Table of Contents

April 20, 2017
The Student Union

9:00 a.m.-12:45 p.m.

SCHEDULE OF ORAL PRESENTATIONS

	Room 3130	Room 3120	Room 3110
9:00 to 9:20	**UR.1** **Kristin Reque** Sociology A Need for Needles: A Qualitative Examination of La Crosse County Injection Drug Use and Harm Reduction Strategies	**UR.4** **Lindsey Felt** Sociology Impacts of Successful Reintegration for Offenders: Neighborhood Structure Versus Home Structure	**Grad.1** **Brittany Brown** Microbiology Identifying Changes in the Gut Microbiome of *Biomphalaria glabrata* in the Presence and Absence of *Echinostoma caproni* Infection
9:25 to 9:45	**UR.3** **Kathryn Thompson** Biology Thirteen-Lined Ground Squirrel Hibernation Effects on the Enteric Nervous System of the Colon	**UR.11** **Alyssa Nelson** Educational Studies Towards a Better Understanding of Communication Expectations between Parents and Schools: A Review of the Literature and Survey & Interview Analysis	
9:50 to 10:10	**UR.8** **Peter Roth** Biology Breathing Life Into Dinosaurs	**UR.10** **Kaitlyn Zander** Public Administration Counseling Program for Jurors under Serious Stress in the State of Wisconsin	

10:15 to 10:35		**UR.6** **Payton Yahn** English Shakespeare & Masculine Gender Performance	
10:40 to 11:00	**UR.5** **Chris Rudolph** Public Administration & Political Science Examining the Role of Race, Risk Assessments, and Preventative Sanctions in the Pretrial Justice System		
11:05 to 11:25	**UR.7** **Rebecca Taylor** Physics Finding New Interstellar Neutral Hydrogen Shells in the Milky Way	**UR.2** **Jack Hackman** English Defining Rhetoric	
11:30 to 11:50	**UR.9** **Alex Peeters** Public Health and Community Health Education "See the Real Me" A Healthy Body Image and Body Positive Program for College Students at the University of Wisconsin-La Crosse	**UR.12** **Elena Montanye** English White Privilege in the Uptake of Black America and Hip Hop: A Rhetorical Analysis	

UNDERGRADUATE STUDENT ABSTRACTS

Poster Session A
The Bluffs: 9:00 am-10:45 am

U.1 Methylmercury Contamination in the Lower Food Web of At-Risk Minnesota Rivers

Khadel Akindolire-King
Co-authors: Marissa Despins, Phoenix Rogers, and Kristofer Rolfhus
Mentor: Kristofer Rolfhus, Chemistry and Biochemistry

Methylmercury (MeHg) is a potent and bioaccumulating neurotoxin for both humans and wildlife, with most exposure through the consumption of fish. The Minnesota Pollution Control Agency has recently identified five Minnesota Rivers (Kettle, St. Louis, Roseau, Thief, and Vermillion) that exhibit exceptionally high fish mercury levels. We are investigating the lower food webs of these "High-5" rivers relative to a low fish-Hg control (Mustinka River), to test the hypothesis that aqueous MeHg concentrations are controlling bioaccumulation into higher trophic positions (benthic invertebrates, small fish, and predatory fish). Here we report our findings for 0.45-Âµm filtered water, seston (suspended particles), periphyton (attached algae), benthic invertebrates, and small preyfish for the High-5 Rivers and Mustinka River compared to regional western Great Lakes averages. Rivers were characterized by sampling locations along the main stem and main sub-watershed tributary inflows between May 2015-June 2016. River-averaged MeHg levels in filtered water ranged between 0.13-0.65 ng/L (mean 0.34±0.06 ng/L) for the High-5 rivers, compared to the Mustinka control (0.076 ng/L) and the regional average (0.065 ng/L). Each of the High-5 rivers were indeed statistically higher in MeHg concentration than the regional and Mustinka averages (ANOVA, $p < 0.05$), while the Mustinka control did not differ from the regional average. Methylmercury in seston ranged between 1.2-3.3 ng/g (mean 2.2±0.3 ng/g) in the High-5 rivers, compared to the Mustinka River (0.6 ng/g) and the regional average (1.2 ng/g). For periphyton, the High-5 rivers ranged from 1.7-12 ng/g (mean 6.2±1.5 ng/g), relative to the Mustinka (5.0 ng/g) and the regional average (2.4 ng/g). The High-5 Rivers were not statistically different in MeHg content compared to the regional values for seston and periphyton. Our results suggest that elevated aqueous MeHg levels (and the physical/chemical factors that produce MeHg) do exhibit control on bioaccumulation in riverine systems where high fish-Hg is observed.

