks young professionals to assist their sustainability needs for the future of their organization. Their goal is to cultivate this younger demographic to become a larger part of the organization through individual match pledges, donations and the building of long lasting community partners. The organization wants to create awareness for their cause by holding an event at a popular restaurant in the La Crosse area. The event will specifically target members of the community in their mid-20s to early 30s. BBBS also wants to raise funds to keep the La Crosse organization running for generations to come. This project will be considered a success if the team can plan, promote, and execute an event that attracts young professional community members to pledge and donate to the organization while increasing recognition about BBBS programs. This will include: creating, planning, marketing, executing, and managing a brand new fundraising event. The intended result of our project is to maximize the following for our sponsors: Promote the mission and vision statement of Big Brothers Big Sisters, Raise $1,000 - $3,000, Increase the potential of a long lasting pledge relationship, Create a successful cultivation event to further support Big Brothers Big Sisters, Attract 40-50 people under the age of 35 to come to the fundraising event.

UR.24 **"Y Era Torta Encima": Exposing Gender Bias within Argentine Gay Communities.**

Johnny Glaunert

Mentor: Stephen Mann, English

Feminist activists and scholars have long recognized problems of exclusion within gay communities, specifically as they intersect with sexism, white privilege and transmisogyny. More recently, gay rights victories such as marriage equality in the US and Argentina have prompted activists and scholars alike to revisit issues of gender-based exclusion within gay male spaces. This presentation will examine data gathered from 47 language attitudes surveys and interviews with gay men in Buenos Aires as part of a grant-funded undergraduate research project conducted in the spring of 2015. Utilizing a modified matched-guise technique, I created Reader and Listener Attitudes surveys specifically designed to examine sexist language attitudes among straight and gay men in Argentina. My findings revealed a higher degree of sexist attitudes among straight men, who consistently rated assertive female authors as more nosy, vulgar, and aggressive than identical male authors. These findings conform to my prediction that, due to prior contemplation of gender norms, gay men would express fewer normative language attitudes than their straight counterparts. Gay participants did, however, articulate similar attitudes during the oral interviews conducted post-survey. Several gay men were found to express a particular disdain for women in positions of power, describing female employers as more bossy, demanding, and unpredictable than male employers. These data support recent findings on the effects of gender bias upon ratings of female authority figures while providing new insight into the role that sexual orientation plays in the construction of gendered ratings. I argue that by exposing gender bias within gay communities we disrupt the (hetero) sexist logic that so often informs gay male space and thus mobilize efforts to create truly transformative communities free from gender- and sexuality-based exclusion.

UR.25 **Monitoring Salivary Hormones, Training Volume, Jumping Ability, and Competition Performance in CAA Division III Women Pole-Vaulters**

Meaghan Howell

Mentor: Matthew Andre, Exercise and Sports Science

The purpose of this study is to monitor free testosterone, cortisol, and the ratio of testosterone to cortisol in collegiate Pole-Vaulters. Data collection weeks throughout the track and field indoor and outdoor seasons and compare these values to a multitude of training factors. Factors that will be assessed and measured include training load, nutritional intake, broad jump measurement, body composition, psychological stress, and pole vault performance during competition. Training load will be assessed by specific sprinting workouts and weight lifting sessions that the athletes undergo throughout data collection week. Participants will be asked to keep a food diary of everything consumed between Monday and Thursday of data collecting week. Body composition analysis will be performed through a Bod Pod in which athletes will be told to restrain from eating two hours before analysis in order to attain most accurate results. Following Bod Pod analysis, athletes will do a mild warm up before performing and measuring three standing broad jumps into a sand pit. A psychological questionnaire containing pole-vault specific stress questions and academic stress questions will be administered before the weekly pole vault practice and competition. Finally, we will be comparing the various factors to individual pole vault performances at the weekend competition. This information will be useful for practitioners and coaches for monitoring under what biological conditions will enable their athletes' compete at optimal performance. Moreover, coaches will understand the physiological costs of selected training and help draw conclusions about whether their athletes are adapting in the intended direction. Learning how athletes respond to the systematic training stimuli will help coaches properly manipulate the stressors applied to the biological systems that govern athletic success.

UR.26 **Assessing the Impact of Surgical Residents In-Training on Breast Cancer Surgery Outcomes**

Shaun Fleischhacker, Courtney Mumm, and Jonathon Forsythe

Mentor: Barbara Bennie, Mathematics and Statistics

Educating resident surgeons in-training is essential for quality medical care in the future. This is particularly true in the context of breast cancer surgeries as breast cancer is the most common non-skin cancer among women. The goal of this study was to statistically analyze the association of resident presence in the operating room with early postoperative outcomes and total operation time in breast cancer surgeries. We designed a retrospective analysis of breast surgeries in women drawn from the American College of Surgeons' National Surgical Quality Improvement Program (ACS NSQIP) database from 2005 to 2012. Our primary response variable for this study was early-postoperative mortality or serious morbidity (M&M) defined as cardiac arrest requiring CPR, myocardial infarction, pneumonia, progressive renal insufficiency, acute renal failure, deep incisional surgical site infection, deep vein thrombosis requiring therapy, pulmonary embolism, organ space surgical site infection, sepsis, septic shock, unplanned intubation, urinary tract infection, wound disruption, reoperation or death within 30 days of surgery. Our key predictor variable was the presence of a surgical resident (yes/no). A statistical analysis of the association between M&M and resident presence was done using a multiple logistic regression model. A general linear model was used to analyze total operation time. Several confounding variables were included in these models including patient age and many metrics of the patients' preoperative health. No statistically significant association was noted between resident presence and early serious postoperative outcomes. There was a statistically significant association between the presence of a resident and the length of operation. In particular, cases where a resident was present in the operating room had significantly longer operating times.

UR.27 **Induction of Intestinal Dysbiosis through Broad-Spectrum Antibiotic Gavage, High-Fat Feeding Impairs Microbiota-Gut-Brain Axis and Sleep Behavior in Mice**

Jonathan Lendrum

Mentor: Bradley Seebach, Biology

The glymphatic system, a perivascular circulatory system active during sleep phases and the recently uncovered meningeal lymphatic vasculature have brought into question the long-standing notion of immune privilege of the central nervous system. The aim of our study was to investigate relationships between altered compositions of intestinal microbiota and sleep behavior in mice. To do so, we individually housed three groups of five C57BL/6 mice in cages fit with an infrared security camera system used to record sleep behavior. Five of the mice were gavaged with a broad-spectrum antibiotic cocktail consisting of ampicillin, neomycin, metronidazole, and vacomycin in order to perturb intestinal microbiota and induce dysbiosis. To a second group of mice we used high fat (60% kcal) feeding to alter the gut-microbiome. Ussing chamber techniques were used to assess mucosal barrier function and whole blood parameters were measured with a HemaVet Analyzer. We found that antibiotics and high fat diet-induced dysbiosis caused a dramatic increase in intestinal permeability, indicating mucosal barrier impairment. Additionally, energy harvest capacity, spleen size and total white blood cell count was significantly reduced in antibiotic treated mice. The results of this study suggest that different states of dysbiosis damage mucosal barrier similarly, but the consequence of which leads to microbial-specific compromises in immune cell homeostasis, glymphatic dysfunction and subsequent disruption in sleep-wake behavior.
Acknowledgement: NIH R15 DK097460-01A1 (SL) and UW-L undergraduate research grant (JL).

UR.28 **Beyond the Degree: The Impact of Individual Characteristics and Institutional Factors on Post-Baccalaureate Degree Enrollment, 2008-2012**

Kendra Kiepke

Mentor: Enilda Delgado, Sociology

College Graduation is an impressive feat by itself, not to mention those individuals who manage to further their education to the next level attain a certain level of prestige in achieving higher education. Opportunities for success are not equal for each individual and so it is logical to expect that there are societal fences set in place that those with a bachelor's degree must overcome, the question then becomes what factors of society and characteristics of the individual are found in persons attending post-baccalaureate programs. The question is examined by analyzing data from the 2008-2012 Baccalaureate and Beyond Longitudinal Study (N=12,000), focusing on students who received their bachelor's degree in 2007-08 and were followed for 4 years, until 2012. The purpose of this research is to detect which variables are associated with enrollment in additional degree or certificate programs since completing the Bachelor's degree. While roughly 45% of students who earned their Bachelor's degree in the United States in 2008 enrolled in additional degree programs, this statistical analysis focuses on the importance of high school SAT/ACT scores, undergraduate academic honors, type of undergraduate institution attended (i.e., public vs. for-profit vs. private nonprofit) and eligibility for TRIO programs, as predictors of further graduate education enrollment. Additionally, this research explores the significance of undergraduate and secondary school experiences, use of student loans, and demographic characteristics, as predictors of future post-baccalaureate enrollment.

UR.29 **Observing Changes in Usefulness of a Ligament with Increasing Bite Force in the American Alligator (*Alligator mississippiensis*)**

Mari Sweetman and Cody Fisher

Mentor: Eric Snively, Biology

The highest bite forces on record have been exhibited by crocodilians, including the American alligator (*Alligator mississippiensis*). This species has the ability to crush prey such as crabs and turtles. Our previous results suggested that the high density and stiffness of the skull minimized potentially damaging strain from high feeding stresses. However, these analyses showed unexpectedly high stresses on the frontal bone between the animal's eyes. Recently, there has been newfound evidence of a tension chord ligament located in the septum nasi that could compensate for these possibly anomalous frontal stresses. Bone is better at handling compression than tension, and the ligament would reduce tension on the palate and reduce the overall stress on the frontals (Klenner, et al. 2015). New analyses on a three-dimensional *A. mississippiensis* skull model enabled us to assess if the tension chord significantly reduced stresses on the frontal bones, and how the skull responded to several known alligator biting behaviors.

UR.30 **Changes in Celtic Consumption: Roman Influence on Faunal Diets of the Atrebates**

Alex Frey

Mentor: Heather Walder, Archaeology and Anthropology

This presentation addresses cultural impacts of the Roman Empire's invasion and conquest of Britain on the Atrebates, a local Celtic tribe. The Atrebates held large portions of land in southern Britain, centered around the ancient city of Calleva Atrebatum, near present-day Silchester. Their land became a client kingdom under the Roman Empire in 43 AD, by peaceful resignation to the Roman invaders. With Roman rule also came Roman meat-based diet and animal husbandry patterns, reflected in animal remains within the archaeological record. To better understand the faunal dietary transition from the Late Iron Age habits of pre-Roman Britain until the early Saxon period of post-Roman Britain, I have analyzed the datasets from numerous excavations within the city limits of ancient Calleva Atrebatum, along with 19 rural archaeological excavations surrounding the city. By individually analyzing faunal datasets from each site, I calculated the proportions of each animal species per context, and compared those proportions across the sites. Utilizing the calculations of Number of Individual Species (NISP) found and the Minimum Number of Individuals (MNI) possible for each excavation site, I assessed the changing prominence of sheep, pigs, and cattle in the diets of the Atrebates over time. This research demonstrates the pervasive impact of the Roman Empire on populations with whom they interacted, beyond simple governance to influencing cultural practices.