U.2 Classification of *Streptomyces* Isolates and Determination of Antibiotic Producing Genes

Charlotte Alexander
Mentor: Anita Baines, Biology

Antibiotic resistance has become an increasing problem as more strains of bacteria gain resistance to currently used antibiotics. *Streptomyces* are a common source of commercial antibiotics used today. Little research has been done on the antibiotic production capabilities of freshwater *Streptomyces*. This project genetically classifies 25 *Streptomyces* previously identified in the Baines Lab and determines if they have genes for production of known antibiotics. Isolates are grown and 16S rDNA will be sequenced, then compared to sequences in the GenBank database. This determines if these freshwater species have been previously identified. Specific antibiotic production genes are identified by creating primers using *Streptomyces griseus* as a model. Additional analyses are performed using these primers. The presence or absence of known antibiotic-producing genes are determined with gel electrophoresis. If the known antibiotic producing genes are not found, it may indicate novel antibiotic genes. Further research will be needed to identify these genes.

U.3 Monitoring Recovery Status, Eating Patterns, and Stress in Collegiate Female Swimmers

Christina Bastian
Mentor: Matthew Andre, Exercise and Sport Science

Overtraining syndrome (OTS) is a condition in which an accumulation of stressors from excessive training with inadequate recovery leads to typical symptoms of continuous fatigue, negative hormonal changes, negative alterations in mood state, and, most importantly, the diagnosis is dependent on decreases in performance that do not improve with rest (Mackinnon & Hopper, 1995). While all athletes have the potential to develop OTS, some sports (such as collegiate swimming) may be predisposed to this condition more than others likely as a result of a higher training volume which is common to the sport. To exacerbate this problem, there are limited objective tests available to monitor a swimmer's recovery from the training load. Because of this, many coaches rely on past experiences and perception of how well an athlete performs during practice to determine recovery from the training load. Other sports have used additional monitoring tools to assess athlete's comprehensive (i.e. physiological, psychological, performance) recovery, and these

tools could potentially be used with collegiate swimmers; however, the merit of their application is still in question. Therefore, one purpose of this study is to monitor the recovery status of collegiate female swimmers competing in the 50-yard freestyle swim throughout the season. The other purpose of this study is to identify a potential relationship between training volume, competition performance, and recovery status. The researchers will use the 50-yd sprint swim, salivary testosterone and cortisol, dietary records, perceived stress scale, self-rated sleep logs, and the perceived recovery status to assess the swimmers' recovery during 10 weeks of preparatory training.

U.4 Effects of Analytical Parameter Settings on Estimating Patterns in Diversity of Tropical Leaf-Associated Fungi

Amanda Bradley
Co-author: Matteo Garbelotto
Mentor: Todd Osmundson, Biology

Fungi associated with the leaves of tropical plants are highly diverse and important to the biology of the host plant; however, their cryptic appearance makes understanding their patterns of occurrence difficult. High-throughput DNA sequencing makes it possible to "see" these fungal communities with enhanced resolution, but can introduce artifactual species due to sequencing errors and/or choice of analytical parameters. Previous analyses of leaf samples from Moorea, French Polynesia using a low-throughput sequencing approach revealed several biologically interesting patterns that were not observed in a subsequent high-throughput dataset. The proposed research will thoroughly examine analytical parameters to determine whether this contradiction results from (1) false patterns in the low-throughput data due to low resolution; (2) an excess of artifactual noise in the high-throughput data; or (3) diverse, species-specific patterns that are obscured when data are analyzed in aggregate. One potentially important difference is between endophytic (living within the leaf tissue) and epiphytic (living on the leaf surface, or existing only as hitchhiking spores) fungi; a collection of confirmed endophyte cultures will be sequenced in order to distinguish these species in the high-throughput dataset and allow comparative analyses. The results of this research have important implications for understanding and refining how high-throughput DNA sequence data are used in microbial diversity studies.