UR.31 **Cultural Hybridity in Northern Roman Britain: A Comparison between Binchester and Housesteads Roman Forts**

Allison Weeks

Mentors: Katherine Grillo and Heather Walder, Archaeology and Anthropology

Cultural hybridity theory has the potential to provide classical archaeologists with a more holistic method of approaching cultural materials. The paradigm of hybridity was developed for analyzing modern societies living in the peripherals of global world powers. For example, in the United States this includes African American, Latino/a, and refugee populations. Cultural hybridity theory has begun to be more widely used in archaeology as a result of modern global politics and neo-imperialism. For example, the paradigm has been

used to explore the effects of Spanish colonialism on indigenous populations in its former American colonies. The framework does require further definition and analysis before it should be more widely accepted as an archaeological theory. My research assesses how the theoretical framework of cultural hybridity can be used in Classical archaeology by focusing on intercultural interaction in the Northern peripheries of the Roman global empire from 80 AD to 410 AD. / Military locations are the most frequently excavated form of Roman site in Britain because of their long association with prestige materials. As a result a large number of contemporaneous Roman military fort sites are available for study and cross-examination. I chose to focus on the forts of Binchester and Housesteads by comparing evidence from architectural features and artistic artifacts from both sites. I demonstrate instances of cultural hybridity in the British peripheries of the Roman Empire in cultural materials like graffiti, religious deities, and smelting molds. / While context is always an important aspect of any archaeological study, the aspects of hybridity are found most frequently in the context of an artifact within the architectural feature. Very rarely do specific materials exhibit hybridity. For this reason, applying the theoretical framework of cultural hybridity in Classical archaeology is most effective at the scale of site-level analysis.

UR.32 **Monitoring Recovery in Collegiate Wrestlers**

Christina Bastian

Co-author: Glenn Wright

Mentor: Matthew Andre, Exercise and Sports Science

PURPOSE: The purpose of this study was to monitor changes in performance, perceived recovery, and hormonal status in collegiate wrestlers across a season. METHODS: Nine collegiate wrestlers, all from the same team, attended regularly-scheduled practice and gave a resting saliva sample at 4 different time points across a season. After saliva collection, they performed their team warm-up and were assessed for Reactive Strength Index (RSI), Perceived Recovery Status (PRS), and a sandbag throw conditioning test. Saliva was later analyzed for testosterone (T), cortisol (C), and T/C ratio. Repeated measures ANOVA with effect sizes were calculated to determine changes in these variables across time. RESULTS: Overall ANOVA models were significant for T ($F(3) = 4.018$, $P = .019$, $\eta P2 = .334$), C ($F(3) = 5.267$, $P = .006$, $\eta P2 = .397$), PRS ($F(3) = 3.048$, $P = .048$, $\eta P2 = .276$), RSI ($F(3) = 50.616$, $P < .001$, $\eta P2 = .864$), sandbag test ($F(3) = 3.125$, $P = .045$, $\eta P2 = .281$), and body weight ($F(3) = 5.426$, $P = .005$, $\eta P2 = .404$), but not for T/C ($F(3) = 1.586$, $P = .219$, $\eta P2 = .165$). Refer to Table 1 for time-point comparisons. Significant correlations occurred between T and RSI ($R=.457$, $P = .005$) CONCLUSIONS: Across the season, there was a large reduction in T, which corresponded with a large reduction in RSI, sandbag test performance, and body weight, suggesting reduced ability to recover later in the season. This reduction was despite an increase in PRS at the final time-point. Additionally, RSI and T are positively related; therefore, changes in RSI may reflect changes in T. PRACTICAL APPLICATION: Wrestling coaches should consider monitoring T, RSI, and the sandbag test (in addition to other variables), and adjust training based on recovery needs. Additionally, monitoring changes in RSI may reflect changes in T, giving further evidence that RSI may help monitor neuromuscular recovery.

UR.33 **Analysis of Franklin Delano Roosevelt's Intentions for the U. S. Remaining Isolationist or Joining the Second World War (WWII): An Archaeological and Anthropological Examination.**

Neil Bollinger

Mentor: Jessi Halligan, Archeology and Anthropology

During the first two years of the Second World War (WWII), the United States, spear-headed by President Franklin Delano Roosevelt, took a stance of neutrality to the political upheaval and physical carnage of

Europe. Only after the attack at Pearl Harbor on December 7, 1941 did the U.S. break from its isolationist posture and demand entry into the fight. Since the end of the war, there have been numerous books and articles written that document how backroom meetings and political mastery on the part of F.D.R. may have helped garner support for joining the fight in Europe. In order to test these stories, I have plotted the locations of known U.S. merchant vessels sunk in the Atlantic prior to the attack on Pearl Harbor to determine if the spatial distribution of these vessels would show corresponding signs of subversion, refute the written records, or tell me something unexpected. My preliminary analysis of this data does not lead to glaring corroboration, nor does it necessarily contradict the written records. It does however, demand further investigation.

UR.34 **Formal and Informal Language Labs: Increasing Listening Comprehension and Student Motivation**

Cailin Hodgins

Mentor: Rose Brougham, Modern Languages

The implementation of language laboratories in the quest for second language acquisition has opened doors for learners to move from theoretical knowledge to using the living language in context. The shift from reading and writing to speaking and listening is a major turning point that help develop intermediate language learners into advanced learners. Being that the use of laboratory methods is a new but ubiquitous and constantly changing tool at the disposal of second language teachers, there is still much to be studied on the effectiveness of various lab strategies. The question remains how to best prepare and motivate students for peak comprehension. Through research of current experiments in lab activities, this paper proposes activities to not only develop listening comprehension in the lab, but strategies to motivate students to continue seeking input outside of the classroom. The authors ideas on how to encourage students to seek out L2 opportunities through personal technology ("informal labs") are also presented. Such information serves current and future language teachers, as well as second language learners who seek to better strategize the acquisition of their target language.

UR.35 **User Interaction with Custom Volunteer Management Software**

Jesse Dahir-Kanehl

Mentor: Kenny Hunt, Computer Science

The Habitat for Humanity (HFH) of La Crosse currently manages volunteers using a mixture of pen and paper, excel spreadsheets, and donor software, Donor Perfect. This way of recording events, group, and volunteer information can make it difficult and slow to retrieve and manipulate data. HFH would like a better system for volunteer management. While there are many pre-built software solutions like Volunteer Impact and Volgistics, these solutions are expensive and can be difficult to customize. Instead of building the volunteer management site from scratch it was decided to use a preexisting framework. Civicrm is open source web software built to help non-profits organize their staff and members. Civicrm provides functionality to create and manage groups, events, activities, relationships between contacts, and reports to summarize statistics on previously mentioned entities. There is a site, UGetConnected (UGC), hosted by the University of Wisconsin - La Crosse that provides a general membership for users to access most of the local non-profit organizations. Ideally volunteers could sign up on either site and be registered for both sites. Events would show up on either site. Creation and management of volunteers, groups, managers, and events would happen on the Civicrm site controlled by the volunteer manager or admin. Development of the site is ongoing, but once it reaches a testable phase small informal user studies will be conducted frequently to gather observations on the user interface and effectiveness of the website with volunteer

coordinators and volunteers. This software could be used for other nonprofit groups, evaluated with more user studies, and developed into a software solution for a broader use case.

UR.36 **UW-La Crosse College of Business Administration Website Remodel**

Jennifer Zmyslo, Isaac Mansur, and James Rawlins

Mentor: Samantha Samreth, Management

The purpose of this project is to provide ideas on website improvements, identify technical issues, and provide a feedback report on interviews of UW-L College of Business Administration students by the end of the Spring 2016 semester. The website improvements may include, but are not limited to: website layout, placement and style of header and titles, addition and deletion of pictures and videos, general content and links and overall general format. The main problem with the UW-L CBA website is that it is not useful to current students. The project will be successful if the Dean of the College of Business Administration and her associates decide to implement the ideas generated from the feedback report from the interviews and website improvement ideas that we come up with. The intended result of this project is to provide ideas that will lead to the production of a better website that will get more traffic and will be more useful to all business students by providing creative ameliorations, seeking out technical problems and acquiring opinions on the current website from students.

UNDERGRADUATE EXHIBIT PRESENTATION ABSTRACTS

Valhalla Hall:
Session A
9:00 am-10:45am

E.1 **Journey Down.**

Ashley Dechant

Mentor: Kate Hawkes, Art

In the summer of 2015, Ashley Dechant spent 74 days traveling down the Mississippi River from Minneapolis to New Orleans alone in a 12-foot fishing boat. During the journey, she documented her experiences and the people she met on the river. Using the audio, video, and photographs from the trip, Dechant has made an hour long documentary film about her journey down. This project was supported, in part, by a UWL Undergraduate Research Grant.

E.2 **Portraiture in Clay**

Elizabeth West

Mentor: Karen Terpstra, Art

The topic of my research is to bring the idea of human representation in ceramics into a more relevant and modern context. Meaning that I will be exploring the concept of a modern human bust. To do this I attended a summer 2015 workshop at one of the leading fine arts schools: Haystack Mountain School of Crafts in Deer Isle, Maine. The instructor who taught this workshop, Tip Toland, specializes in life-like ceramic sculpture. Toland has mastered human representation and utilizes this to define an individual in relation to their identity. Toland also takes realism to another extreme by exaggerating features in order to further define the relationship between physical self and spiritual identity. Therefore the workshop allowed me to become proficient in the technical skills behind human representation in clay, and I also gained a comprehensive understanding of the content needed to successfully portray a person's identity. By applying my research I am able to expand on and reinvent the idea of the human figure in clay. The outcome of my research will be a series of works I will produce in the upper level ceramic courses which will explore the human form, themes, and issues associated with the human figure in art such as the human experience and how this contributes to identity.

E.3 **Insect Sleep Animation**

Danielle VanBrabant

Mentor: Barrett Klein, Biology

When one thinks of organisms that sleep, insects are usually not the first examples to come to mind. However, studies first piloted and published in the 1980s and subsequent studies have shown that insects, including honey bees (Apis mellifera), cockroaches (Blaberus giganteus), and the fruit fly (Drosophila melanogaster), all display sleep behaviors. The honey bee, one of the most thoroughly studied species of invertebrates, exhibits a specific posture, reduced activity, and lower response threshold, and this state is internally controlled. I produced an animation to demonstrate what distinguishes alert from sleep states in insects using the honey bee as a model, and to illustrate caste-dependent effects on honey bee sleep. Using this tool to teach other researchers and students to identify and understand sleep in non-mammals could inspire others to explore possible shared functions of sleep across animal phyla.ect Sleep Animation

E.4 **Saving Sami: Preservation through Print**

Andrea Anderson

Mentor: Joel Elgin, Art

The Sami of Northern Scandinavia are an ancient people with a rich cultural past that is fast diminishing. Only recently have Scandinavian nations recognized the value of preserving Sami history and culture. My project took me to Oslo and Karasjok in Norway to conduct research at the Norwegian Folk Museum, the Historical Museum, Sapmi Park, and the Sami Collections in order to gain further insight into Sami culture, history, and mythology. The end result is a series of prints, a medium chosen for its deep-rooted history in the spreading of knowledge, that operate as a means of cultural and historical preservation of the Sami people and their stories.