U.5 The Effects of Voodoo Floss Band® Application on Ankle Range of Motion in Healthy Subjects

Jared Buntin
Mentor: Cordial Gillette, Exercise and Sport Science

Within the orthopedic rehabilitation and sports medicine world, a clinician's primary goal is to return patients to full function and eliminate pain following injury or surgery. Very often after musculoskeletal injuries, a patient's range of motion will be limited due to pain or tissue restriction. It is the clinician's job to restore proper movement of the affected joint. This is commonly achieved through stretching, soft tissue mobilization, and exercise. The purpose of this research is to see if Voodoo Floss Bands®, a 7-foot latex band, can be used over the course of 3 weeks to improve ankle dorsiflexion range of motion in healthy patients. A total of 16 participants received Voodoo Floss Band® application to their ankle for two minutes across 15 sessions. To examine if ankle range of motion has changed, ankle dorsiflexion measurements were assessed before, during, and after the study. Measurements were taken using a biplane goniometer for active and passive range of motion, while a digital inclinometer was used to assess functional weight bearing ankle dorsiflexion. The hypothesis of this study is that applying Voodoo Floss Bands® to the ankle joint will improve ankle dorsiflexion, in turn providing clinicians with a quick and easy to use tool to improve patient care or as an injury prevention tool.

U.6 The Effects of Cigarette Tax Hikes on Adult-Onset Asthma

Zachary Cowell
Mentor: Mary Hamman, Economics

The purpose of this project is to examine the relationship between cigarette taxes and adult-onset asthma. Previous research suggests that a higher cigarette tax may reduce smoking rates. Smoking includes both the action of smoking a cigarette and inhaling second-hand smoke, which often occurs in public places where there are not laws to prevent smokers from doing so, or at home when a family member is a smoker. Finding if there is a correlation between tax hikes and adult-onset asthma will allow policy makers to become more informed as to the extent their policy choices protect public health. Findings are based on analysis of publicly available Behavioral Risk Factor Surveillance System (BRFSS) survey data. Information on state tax hikes is collected from the Center of Disease Control. Preliminary results suggest that there is a positive correlation between cigarette tax hikes and the prevalence of adult-onset asthma.

U.7 Characterizing the Interactions between Mg2+ and a Periplasmic Lipoprotein Involved in Mg2+ Homeostasis in *Salmonella enterica*

Timothy Davie
Co-authors: Cody Vaneerd and Damien Rasmussen
Mentor: John May, Chemistry and Biochemistry

The ability to acquire Mg2+ is needed for certain bacteria to cause disease due to the nutrient's importance in physiological processes. Pathogenic bacteria have proteins which help them to adapt to environments where Mg2+ is in low supply. We have identified a periplasmic lipoprotein found in *Salmonella enterica*, a bacteria that is a major contributor to food-borne illness, that allows the pathogen to survive in low Mg2+ environments. The Salmonella lipoprotein of 19.7 kDa monomeric molecular weight consists of a signal peptide and a single domain of unknown function that is conserved among enterobacteria. The purpose of this research project is to determine if the protein binds Mg2+ and identify the amino acid residues that are required for the protein to function properly. We have developed a protocol to overproduce and purify the recombinant lipoprotein. Protein variants are created using site directed mutagenesis to replace residues thought to be critical for binding Mg2+. To test for whether a particular residue is required for the ability of this lipoprotein to promote growth in a low Mg2+ environment, growth of Salmonella expressing these protein variants in low Mg2+ is being assayed. This physiological assay will indicate which residues are required for the physiological function of this protein in Mg2+ homeostasis. A fluorescence assay that utilizes Mg2+ sensor 8-hydroxyquinoline-5-sulfonic acid (HQS) has provided evidence that the lipoprotein is sequestering Mg2+ from solution. We observed a change in HQS fluorescence when the protein is present, indicating that HQS and the protein compete for Mg2+. The results from the HQS biochemical assay, combined with our site directed mutagenesis experiments, will provide a model for how the protein functions. The results of the project may allow for a further understanding of how Salmonella and other bacteria adapt to their environment and maintain virulence in harsh conditions.

U.8 Financial Well-Being and Happiness: A Comparison of German and US Economics University Students