E.5 Uncovering the Secrets of Eating Disorders

Kirsten Tincher

Mentor: J. Baker

My research project works with the theme of aesthetics, more specifically body image, self-esteem, and eating disorders. To best understand the effects of this topic and issue I have conducted interviews with past and current patients and staff at the Oconomowoc, WI location of Rogers Memorial Hospital. The patients have gone through the inpatient, residential, PHP (partial hospitalization program), and/or IOP (intensive outpatient program) eating disorder program or they work within one of these units. Their identities will be kept anonymous. My hope with this project is to give these people a voice, to be able to say what they can't. A major component of all of these programs is art therapy and so I hope to connect that with my project since many times, art can express what words cannot.

UNDERGRADUATE EXHIBIT PRESENTATION ABSTRACTS

Valhalla Hall:
Session B
11:00 am-12:45 pm

E.6 **Social Justice through Art**

Nicklaus Schanen

Mentor: J. Baker, Educational Studies

I have based my art on topics in my Multicultural education class, EDS 206. The topics I have focused on are race, classism, religion, gender, gender identity, aesthetics, and ableism. I have found that expressing social justice through art is a powerful way to present ideas. By creating many pieces that require interpretation by the viewer, I have found that a piece can be more powerful than I had originally intended it to be. Once a piece is created, the meaning leaves my hands. The viewer may get what I had seen when creating the piece, or find the piece more striking in a different way. Through this project I have discovered the power of art in representing social issues.

E.7 **Faces**

Carolyn Peterson

Mentor: J. Baker, Educational Studies

These pieces depict multicultural education through the faces of educators in the past and the present. I have interviewed middle school teachers, high school teachers, professors, and some multicultural educators for different perspectives. These individuals told me their experiences of interacting and teaching students of diversity. With their stories there are historical events from the country that have impacted the classroom. Words and images put together from their stories, create each individuals face and the depiction of multicultural education throughout the times.

E.8 **Pressures of the Mind**

Casey Liston

Mentor: Bradley Nichols, Art

My goal is to create a series of works in metal using hydraulic press forming techniques to create visual representations of mental disorders. Based on my personal experiences, those who do not have mental illness lack the understanding of the impact it has on the individual and people around them. It is often difficult for a person diagnosed with a mental illness to adequately explain its effects on their daily lives. Through this project, I intend to create greater awareness and understanding through visual narratives contained in the artwork I will produce. Through experimentation of metal forming techniques combined with research of mental disorders, I intend to convey the emotional feeling of pressure revealed through objects created using physical force.

E.9 **I Am More than What You Think You See**

Shannan Hartel

Mentor: J. Baker, Educational Studies

This project is a visual study of how we judge racial, social or ethnic groups based on stereotypical items and aims to push back against these stereotypes using art. The stereotypes shown in this set of artwork are so ubiquitous that people do not realize they have them until they are revealed. When looking at this project, the viewer should readjust their perspective of their own privilege and the stereotypes they hold to be true. These generalizations are becoming more dominant in society which is shown in a study done in 2007 by Roy, Weibust and Miller at the University of Vermont. This study showed that typical stereotypes such as those against women become more prevalent during times of financial hardship in the United States, which has been increasing since the fall of the economy in recent times. The only way to resolve the stereotypes depicted in this art is to realize them and work to amend our views towards groups different than ourselves.

GRADUATE STUDENT ABSTRACTS

GRADUATE POSTER PRESENTATION ABSTRACTS
Poster Session A
Valhalla Hall: 9:00am-10:45am

G.1 **A Reliability Assessment of a Football-Specific Repeated Sprint Test on a Non-Motorized Treadmill.**

Sarah Lose

Mentor: Glenn Wright, Exercise and Sport Science

The purpose of this study was to determine the test-retest reliability of a football-specific repeated sprint test on a non-motorized treadmill as a way to assess anaerobic performance. Twenty-one NCAA DIII football players that played a non-line position (Age: 19.3±1.1yrs; Height: 179.0±5.5cm; Weight: 85.45±6.98kg; Body fat: 11.16±2.65%) completed two test sessions. The repeated sprint protocol consisted of ten maximal six second sprints, against a load equal to 15% of the subject's body weight (BW), with 25 seconds of recovery. Power decrement and increase in blood lactate (BLa) were analyzed for reliability for each test. No significant differences were found between the two trials for power decrement and BLa ($p>0.05$). Reliability between the two trials was considered very high for both power decrement ($r=0.77$; CV=14.26%) and BLa ($r=0.82$; CV=8.82%). The results indicate that the football-specific repeated sprint test is reliable for assessing performance decrement of DIII football players. Coaches may use this test to assess football players' performance in a more sport-specific manor.

G.2 **Social Emotional Learning: Understanding the Factors that Affect Teacher Implementation**

Kythie Boyd

Co-author: Robert J. Dixon

Mentor: Robert J. Dixon, Psychology

With rising student mental health concerns, schools have turned to universal supports such as Social-Emotional Learning (SEL) programs. SEL programs have significant positive effects on students when they are implemented with fidelity. This study examines the elements crucial to SEL implementation fidelity, including teacher attitudes, knowledge, self-efficacy, available resources and perceived support, and their relationship to teacher concerns regarding SEL program implementation. Understanding this interplay can help School Psychologists maximize the effectiveness of SEL programs.

G.3 **Improving High School Achievement: The Role of Friends and Engagement**

William Champeau

Mentor: Daniel Hyson, Psychology

The impact of close friendships and student engagement on academic achievement is particularly important in high school, as students are on the verge of entering the adult world. This study examines how the quality of high school students' close friendships and their engagement predict their academic achievement. School psychologists and educators can utilize this information to advocate for practices that encourage the development of close friendships and to implement methods shown to increase student engagement.

G.4 **Impacting Student Mental Health: Examining Teachers' Skills, Knowledge, and Needs**

Stefanie Eggert

Co-author: Robert J. Dixon

Mentor: Robert J. Dixon, Psychology

Teachers are often responsible for administering mental health interventions, yet research suggests that teachers are not adequately trained to help students with mental health needs. This study examines middle school teachers' knowledge, skills, and confidence in supporting students' mental health and compares teachers of core academic and elective classes. Outcomes will inform consultation, support, and advocacy directions for school psychologists to assist teachers in supporting students' mental health.

G.5 **Developing Students' Character: The Impact of SW-PBIS**

Ericka Grimm

Co-author: Robert J. Dixon

Mentor: Robert J. Dixon, Psychology

School-wide positive behavioral interventions and supports (SW-PBIS) have focused schools on a proactive approach to student behavior. Meanwhile, character educators encourage the instruction of cognitive, affective, and behavioral processes for the development of character. This study investigates if teachers' approach to SW-PBIS and teachers' content area impact their self-efficacy for character education. Results provide important considerations for the developmental and consultative role that school psychologists may take within SW-PBIS programs.

G.6 **T.E.A.M: Together Everyone Achieves More**

Kayla Guanella

Mentor: Nancy Richeson, Recreation Management and Therapeutic Recreation

Therapeutic Recreation Graduate student, Kayla Guanella, used a process to assess, plan, implement and evaluate T.E.A.M, a team building program developed for Special Olympic athletes and adults with disabilities, as her final project to complete her Masters. Kayla worked with Special Olympic staff to host the program at the Black River Beach Neighborhood Center in La Crosse. It ran October 11, 2015 from 9-3. The program used funds from an RSEL mini grant for activity supplies and T-shirts for each participant. The activities focused on four main skills which include: social skills, communication, group cohesion, and problem solving.

G.7 **Teacher Efficacy in Classroom Management: Impact of Support and Experience**

MacKenzie Welch

Co-author: Jocelyn Newton

Mentor: Jocelyn Newton, Psychology

Teacher efficacy plays a pivotal role in classroom management and the associated positive outcomes for students. This study will examine the predictive relationship of perceived colleague and supervisor support, along with years of teaching experience on teacher efficacy in classroom management. Findings will

provide school psychologists with additional information in regards to future consultation practices for increasing teacher efficacy in classroom management.

G.8 **Student Engagement: What It Means for English Language Learners**

Rachel Maziarka

Co-author: Jocelyn Newton

Mentor: Jocelyn Newton, Psychology

Student engagement is a multidimensional construct made up of emotional, cognitive, and behavioral components. Higher student engagement has been linked to better grades and high school graduation rates, while lower engagement is correlated with poor grades, dropout, and retention. Therefore, engagement is crucial for groups who are at-risk of academic failure. This study examines levels of student engagement between English language learners and native English-speaking students, and between males and females within these groups.

G.9 **Professional Learning Communities: Exploring Burnout by Examining Teacher Collaboration**

Jessica Muehlbauer

Mentor: Robert J. Dixon, Phycology

Professional Learning Communities (PLCs) have been introduced to support teachers and ultimately impact student outcomes. This study examined the influence of PLCs on teacher burnout (i.e., emotional exhaustion, depersonalization, and personal accomplishment), while additionally investigating if there are significant differences based on teacher experience (i.e., Novice vs. Veteran). With this knowledge, school psychologists will be better equipped to understand the complexities of teacher burnout, while developing effective support strategies to assist teachers.

G.10 **Student Engagement: The Impact of Relational Aggression in High School**

Brittany Oblak

Mentor: Jocelyn Newton, Psychology

Student cognitive engagement can positively influence a student's academic performance in school and result in increased graduation rates. This study examines how relational aggression can impact cognitive engagement and how this impact differs between male and female students. Practitioners will create a deeper understanding of relational aggression and engagement resulting in allowing school psychologists to assist students by identifying and implementing effective interventions.

G.11 **Optimization of Bacteriocin Production by an Antarctic Carnobacteria Strain**

Adam Vance

Mentor: Bonnie Bratina, Microbiology

Bacteriocins are extracellular antimicrobial proteins that kill or inhibit the growth of bacteria. Due to ever decreasing effectiveness of antibiotics and increasing consumer concerns over chemical preservatives in food, bacteriocins have become widely studied in recent years (1). While bacteriocins are produced by many genera of bacteria, the lactic acid bacteria (LAB) are a widely studied bacteriocin producing group

since many members of this group are involved in food production(2). In particular, Carnobacterium is an abundant LAB that is found in a wide variety of environments including a major reservoir in fermented meat and dairy products. Since the Food and Drug Administration found bacteriocins safe for human consumption (4), bacteriocins could be applied in food industry as a natural preservative. However, bacteriocins have to be produced in high concentrations and extensively diluted to be effective in hospital and industrial settings. This study has aimed to increase bacteriocin production by altering growth conditions. Several strains of Carnobacteria were previously isolated from Lake Vanda, Antartica and screened for the ability to produce bacteriocins. LV66 is able to produce bacteriocins and several attempts have been made in order to increase bacteriocin production for subsequent use in hospital and industrial settings. Increasing salt concentrations in growth media was not shown to increase bacteriocin production. However, the use of rich media and changing pH have increased bacteriocin yield. Future tests will include altering carbon/nitrogen sources, temperature and pressure.

G.12 **Becoming a Certified Inclusivity Assessor to Promote Physical and Social Inclusion: Contributing to an Online Database of Accessible Recreational Spaces for Recreation Service Providers and People of all Abilities**

Brett Anderson

Co-authors: Katherine Mabery and Taylor Vieau

Mentor: Susan Murray, Recreation Management and Therapeutic Recreation

According to the U.S. Census Bureau, approximately 56.7 million people - 19% of the population - had a disability in 2010, with more than half of them reporting the disability was severe (United States Census Bureau, 2012). The purpose of this service project and graduate mini-grant award was to (a) complete a ten-hour online training to become a Certified Inclusivity Assessor and (b) individually assess and report physical and social dimensions of accessibility of public recreation sites to be included in an online recreation database maintained by SUNY Cortland's Inclusive Recreation Resource Center. This database is a free tool that is available to the public and is frequently used by recreation professionals including recreational therapists and people of all abilities to anticipate access to recreation facilities and better plan their leisure and recreation pursuits. The authors of this service project contributed assessments from various recreation sites in the Denver, Milwaukee, and Omaha areas.

G.13 **Induction of Pseudo-Sclerotia in Two Morel (Morchella) Clades by Garlic Mustard (*Alliaria petiolata*) Leachate**

Elizabeth Leighton

Mentor: Thomas Volk, Biology

The invasive plant garlic mustard (*Alliaria petiolata*) has demonstrated the ability to suppress the growth of mycorrhizal fungi and, by extension, the plants that rely on mycorrhizal fungi. Thus far, research established that *A. petiolata* affects fungi belonging to multiple phyla, but not all species and genera have been studied. Untested genera include the economically and culturally significant morels (*Morchella*). This study tested whether *A.* petiolata affects *Morchella* spp. based on whether pseudo-sclerotia, hardened structures that store nutrients through harsh or stressful conditions, formed after exposure to plant leachate. Aqueous extracts of roots, shoots, and whole plant from *A.* petiolata were used along with reagents of two of *A.* petiolata's suspected allelochemicals. These different chemical treatments were applied to members of both the esculenta (yellow morel) and elata (black morel) clades. The *Morchella esculenta* samples were collected in the La Crosse, WI area, but the *Morchella elata* samples were collected from around the

country. The leachates and chemicals were introduced to the cultures by placing a disc of filter paper into the culture, and adding the treatment onto the disc. When *A. petiolata* was introduced to *Morchella* spp. in vitro pseudo-sclerotia clustered around the point where leachate was added. Similarly, when water was introduced to *Morchella* spp. in vitro pseudo-sclerotia did not cluster where the water was added.

G.14 **Monitoring Collegiate Powerlifters across a Competition Taper**

Matthew Mosiman

Co-Authors: M. J. Andre, A. T. M. Askow, J. J. Allen, L. A. Gillen, E. M. Morrisette, A. R. Jagim, C. M. Gillette

Mentor: Matthew Andre, Exercise and Sport Science

PURPOSE: The purpose of this study was to monitor weekly changes in power, perceived recovery/stress, and hormonal status in collegiate powerlifters across a four-week competition taper. METHODS: Five advanced male collegiate powerlifters (1.79±.06m, 111.3±32.8kg; competition best: squat=240.0±64.5kg, bench press=167.5±40.4kg, deadlift=272.0±38.6kg; Wilks=408.9±57.7), all competing in the USAPL Junior Raw category and all using the same program, gave a resting saliva sample before training on 4 consecutive Mondays across a 4-week taper leading into the USAPL state powerlifting meet, which occurred on the Saturday immediately following the 4th Monday testing session. The taper, which was preceded by a relatively high-volume block, focused on barbell back squat, barbell bench press, and barbell deadlift with minimal assistance work, and featured a linear weekly increase in load with a linear weekly decrease in both volume and volume-load across the block. During saliva collection, they reported Perceived Recovery Status (PRS) and answered the Perceived Stress Scale (PSS). Then, they performed a brief dynamic warm-up followed by vertical jump (VJ) testing. Peak power for VJ (VJPP) was calculated using the Johnson & Bahamonde equation. Saliva was later analyzed for testosterone (T) and cortisol (C). Repeated measures ANOVA with LSD pairwise comparisons were calculated to determine changes in these variables across time. While P is reported to allow the reader to determine probability of a Type I error, this report focuses on effect sizes (partial eta squared (ηP2) for ANOVA and Cohen's d (d) for LSD), which is a growing trend in sport science studies with necessarily-small n sizes. Consistent with previous literature, when ηP2 is greater than .02, .13, .26, and .39, the relationship is described as small, medium, large, and very-large, respectively; when d is greater than .20, .50, .80, and 1.30, the relationship is described as small, medium, large, and very-large, respectively. RESULTS: Overall ANOVA models had very large effects (time) for T ($F(3)=2.986$, $P=.074$, $\eta P2=.427$), PRS ($F(3)=15.149$, $P<.001$, $\eta P2=.791$), PSS ($F(3)=6.877$, $P=.006$, $\eta P2=.632$), and body weight ($F(3)=8.239$, $P=.003$, $\eta P2=.673$); large effects for C ($F(3)=2.379$, $P=.121$, $\eta P2=.373$); medium effects for T/C ($F(3)=1.167$, $P=.363$, $\eta P2=.226$), VJ ($F(3)=1.381$, $P=.296$, $\eta P2=.257$), and VJPP ($F(3)=.672$, $P=.585$, $\eta P2=.144$). Refer to Table 1 for weekly data, highlighting large to very-large d. CONCLUSION: By the end of the taper, the athletes had an overshoot in T, higher perceived recovery, and lower perceived stress, while maintaining explosive power and body weight. Additionally, all athletes had personal-best totals at the meet, including 7 state records. PRACTICAL APPLICATION: A competition taper featuring a linear decrease in volume and volume-load accompanied by a linear increase in load can be used to enhance recovery and lead to a personal-best performance in advanced collegiate powerlifters.

G.15 **Seeking Help: How School Climate Influences Adolescents' Decision**

Anna Yeager

Mentor: Daniel Hyson, Psychology

While peer victimization is a well-known problem in schools, research indicates that the majority of students do not seek help from school professionals. The present study investigates the relationship between multiple dimensions of school climate and adolescents' willingness to seek school-based help for peer victimization. The results of this study will highlight the most predictive aspects of a school's climate so that schools may offer more effective programming targeted at facilitating help-seeking behavior.

G.16 **RTL in High School: Teacher Attitudes, Self-Efficacy, and Burnout**

Amanda Yenter

Co-Author: Daniel Hyson

Mentor: Daniel Hyson, Psychology

As of 2015, over 40 states have adopted their own version of Response to Intervention. Teachers from high schools in the Midwest were surveyed to examine how differences in teachers' attitudes towards RtI and their self-efficacy impact burnout. Results of this study will provide information about the unique challenges high school teachers face in the implementation of RtI. Additionally, ways for school psychologists and administrators to better support teachers and reduce burnout will be discussed.

GRADUATE POSTER PRESENTATION ABSTRACTS
Poster Session B
Valhalla Hall: 11:00am-12:45pm

G.17 **Effect of Fatigue and Real-time Visual Feedback during Drop Landings on Patellofemoral Joint Stress in Healthy Female Adults**

Christina Olbrantz, Jamie Bergelin, and Jill Asmus

Mentors: Tom Kernozek, and Naghmeh Gheidi, Health Professions

Our purpose was to determine how healthy college-aged females use visual real-time feedback (VRTF) from vertical ground reaction force (VGRF) to alter patellofemoral joint stress (PFJS) during drop landings throughout a fatiguing protocol. Twenty-two female college-aged subjects participated. Data were collected during a single session with baseline, pre-fatigue and post-fatigue sets of five drop landings from a hang bar. The fatigue protocol included multiple sets of 15 consecutive jump squats until fatigue based on a 25% reduction of their initial maximum vertical jump height. VRTF data was streamed on VGRF during the pre-fatigue and post-fatigue sets for each drop landing. Motion capture and force platform data were captured during each performance trial where PFJS was calculated using a mathematical model of the patellofemoral joint for all trials. Statistical comparisons were made on baseline, pre-fatigue and post-fatigue landing trials with VRTF. The peak PFJS went down by nearly 5% from the baseline to pre-fatigue drop landings with VRTF. However, with fatigue peak PFJS returned to near baseline. We conclude that VRTF may successfully reduce PFJS, but participant fatigue may influence the overall effectiveness of VRTF.

G.18 **Effect of Running Speed on Achilles Tendon Stress**

Jessica Miller and Kelly Adkins

Co-authors: Zachary Mestelle, and Thomas Kernozek

Mentor: Thomas Kernozek, Health Professions

Purpose: To compare the effect of speed on Achilles tendon (AT) stress during running. Methods: Twenty-five female runners (Age: 21.6 ± 1.7 years) with a rearfoot strike pattern participated. Transverse 2D ultrasound images were obtained of each participant's AT cross-sectional area before being equipped with 47 markers for 3D motion capture. Participants ran down a 20-meter runway under three conditions: 3.3 m/s ± 15% (2.8 and 3.8 m/s). An error range of ±5% was accepted for each speed as calculated by the elapsed time (seconds) it took the runner to pass through two photoelectric timing gates. Fifteen motion analysis cameras captured kinematic data at 180Hz while kinetic data were collected using a force platform at 1800Hz. Muscle forces were estimated using static optimization. Multivariate statistics with repeated measures were used to examine differences in peak AT stress, strain, and strain rate (α=.05). Results: Running speed affected peak AT stress and peak strain between the lowest and highest speeds, but had no impact on strain rate. Conclusion: Manipulating running speed may be beneficial in the treatment and prevention of AT-related injuries. We suggest that runners adhere to a transitional period if conversion is indicated.

G.19 **Effect of Heel Lifts on Patellofemoral Joint Stress**

Zachary Mestelle

Co-authors: Kelly Adkins and Jessica Miller

Mentors: Thomas Kernozek, and Naghmeh Gheidi, Health Professions

Purpose/Hypothesis: To compare the effect of orthotic heel lifts on peak patellofemoral joint stress, patellofemoral stress integral, and peak quadriceps force. We hypothesized that peak patellofemoral joint stress, patellofemoral stress integral, and peak quadriceps force will all be lower during the heel lift conditions. Methods: Twenty five habitual female rearfoot runners (Age: 21.6 ± 1.7 yrs; Weekly Mileage>10 miles/wk) were participants. All subjects had 47 reflective markers placed on body segments for the purpose of 3D motion capture. The test protocol required subjects to run at 3.46 m/s ± 2.5 % and walk at 1.56 m/s ±2.5%, each under two randomized conditions: flat (0mm) and lift (11mm). Motion analysis data acquired from the 15 cameras and ground reaction forces were collected using a force platform. Muscle forces were estimated using static optimization which was used in a patellofemoral joint model to estimate joint stress. Multivariate statistics with repeated measures compared subject means for flat and 11mm lift conditions (α=.05). Results: For both walking and running conditions, no differences were found for peak patellofemoral joint stress, patellofemoral joint integral, and peak quadriceps force ($p>0.05$). Conclusions: These data suggest that the addition of 11mm orthotic heel lifts do not appear to influence patellofemoral kinetics in female runners. Further research is required to discern if larger heel lifts alter kinetics at the patellofemoral joint.

G.20 **The Effect of Backward Running on Achilles Tendon Stress**

Alexis Mehr, Lauren Strommen and Carolyn Apfelbach

Co-authors: Naghmeh Gheidi, Thomas Kernozek, and Drew Rutherford

Mentors: Naghmeh Gheidi, Thomas Kernozek, and Drew Rutherford, Health Professions

Achilles tendon (AT) pathology is one of the highest reported injuries for runners. Backward running (BR) is currently used as a rehabilitation exercise. Studies have reported that BR has lower patellofemoral joint compressive forces as compared to forward running (FR), making it a good rehabilitation exercise for patellofemoral pain patients. However, to our knowledge, no studies have compared AT stress between FR and BR. Our purpose was to identify the effect of BR on AT stress. Twenty-two college-age healthy males participated. Each performed five running trials with a speed range of 2.8-3.4 m/s. AT cross sectional area was measured using ultrasound imaging. Kinematic and kinetic data were collected using a motion capture system and force platform. AT force was determined by summing the medial and lateral gastrocnemius and soleus muscle forces. Repeated measures ANOVA was performed to detect differences in AT stress, AT force, ground reaction force (GRF), ankle range of motion (ROM) and ankle moment between the FR and BR patterns. Differences occurred between FR and BR patterns on multiple variables ($p<0.05$). BR resulted in higher AT stress (135.5 vs.86.9MPa), AT force (7385 vs.4659N), ankle ROM (27.6 vs.15.6°) and ankle moment (225.8 vs.140.6Nm) as compared to FR. BR results in AT stress and force 1.6 times greater than FR. Due to the difference in strike patterns, there is a greater demand on AT to control heel lowering during the stance phase of BR that is not present in FR. With the repetitive nature of running, continued stress and force production may lead to overuse injuries to the AT during BR. When utilizing BR as a rehabilitation tool, clinicians should be cognizant that AT stresses and loads are higher.

G.21 **The Panopticon of Racism: Exploring Systemic Racism and the Success of Black College Men**

Charles Martin-Stanley II

Mentor: Jorg Vianden, Student Affairs Administration

"Nationally, 68% of Black men who start college do not graduate within six years, which is the lowest college completion rate among both sexes and all racial/ethnic groups" (Harper, 2006). African-American college men face serious problems at predominately White institutions, including lower rates of academic success and systemic racism. They are performing at lower rates than their counterparts from other racial groups in the U.S. (Educational Testing Service, 2014). This statistic helped illustrate the underrepresentation of African-American men as a serious problem in higher education today. The purpose of this research project was to study the explicit and implicit messages of systemic racism that Black male students receive both before and during their college career. In addition, the research focused on Black male students' views on academic success and their experiences with racism in high school and college. The researcher conducted a series of three one hour interviews with five different participants. In addition, there was a one hour focus group discussion with all the participants. Educators need to understand the importance of cultural competence in the classroom in order to ensure African-American men are having a culturally inclusive experience along with their white peers. It is our job as a campus community to educate ourselves on explicit and implicit messages of systemic racism because that is the only way we will dismantle the Panopticon of Racism.

G.22 **Circle of Security Training: Impact in an Alternative School**

Taylor Wacholz

Mentor: Betty DeBoer, Psychology

Children with severe behavior problems at school frequently demonstrate similar challenges at home. This study measures the effectiveness of Circle of Security (COS), a parental attachment-based program. COS has been successful in promoting appropriate attachment and security with infants and toddlers. Though this research has been successful and is a strong foundation for attachment-based parenting interventions, our plan is to measure the effectiveness of the training in an alternative school setting with older, school-aged children. It is important for school professionals and educators to undergo the importance of parent-child attachment and ways inadequate relationships can affect children in school. For our study, parent participants were selected by school administrative staff based on parent willingness to be trained on COS, their recognition that their behavior impacts that of the child and their level of curiosity about their child's behavior and how they can help. Two sets of parents were recruited from an at-risk population of students who are currently receiving services at an alternative school due to behavioral problems. Most parents in this sample will likely be low to medium wage earners with chronic stressors related to mental health, physical health, family, or resource issues. A reason for using these parents is that they may often struggle with finding ways to meet their child's behavioral and emotional needs in an adaptive manner. Participants will be asked to complete questionnaires at the start and end of their training by staff. This study assesses the impact of COS by measuring parental self-efficacy, parental stress, behavioral management strategies, parent-child relationship factors, and child self-regulation with school-aged children in an alternative school.

G.23 **The Effect of a Single Bout of Exercise on Motor Learning of a Drop Vertical Jump Landing Strategy**

Dianne Kilgas, Chris Hintz, Michael Price, Cassie Raduka, Lindsey Sheehan, and Emily Sobocinski

Mentor: Patrick Grabowski, Health Professions

Purpose: A single bout of cardiovascular exercise improves cognitive learning, but effects on motor learning have been scarcely researched. Key questions remain including the ideal exercise intensity. The purpose of this study is to test the effect of moderate intensity exercise (ModEx) on the retention of a drop vertical jump (DVJ) "soft" landing strategy. Subjects: 20 healthy females (mean age: 20 years, range: 19-22) from the University of Wisconsin-La Crosse participated. Methods: Participants attended a 1 hour session, first performing 2 DVJs to gather baseline data. Peak vertical ground reaction forces (PVGRF) and hip flexion (HF) angles at the deepest point of the landing were measured with a force plate and two-dimensional motion capture software. Next they performed 30 repetitions with feedback. Individuals were then randomized to the ModEx group (n=10), who performed a 30 minute biking protocol at 55-65% heart rate reserve, or the control group (n=10) who received 30 minutes of sham electrical stimulation. After one week, a retention session was conducted to assess performance using PVGRF and HF angle. Results/Conclusion: Both groups demonstrated reduced PVGRF and HF angles after training ($p<0.01$) and at retention ($p<0.01$). There were no statistically significant differences between groups from feedback to retention for PVGRF ($p=0.24$) or HF angles ($p=0.51$). The results indicate the training methods were sufficient to induce motor learning, but fail to support the hypothesis that ModEx enhances motor learning during a DVJ. Clinical Relevance: Results remain mixed and recommendations for use of ModEx to enhance motor learning cannot be made on the basis of these results. Due to substantial variability, further study with a larger sample will strengthen conclusions. In addition, further investigation could include exercise timing and dosage, skill complexity, and length of the retention period.

G.24 **The Cellular Protein, ALIX Does Not Have an Apparent Role in Human Parainfluenza Virus Type-3 Particle and M-VLP Budding.**

Suresh Kandel

Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus type 3 (HPIV-3) is a clinically significant pathogen. It causes upper respiratory tract infections such as common cold and pharyngitis to more complicated diseases like pneumonia and bronchiolitis. The paramyxovirus matrix (M) protein is the most abundant protein in the virion and plays a vital roles in virus assembly and release. Late domains (4-6 amino acid sequences) present in the M proteins of related viruses bind and hijack host cellular proteins that are normally involved in the endosomal sorting complex required for transport (ESCRT) pathway. This cellular pathway can promote virus particle budding from the plasma membrane. We previously identified candidate late domains, YLDV and YPMLDL, in HPIV-3, that are fall under the established late domain, YP(X)nL. These late domains have been shown to function in virus budding through an interaction with the cellular Alix (Apoptosis-linked gene 2 interacting protein X) protein, which is involved in the ESCRT pathway. We have now investigated the role of Alix on HPIV-3 particle and M- VLP budding using Alix depleted stable cell lines. With these Alix-depleted cell lines we did multicycle growth assays to look at the impact of Alix depletion on viral replication kinetics. Additionally, we radiolabeled virus-infected Alix knockdown and WT cells to examine the release of viral proteins and particles from cells. We did not see the alteration of viral proteins, particles, and M-VLP release from the Alix-depleted cell lines, indicating that Alix has no an apparent role in HPIV-3 particle and M-VLP budding. This suggests that other cellular protein may have a role in HPIV-3 particle and M-VLP budding.

G.25 **Persistence Effects of Visual Feedback of Landing Performance**

Jamie Fechhelm and Meghan Cram

Co-author: Michelle Wanta

Mentor: Drew Rutherford, Health Professions

Background: Incidence rates for anterior cruciate ligament (ACL) injuries are increasing among young athletes in competitive sport activities (Agel, Arendt, & Bershadsky, 2005; Dick et al., 2007). Female athletes display significantly increased occurrence rates over males during landing and cutting maneuvers. Many studies have sought to reduce injury rates by training methods targeted at various kinematic and kinetic risk factors. While prior studies have shown improvements in kinematics (Munro & Herrington, 2014), there is little consensus on the effectiveness of different forms and presentation of external feedback. Purpose: The purpose of this study was to investigate changes in kinematic and kinetic variables during landing in response to training using augmented visual feedback modules. Methods: Twenty-two college aged females were recruited for this study. Participants were initially assessed for jump landing injury risk using the landing error scoring system (LESS) test. Participants viewed visual feedback of ground reaction force (GRF) with the goal of reducing the peak force to avoid performance associated with high ACL injury risk. Trials were performed by having the participant drop from a horizontal hang bar with their feet positioned 50 cm above the ground. Participants completed a set of pre-test trials, two sets of practice with feedback, and a set of post-test trials. Results: Based on current qualitative trends in one of the variables collected, over half the participants appeared to show lasting reductions in GRF at post-test. This preliminary finding may suggest positive changes in kinetics as a result of landing training with augmented feedback.

G.26 **Use of Six-Minute Walk Distance and Rating of Perceived Exertion to Predict Maximal Aerobic Capacity and Ventilatory Threshold in Cardiac Rehabilitation**

Maria Cress

Mentor: John Porcari, Exercise and Sport Science

Introduction: Because maximal exercise testing with gas exchange is impractical in a clinical setting, accurate quantification of maximal aerobic capacity (maxMETS) and ventilatory threshold (VT) is problematic. The 6-minute walk test (6MWT) is a commonly used tool in most cardiac rehabilitation programs; however, prediction of maxMETs from walk distance is insufficiently precise, and translating 6MWT distance into useful information for exercise prescription is difficult. It was hypothesized that the equations which predict maxMETs and METs at ventilatory threshold (METs@VT) could be enhanced by the addition of rating of perceived exertion (RPE). Purpose: To develop equations to predict maxMETs and METs@VT from 6MWT distance and terminal RPE. Design: Utilized multiple regression techniques to predict maxMETs and METS@VT using 6MWT distance and RPE. Methods: Thirty-six maintenance cardiac rehabilitation patients (21 F and 15 M: mean age = 58±8.6 yrs) completed a treadmill maximal oxygen consumption (VO2max) test to identify maxMETs and METs@VT. On a separate day subjects completed a 6MWT. At the conclusion of the 6MWT subjects rated their effort using the 6-20 Borg Scale. MaxMETs and METs@VT were predicted from 6MWT distance (m) and terminal RPE using stepwise multiple regression. The accuracy of the equations were determined using multiple correlation (R), R2, standard error of estimate (SEE), coefficient of variation (CV), and standardized residuals (SR). Results: The resultant equations were: MaxMETS= 3.212+ 0.016 (6MWT distance) - 0.354 (RPE); R=.87, R2=.75, SEE=1.17 METS, CV= 13.6%, SR=.92 METS METs@VT= 0.944+ 0.013 (6MWT distance) - 0.192 (RPE); R=.82, R2=.68, SEE=1.05 METS, CV=16%, SR=.78 METS. Conclusions: It was found that MaxMETs and METs@VT could be predicted

with reasonable accuracy using 6MWT distance and terminal RPE. These results indicate that the addition of RPE to 6MWT distance may aid in identifying maximal and sustainable exercise ability. Additionally, these data may be useful to clinicians in providing accurate exercise prescription plans.

G.27 **The Energy Requirements of Laser Tag**

Jennifer Budzien, Kelly Faber, Alexander Niznik, Kimberly Schumacher, Sydney Swenson, and Laura Szymanski

Co-authors: John Greany, and Kristin Greany

Mentor: John Greany, Health Professions

Purpose: The purpose of this pilot was to measure the physiological demands of young healthy adults playing laser tag. Subjects: Two recreationally active female subjects participated (23 and 24 years old). Methods: Subjects completed a maximal treadmill exercise test (modified Balke) to determine maximum exercise capacity. Respiratory gases, heart rate, and rating of perceived exertion (RPE) were collected (Oxycon Mobile) and heart rate monitor. Participants played laser tag at a local venue for two, 4-minute games while wearing the portable gas analyzer. Data from the last three minutes of each game were used to determine energy expenditure and relative intensity of laser tag. Results: The mean percentage of HRmax was 90-95% and 80-86% for the two subjects. The percent of VO2 was 50-63% and 59-60%.Conclusion: The intensity of laser tag for these two subjects is an adequate stimulus (>64% for HR max) for health and fitness benefits. The study should be repeated with a larger sample size. Clinical relevance: The Compendium of Physical Activity contains an extensive listing of physical activities and their respective intensities. Laser tag has not been evaluated as a viable source of exercise and is currently not included in the Compendium of Physical Activity.

G. 28 **The Effects of Hawthorn Supplementation on Exercise Capacity**

Alenander Niznik, Kelly Faber, Kimberly Schumacher, Jenny Budzien, Laura Szymanski, and Sydney Swenson

Mentor: John Greany, Healthc Professions

Background: Hawthorn (Crataegus laevigata) is a supplement marketed to promote circulatory system health. It contains antioxidant flavonoids which may dilate blood vessels and augment blood flow. Research supports its efficacy in patients with heart failure however, its effect on exercise is unknown. Purpose: The purpose of this study is to determine the acute effects of Hawthorn supplement on exercise capacity (submaximal and maximal).Methods: A convenience sample of 10 healthy subjects (9 females, 1 male) age 23.4 + 1.2 years (mean + SD) completed the study. Each subject completed two maximal treadmill tests. Gas exchange variables (VO2, VCO2, BF, RER, VE), hemodynamic variable (HR), and rating of perceived exertion (RPE) were measured. Each subject consumed 900 mg of Hawthorn extract for 14 days and post measurements were obtained. Variables were then analyzed for significance using SPSS v23.Results: Maximal VO2 showed a trend for decreasing (42.5 + 5.5; 38.4 + 3.6 ml/kg/min, p=.05). Cohen's d effect size for maximal VO2 (d= 0.89) suggests a large practical significance. There was a significant increase in RER at maximal intensity (1.2 + 0.10; 1.4 + 0.21, p = 0.03). Similarly, BF increased (49.4 + 6.9; 52.0 + 7.8, p = 0.01) and VE increased (97.3 + 20.8; 102.9 + 20.6 L/min, p = 0.01). No significant changes were noted in HR, RPE or VCO2 at maximal and all variables at submaximal intensities. Conclusion: Increases in BF, RER, and VE, with a concurrent decrease in maximal VO2, suggest a less efficient utilization of oxygen while taking Hawthorn. Further studies should consider the effects of Hawthorn over a longer time period, use a larger sample size, and include individuals at risk or with cardiac conditions.

G.29 **The Effect of Armrest Use with the Five Times Sit to Stand Test**

Jennifer Budzien

Co-authors: John Greany and Kristin Greany

Mentor: John Greany, Health Professions

Purpose: The purpose of this study was to evaluate the effect of armrest use in the Five Times Sit to Stand (5xSTS) test for adults with neurological disorders. Subjects: 12 females and 26 males (68.9 + 12.3 years; BMI 27.8 + 5.9 kg/m2) with Parkinson's disease, Multiple Sclerosis or other neurological disorders participated in the study. Methods: Participants attended a 1-hour physical activity program twice per week for 12 weeks. Timed Up and Go, 6 Minute Walk test, Functional Gait Assessment, and 2 trials of 5xSTS were measured prior to and following the program. The first 5xSTS trial was completed without the use of armrests and second trial was conducted using armrests. Data were analyzed using a 2-way ANOVA within-group comparison and correlations with other functional assessments. Results: Effect of time ($F=31.6$; $p<0.001$) and use of arms ($F= 11.1$; $p=.002$) were found to be statistically significant. The interaction of the two variables was not significant ($p=0.25$). Subjects had a mean improvement on the 5xSTS of 2.8 sec without using armrests and 2.3 sec using armrests. Both values support or surpass the known MDIC of 2.3 sec. The correlations between 5xSTS and TUG, 6MWT, and FGA were 0.59,- 0.71, -0.57, respectively, with no arms and 0.71, -0.76, -0.57 with arms. Conclusion: The use of the armrests with 5xSTS does not significantly influence the outcome if the same procedure is used consistently. Both variations of 5xSTS demonstrate a strong correlation to 6MWT, FGA and TUG, and have similar MDIC values. Clinical relevance: The 5xSTS is used as a measure of lower extremity strength. In a population of adults with neurological impairment, it can be used with or without arms to evaluate improvements.

G.30 **The Effects of a Putative Two-Component Regulatory System in *Staphylococcus Aureus* on Sortase A Expression**

Amy Baker

Co-author: William Schwan

Mentor: William Schwan, Microbiology

Methicillin-resistant *S. aureus* (MRSA) are the number one cause of hospital-associated infections. Methicillin-resistant *S. aureus* often causes chronic reoccurring infection due to the ability of the organism to from persister cells. Persister cells are defined as dormant variants of regular cells that do not grow or die in the presence of bactericidal compounds. Prior work with a MRSA strain in Dr. William Schwan's lab demonstrated the ability of this strain to form persisters in the presence of a novel drug SK-03-92, possibly through a putative two-component regulatory system. The objective of this project is to determine the effects of this putative two-component regulatory system on biofilm formation and overall virulence of the organism through regulation of the *S. aureus* Sortase A gene, srtA. Sortase A enzymatically anchors attachment proteins, often involved in biofilm formation, on the bacterial cell wall. The two-component regulatory system consists of a sortase regulator gene, MW2284, and a sortase sensor gene, MW2285. Mutant strains of both genes were used to compare the biofilm forming abilities of mutant strains versus the wild-type strain, JE2. Specifically, three biofilm assays were performed, a true biofilm assay, a primary attachment assay which measures the ability of the organism to complete the first phase of biofilm formation, and a percent aggregation assay which measures the ability of the organism to aggregate in broth. Initial results demonstrate that the MW2285 mutant strain has an increased ability to form a biofilm, initiate the primary attachment phase of biofilm formation, and aggregate compared to that of

wild-type and the MW2284 mutant strain, indicating the mutation of MW2285 results in an increase in Sortase A expression, leading to an increase in biofilm formation. Further experiments will be performed to confirm these initial results.

G.31 **Secretory IgA Production in Response to Sub-populations of Gastrointestinal Microbiota in 13-Lined Ground Squirrels**

Amanda Anderson

Mentor: Bonnie Bratina, Microbiology

Many individuals suffer from inflammatory bowel diseases, resulting from inflammation within the gastrointestinal tract. Understanding immune responses at the intestinal surface and how the human immune system interacts with the microbiota, or bacteria naturally found within the digestive tract, is a big step in understanding how inflammatory diseases occur or how they may be treated. IgA, as the primary antibody produced in the digestive tract, plays an important role in these immune interactions. IgA is produced in response to the presence of antigens from bacteria lining the intestinal surface, and serves to slow down bacterial movement to prevent invasion without causing damaging inflammatory responses. Using antibiotics to create different gastrointestinal community in ground squirrels, relative amounts of fecal and serum IgA across six weeks of treatment were measured by sandwich ELISA to narrow down what microbes are responsible for changes in IgA synthesis. At six weeks, there was a significant decrease in IgA concentration in fecal samples of squirrels treated with Metronidazole. DNA has also been extracted from the fecal material for microbial community analysis and identification of bacterial and archaeal species. Primary results of fecal IgA levels across two antibiotic treatments and an untreated control group over six weeks of treatment and community analysis results via denaturing gradient gel electrophoresis will be presented, as well as future plans for identification and correlation studies between IgA concentrations and community changes.

GRADUATE ORAL PRESENTATION ABSTRACTS

GR.1 **In Search of Beauty: How Body Image and Self-Esteem Influence Appearance Management Behaviors of College Women**

Courtney Pearson

Mentor: Jorg Vianden, Student Affairs Administration

Female identified college students receive implicit and explicit messaging regarding beauty from outside influences, which can include the media and social groups. Such outside factors influence self-esteem and body image, resulting in women practicing appearance management behaviors to alter or monitor their physical appearance. Appearance management behaviors may include excessive dieting and exercising, comparing body to models or peers, and checking fit of clothing. The objectification theory served as the theoretical framework for research and posits that the observer's perspective of women is internalized and results in self-objectification or women no longer viewing their bodies through their own lens. This study included a survey sent to 2,000 degree seeking UWL students, and results were used from female identified students between the ages of 18-24. Results add to the growing body of research conducted exploring self-esteem and body image of women and the lengths women go to, to achieve beauty.

GR.2 **An Investigation: Potential Increase in Complement Component C3 Concentration and Function in Thirteen-lined Ground Squirrels during Torpor**

Garrett Schuh

Mentor: Bernadette Taylor, Microbiology

Thirteen-lined ground squirrels enter a state of torpor during the winter months, characterized by weight loss, decreased metabolism, and decreased immune function. During torpor the squirrels' white blood cells almost completely disappear from circulation, and are able to quickly return to normal levels within 2 hours of arousal. Bucking the trend of immune depression during torpor, it has been recently discovered that the transcription of numerous proteins in the complement system are upregulated during torpor. The complement system is part of the innate immune system and aids in killing infectious bacteria and viruses. Complement component C3 has the most significant increase during torpor. The reason for the upregulation in complement is currently unknown. A chemiluminescent western blot was used to measure and compare complement component C3 levels in the plasma of non-hibernating, hibernating and interbout arousal animals. A functional assay was used to assay whether greater C3 transcription conveys better protection from bacterial invasion. Immunohistochemistry staining of adipose tissue was used to assay if complement C3 is localizing to adipose tissue, a metabolically active site, during torpor.

GR.3 **Strategies for Maximizing Stake Performance: Using Storage, Soaking, Scoring, and Auxin as Pre-Planting Techniques for Sandbar Willow (*Salix Exigua*) Stakes**

Amber Miller-Adamany

Mentor: Meredith Thomsen, Biology

Willow (*Salix spp*.) stakes are often used in riparian restoration projects due to their large root systems, wetland adaptations, and ability to produce adventitious roots. Their rapid growth and height advantage over seedlings allows for swift canopy closure, which helps preempt invasive species establishment. Best practices for maximizing stake performance need to be developed. We harvested sandbar willow stakes from a wetland stand and subjected them to combinations of storage (with and without soaking), scoring,

and auxin application in a potted plant experiment. We found that storage resulted in significantly better performance in terms of height, longest stem length, and above- and belowground biomass. Results for height and aboveground biomass were enhanced when stakes were soaked during storage. There were no significant effects of scoring or auxin application. Our results show that willow stake performance is significantly improved by storing and soaking treatments. Improving stake performance in the field could lead to faster canopy closure and better control of invasive species, thus increasing restoration success.

GR.4 **Effects of Biological Soil Crusts on Chemical and Physical Soil Properties in a Wisconsin Sand Prairie**

Brittany Harried

Mentor: Meredith Thomsen, Biology

Sand prairies are a unique variant of the North American tallgrass prairie, found on sandy glacial and riverine deposits in the Upper Mississippi River floodplain and elsewhere in the upper Midwest. Biological soil crusts (BSC) communities of bacteria, fungi, cyanobacteria, archaea, mosses, and microalgae living within the top 3-14 mm of the soil are known to provide important ecosystems services in sandy habitats worldwide. However, very little is known about BSCs in Midwestern sand prairie ecosystems. To quantify the effects of BSCs on a sand prairie in Wisconsin, soil samples were collected as matched pairs from open sand areas (un-crusted) and nearby areas with BSC intact (crusted). Soil samples were analyzed for organic material (OM), total nitrogen (TN), total organic carbon (TOC), phosphorus (P), and available nitrogen (AN). Soil cores were collected to test for water holding capacity (WHC) and erosion resistance (ER) between un-crusted and crusted samples. Crusted samples had significantly higher OM, TN, and TOC than un-crusted samples. Furthermore, crusted samples were more resistant to erosion than un-crusted samples. However, there was no difference between un-crusted and crusted samples for P, AN, and WHC. Together these results indicate the positive effect of BSCs on sand prairie habitat. Crusted areas with greater erosion resistance and increased amounts of OM, TN, and TOC would allow for greater soil stability and fertility for vascular plant establishment. The similarities between un-crusted and crusted sites for P and AN are likely due to P and nitrogen sequestration by BSC organisms. Additionally, the positive effects associated with the presence of BSCs could be useful in restoration of sand prairie within the Upper Mississippi River floodplain and other sand prairie areas.

GR.5 **Geomorphology, Transient Storage, and Phosphorus Uptake: Longitudinal Trends in a Spring-Fed Stream**

Katie Bohrman

Co-author: Eric Strauss

Mentor: Eric Strauss, Biology

Anthropogenic activities have increased nutrient loading in freshwater systems. Despite the abundance of research conducted on nutrient cycling, the role of low order streams in phosphorus retention is not well defined. Furthermore, intra-stream comparisons of phosphorus uptake in relation to geomorphology and storage area have yet to be made. This study hopes to fill in these gaps by allowing for a longitudinal, intra-stream comparison of phosphorus sequestration in relation to morphological stream characteristics. In the summer of 2015, a series of conservative and reactive tracer releases were conducted in eight reaches of Spring Coulee Creek, a Driftless Area stream in western Wisconsin. Phosphorus release data were analyzed with the breakthrough curve integration method to obtain phosphorus spiraling metrics (e.g., uptake length and areal uptake rate). The conservative tracer release data were then modeled using One-dimensional Transport with Inflow and Storage (OTIS), and OTIS-P software to provide values of hydrological parameters

(e.g., discharge and transient storage) and channel characterization. The hydrological values, phosphorus spiraling metrics, and other physical measurements were compared across the eight reaches. Results from this analysis, and other similar studies, can help develop management practices aimed at limiting nutrient inputs to the Mississippi River.

GR.6 **Spatial and Temporal Patterns between the Invasive Snail *Bithynia tentaculata* and Submersed Aquatic Vegetation in Pool 8 of the Upper Mississippi River**

Alicia Weeks

Mentor: Roger Haro, Biology

Bithynia tentaculata is an invasive faucet snail that was first reported in Lake Michigan in 1871 and has since been rapidly spreading through the Nation's waters. This invasion has been extremely problematic in the Upper Mississippi River, specifically Pools 7 and 8 as this area serves as part of the major migratory flyway. As an intermediate host for several exotic trematode parasites, *B. tentaculata* is associated with severe regional waterfowl mortality. This study was designed to assess the abundance and distribution of *B. tentaculata* relative to submersed aquatic vegetation (SAV) as this provides adequate nesting and food sources for waterfowl. Past studies have shown that SAV has increased dramatically in Pool 8 since 2005 as a result of decreased discharge levels. It is possible that snail abundances have increased as well although, to date, no study has quantified whether *B. tentaculata* abundances have increased over time. Temporal patterns at specific locations were assessed from 2007 to 2015 using data that was collected as part of the Long-Term Resource Monitoring Program. A stratified random sampling design and rake score method were used to survey vegetation and snail densities. Data suggests that *B. tentaculata* densities have nearly tripled since 2007 despite minor changes in vegetation abundance, distribution, and composition. Quantile regression revealed a unimodal association between total SAV abundance and the abundance of *B. tentaculata* for sites in the 95th quantile. Hence, *B. tentaculata* tended to be most abundant at sites with intermediate amounts of SAV, and other environmental variables may limit *B. tentaculata* abundances in areas of very low or very high SAV abundance. Electivity indices showed that *B. tentaculata* is positively associated with *Vallisneria americana*, suggesting that this particular species could play a role in the distribution of *B. tentaculata*. Understanding the spatial distribution of *B. tentaculata* in relation to other habitat features, including submersed vegetation, and quantifying any further changes in the abundance and distribution of *B. tentaculata* over time will be important for understanding the potential risks of disease transmission to waterfowl.

GR.7 **Cultivating Oyster Mushrooms on Invasive Plants: An Alternative Substrate**

Kyle Kaszynski

Co-author: Thomas Volk

Mentor: Thomas Volk, Biology

Invasive plant species are taking over forests and other ecosystems everywhere. Attempts to restore these habitats are ongoing and costly procedures. Methods currently in place include chemical treatment, manual removal and burning. However, by cutting and burning this plant material, many organic nutrients are going unused while emitting high amounts of CO2 into the atmosphere. I proposed removing the invasive plant species buckthorn (*Rhamnus cathartica*) and honeysuckle (*Lonicera maackii*) manually, making woodchips of the plant material, and then growing a local strain of a fungus from the *genus Pleurotus* (oyster mushrooms) on the organic material. The woodchips will be used to make an artificial log to allow for quicker and fuller colonization compared to natural logs because woodchips provide more surface area for

the fungus to colonize. The fungus will produce edible mushrooms from the substrate and simultaneously break down the plant compounds into simple organic nutrients that could be used as a fertilizer or as a supplement in compost piles.

GR.8 **The Mechanism of Microtubule Rod Formation In 13-lined Ground Squirrel Platelets**

Xingxing Lin

Mentor: Scott Cooper, Biology

The mechanism of how 13-lined ground squirrel platelets retain functionality after long term exposure to low (4-8℃) temperature during hibernation is still unknown. The ability of platelets from hibernating mammals to withstand cold is a mystery because the platelets of non- hibernating mammals (humans and mice) are rapidly cleared from the blood after a short exposure to cold. One obvious difference in the behavior of squirrel platelets is in the way their microtubule cytoskeleton responds to low temperature. While the peripheral microtubule ring in platelets of non-hibernating mammals depolymerizes at 4° C, squirrel platelet microtubules reorganize from a ring to a rod structure. We investigated the mechanism of this reorganization. First, we determined the amount of time that squirrel platelets remain functional in vitro, which we suspected was longer than for humans. We conducted an activation assay using flow cytometetry to measure the number of platelets capable of binding fluorescent fibrinogen which is an indicator of their ability to activate. The results showed ground squirrel platelets function in vitro lasts longer and decreases slower than human's. A common mechanism that cells use to reorganize their microtubules is to disassemble the existing microtubules and reassemble them into the new structure, and we tested this hypothesis in squirrel platelets. Taxol prevents microtubule depolymerization or promotes polymerization. In contrast, nocodazole prevents microtubule polymerization or causes depolymerization. The results with taxol not only showed depolymerization is not necessary to form rods but also that taxol treatment alone is enough to form rods. Treatment with nocodazole at concentrations slightly less than that required to depolymerize microtubules did not prevent rod formation suggesting extensive polymerization is not necessary for ground squirrel platelets to form rods. Together, the results suggest that microtubule motor-induced sliding may play a role in ground squirrel platelets rod formation.

2015 UNDERGRADUATE RESEARCH AND CREATIVITY GRANT RECIPIENTS

Name	Department	Mentor	Title
Arianna Abel	Psychology	Tesia Marshik	"Out With the Old, In With the New?": How Discipline Techniques and Attitudes Differ by Maternal Age
Alyce Addesso	Microbiology	Peter Wilker	Creating a ribavirin-resistant influenza virus to study the effects of viral genetic diversity
Andrea Anderson	Art	Joel Elgin	Saving Sami: Preservation through Print
Chris Bastian	Exercise and Sports Science	Matthew Andre	Monitoring Recovery Status in Collegiate Wrestlers
Dane Berres	Sociology	Nicholas, Bakken	Race and Gender Bias in Perceptions of Punishment: An Examination of Academic Misconduct and Illicit Prescription Drug Use
Kelsie Bolstad	Sociology	Lisa Kruse	La Crosse Juvenile Justice Arrest and Disproportionate Minority Contact Inter-Agency (JJADMC) Task Force: A Case Study)
Christa Brehm	Computer Science	Samantha Foley	The Effect of Web Interface Design on the Parallel and Distributed Computing Concepts Learning Process
Emma Brosinski	Health Education and Health Promotion	Whitney, Emily	Child Labor on the Costa Rica - Panama Border
Elizabeth Brown	Art	John Ready	Human Voodoo Doll
Felipe Campos de Almeida	Biology	Sierra Colavito	Role of the inhibition of the gene CHEK1 in breast cancer stem-like cells.
Jesse Dahir-Kanehl	Computer Science	Joshua Hursey	Developing and Analyzing Volunteer Coordination Software
Benjamin Davis	Exercise and Sports Science	Carl Foster	Improved Prediction of Exercise Capacity
Ashley Dechant	Art	Kathleen Hawkes	A Woman's Journey Down The Mighty Mississippi
Jennifer Derocher	History	Ariel Beaujot	Furthering Hear, Here: Recording five addtional stories for a place-based oral documentary project
Jennifer Derocher	History	Ariel Beaujot	Pacing Through History: A Family Self-Guided Walking Tour of Downtown La Crosse
Kendall Doersch	Psychology	Ryan McKelley	No Pain, No Gain: The Influence of Gender Conformity and Priming on Pain Perception
Evan Dowling	Physics	Eric Barnes	Looking for the Adams Instability In N-body Simulations
Megan Engelhardt	Psychology	Tesia Marshik	"Out With the Old, In With the New?": How Discipline Techniques and Attitudes Differ by Maternal Age

Billy Feltz	Archaeology and Anthropology	Tim McAndrews	Analyzing Lithic Stone Tools of the Cosma Archaeological Site
Jack Flinchum	Psychology	Alessandro Quartiroli	Two cans short of six-pack abs: The influence of progress in physical activity goals on happiness.
John Frawley	Biology	Gretchen, Gerrish	Examination of Genetic Divergence in Similar Ostracod Species in Different Marine Habitats
Cole Fuchs	Biology	Tisha King-Heiden	The Effects of Early Exposure to Triclosan on Sex Differentiation and Reproduction of Zebrafish
Michael Fuerte	Mathematics and Statistics	Douglas Baumann	Building a Simulated Multi-Context Dataset to Test for Differential Methylation in Plants
Micheal Gonzales	Psychology	Alessandro Quartiroli	An Evaluation of a Camp-Based Psychosocial Intervention to Promote Healing in Grieving Adolescents
Zoey Good	Biology	Jennifer Klein	Determining Functionality of a Novel Calmodulin GFP Fusion Protein
Julian Greenup	Biology	Jennifer Klein	The Structural Impact of Oxidation on M109 and M124 residues of Calmodulin
Austin Greenwood	Exercise and Sports Science	Gillette, Cordial	The Cold Truth: The Effects of Ice on the Metabolic Rates of Tissues
Brianna Haight	Chemistry and Biochemistry	Adrienne Loh	Determination of the Favorability of Antibiotic Peptide-Vesicle Interactions Based on Enthalpic and Entropic Relationships
Elissa Harter	Microbiology	William Schwan	Transcription profile of SK-03-92 persister
Kathleen Hetzel	Psychology	Bianca Basten	How Behavioral Disability Labels Influence Perceptions of Aggression
Cienna Hopkins	Psychology	Alessandro Quartiroli	Two cans short of six-pack abs: The influence of progress in physical activity goals on happiness.
Meaghan Howell	Exercise and Sports Science	Matthew Andre	Monitoring Salivary Hormones, Training Volume, Jumping Ability, and Competition Performance in NCAA Division III Women Pole-Vaulters
Carli Johnson	Microbiology	Peter Wilker	Creating a ribavirin-resistant influenza virus to study the effects of viral genetic diversity
Jennifer Keute	Archaeology and Anthropology	Constance Arzigian	Examining Seasonality from the Comparison of Fatty Acid Residues on Archaeological pottery from the La Crosse Region
Kendra Kiepke	Sociology	Enilda Delgado	Beyond The Degree
Darrell King	Communication Studies	Sara Docan-Morgan	Black Chicago Gang Members' Perceptions of the Black Lives Matter Movement
Adam Kleman	Chemistry and Biochemistry	Nick McGrath	A New Selective Reduction Reaction For Use In Organic Synthesis

Jonathan Lendrum	Biology	Bradley Seebach	Induction of intestinal microbial imbalances through antibiotic gavage, high-fat diet: effects on the microbiota-gut-brain axis and sleep behavior in mice
Jonathan Lendrum	Biology	Bradley Seebach	Evaluation of Mouse Sleep Behavior and Glymphatic System Function in Response to Manipulations in Gut Microbiota Composition
Casey Liston	Art	Bradley Nichols	Pressures of the Mind
Marcus Lowe	Physics	Shelly Lesher	Studying Nuclear Structure to Understand Stellar Processes
Alexis McKeever	Biology	Jennifer Miskowski	Investigating the Mechanism of Action of CL-5, a Potential New Drug for Parasitic Worms
Courtney McKeever	Biology	Jennifer Miskowski	Investigating the Mechanism of Action of CL-5, a Potential New Drug for Parasitic Worms
Madalyn Melbye	Psychology	Ellen Rozek	The influence of chronic vs. acute stress on utilitarian moral judgment
Erin Miller	Chemistry and Biochemistry	Aric Opdahl	Quantifying temperature dependent interactions between DNA functionalized surfaces and nanoparticles
Kelsey Miller	Biology	Tisha King-Heiden	Effects of Triclosan on Zebrafish Cardiac Output
Elena Montanye	English	Bryan Kopp	How Jazz and Hip-Hop Musicians Respond to Police Brutality: A Rhetorical Comparative Analysis
Tobias Nelson	Physics	Roberto Salgado	A Spacetime Approach for Clarifying
Katharine Niedorowski	Sociology	Enilda Delgado	Housing and Food Insecurity at UWL: Can it Be?
Calli Niemi	History	Ariel Beaujot	Pacing Through History: A Family Self-Guided Walking Tour of Downtown La Crosse
Callie O'Connor	History	Ariel Beaujot	Curating [art]ifact:where hisotry meets art
Kelsey Phillips	Exercise and Sports Science	Andrew Jagim	The effects of supplementation with Bio-Gro (Bio-Active Peptides-BAP) and resistance training on body composition, strength and power recreational weight training males for twelve weeks
Ariel Reker	Archaeology and Anthropology	Connie Arzigian	Material Culture Analysis on Subadults of Medieval Transylvania
Taylor Roessler	Geography and Earth Science	Colin Belby	Portable X-Ray Florescence Analysis of Silicified Sandstones
Maricruz Sanchez	Communication Studies	Nicole Ploeger-Lyons	Nuestros Cuentos: Latina Immigrant Narratives in Wisconsin.
Rebecca Schnabel	History	Shelley Sinclair	Дубне-Ла Кросс: People-to-People Diplomacy

Sarah Schultz	Biology	Gretchen Gerrish	Identifying genetic barriers associated with geographic barriers among luminescent ostracod (Photeros morini) populations
Sarah Sorensen	Psychology	Katherine Kortenkamp	On or Off the Clock: The Influence of Occupational Prestige on Helping Intentions
Alayna Stein	Psychology	Jessica Sim	Competence in Writing for ESL and Native Speakers: The Impact of Motivation, Goal Orientation and Mindsets
Tanner Taylor	Psychology	Casey Tobin	Identity under attack: Threatened masculinity's effect on gender-related attitudes
Rachel Tidwell	Archaeology and Anthropology	Elizabeth Peacock	English in Post-Colonial Belize: How English Affects Daily Life in Belize
Katelin Traffie	Psychology	Jessica Sim	Competence in Writing for ESL and Native Speakers: The Impact of Motivation, Goal Orientation and Mindsets
Christopher Unterberger	Chemistry and Biochemistry	Nick McGrath	Bioorthogonal Approach to Reacting Diazo Compounds with Coumarin Double Bonds
Danielle VanBrabant	Biology	Barrett Klein	Insect Sleep Animation
Aaron Vesey	Philosophy	Mary, Krizan	Axiomatizing an information theorectic approach to quatum gravity
Evan Weis	Geography and Earth Science	Gargi Chaudhuri	Developing Geospatial Datasets and Mapping Mountaineering Patterns in the Himalaya Between 1950-2014
Heather Willems	Biology	Scott Cooper	Measuring stability of red blood cells during hibernation.
Gaokhia Yang	Biology	Margaret Maher	Comparison of Responses to Mental and Physical Stress Between Second Generation Hmong-Americans and White-American Peers
Gemma Zahradka	Archaeology and Anthropology	Katherine Grillo	Structure and Demographics of Pastoralist Cattle Herds at the Archaeological site of Luxmanda in Northern Tanzania
Pedro Zavala	Exercise and Sports Science	Andrew Jagim	The effects of supplementation with Bio-Gro (Bio-Active Peptides-BAP) and resistance training on body composition, strength and power recreational weight training males for twelve weeks

2015 GRADUATE RESEARCH, SERVICE, AND EDUCATIONAL LEADERSHIP AWARD RECIPIENTS

Name	Department	Mentor	Title
Amanda Anderson	Microbiology	Bonnie Jo Bratina	Secretory IgA Production in Response to Sub-Populations of the Gastrointestinal Microbiota of 13-Lined Ground Squirrels
Amy Baker	Microbiology	Bill Schwan	The Effects of a Putative Two Component Regulatory System in Staphylococcus Aureus on Biofilm Formation and Sortase A Expression
Alex Beauchene, Sara Fry, and Sam Sonnek	Exercise and Sports Science	Carl Foster	Rockport II: Incremental test to measure VO2mx/VT in broad range of people. Compare prediction from Rockport HR equation vs equation built on RPE
Katherine Bohrman	Biology	Eric Strauss	The Effect of Geomorphology on Transient Storage and Phosphorus Uptake in Spring Coulee Creek
Kythie Boyd	Psychology	Rob Dixon	Social-Emotional Learning: Understanding the Factors Affecting Teacher Implementation
Benjamin Ceder	Health Professions	John Greany	A University-Based Physical Exercise Program for Individuals with Parkinson's Disease
William Champeau	Psychology	Daniel Hyson	Improving High School Achievement: The Role of Friendships and Engagement
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