Stephanie Drefahl
Mentor: Donna Anderson, Economics

Happiness Economics is a relatively new field, with the United Nations World Happiness Report country rankings first published in 2012. The 2015 report ranks the United States 15th in happiness, behind countries such as Switzerland, Denmark, and Mexico; Germany is ranked 26th, behind countries such as Oman, Venezuela, and Ireland (Helliwell, Layard, & Sachs, 2015). Thus, despite similar GDP per capita, the U.S. at $54,000 and Germany at $48,000 in U.S. dollars Germany is quite a bit lower for happiness, supporting past research that differences in other factors besides income are in play here. An interesting twist is the question of the happiness of the researchers - economists - who study happiness (Haucap & Heimeshoff, 2014). I chose to compare the happiness of economics students from the U.S. and Germany. I tested five hypotheses: (1) German economics students are less happy than U.S. students; (2) Income plays a larger role in determining happiness for U.S. students than German students; (3) In each group, happiness increases with income only to a certain level, but then plateaus and even decreases as income increases; (4) Social support levels and healthy life expectancy is less important to U.S. students' happiness than it is to German students' happiness; and (5) Immigration has a much larger impact on happiness in Germany than in the U.S. I administered a survey to and conducted interviews with a sample of economics students at Frankfurt University of Applied Sciences and University of Wisconsin-La Crosse. My survey used questions from the Bhutan Gross National Happiness survey since Bhutan is the pioneer in assessing happiness of its citizens. The results and implications within the context of the global immigration debate are discussed.

U.9 GIS Analysis of an Auger Survey at the Archaeological Site of Luxmanda, Tanzania

Brandon Emerson
Mentor: Katherine Grillo, Archaeology and Anthropology

In the summer of 2015, archaeological excavations were conducted at the Pastoral Neolithic site of Luxmanda in north-central Tanzania. Luxmanda is the largest prehistoric site occupied by an ancient herding society in eastern Africa. The 2015 excavations were the first large scale excavations to take place at the site, and several different data types were recorded. My project focuses on the data collected during an auger survey, which I assisted with. By looking at the coring samples that were taken every 20 meters in a grid across the site, I was able to distinguish several important

spatial aspects about the site. Specifically, it was possible to determine the boundaries of the site, the spatial distribution of archaeological features within the site, and discrete occupational layers. In the end, I created different site maps and 3D models using Geographic Information Science (GIS) analyses. This work helps to better understand settlement patterns in the Pastoral Neolithic and pinpoint where future excavations will be conducted at Luxmanda.

U.10 The Crocodylian Secondary Palate Directly Facilitates Crushing Prey in Concert with Tensed Ligaments

Cody Fisher and Mari Sweetman
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.

U.11 Thrombomodulin Cloning and Expression

Evan Fisher, Joseph Forman, and Kaitlyn Rago
Co-authors: Joshua Jensen, David Feller, and Rodrigo Alves da Silva
Mentor: Scott Cooper, Biology

Thombomodulin is a protein involved in the clotting mechanism in humans, but may be involved in other processes in different species. This project's goal is to produce Thrombomodulin from a range of model species of animals by cloning the genes with PCR and Gibson Assembly recombination into a plasmid, followed by protein expression in yeast. We currently have TM, the gene that encodes for Thrombomodulin isolated from *D. rerio*, *X. laevis*, *Gallus gallus*, and Tilapia.

U.12 Quoting Analysis

Lydia Frank, Quinn Burzynski, Zac Nordstrom, and Jake Wolfe
Mentors: Song Chen and Chad Vidden, Mathematics and Statistics

Fastenal has partnered with the PicMath course from the Mathematics department at UWL to develop a quoting practice for their company. Each branch store of Fastenal is responsible for the growth of business and sales in each of their local markets, where local pricing and quoting practices guide the growth. We are working to discover the key factors that influence a quote's success or failure and to develop our own quoting strategy, or pricing guide, to maximize sales and profitability. With the data we've been given, we have constructed and are using a neural network to predict the outcome of a quote. From this we will build a pricing guide for use in Fastenal's branch stores. We do not currently have results to conclude.

U.13 Flexibility and Jump Performance in Previously Injured Knees

Marlee Freitag and Cole Tidemann
Mentor: Naoko Aminaka, Exercise and Sport Science

Rehabilitation protocol after knee injuries tends to focus on muscular strengthening and balance exercises, while lacking in flexibility based activities. The purpose of this investigation was to find if there is a correlation between flexibility of the hip and knee joints and jump performance and biomechanics. This study utilized 28 participants (8 males, 20 females) within the age range of 18 - 24 years, who have previously experienced an injury to any knee ligament or meniscus that required physical therapy and/or surgery. Participants underwent a standardized warm up protocol and passive range of motion tests with a goniometer in the hip and knee joint. Jump performance was measured by a countermovement jump (CMJ) assessing jump force with a force place, along with joint angles and vertical jump height measured with the 3D motion capture system. Currently data processing is in progress, however the preliminary results

indicate that knee and hip flexibility is correlated with jump performance/kinematics. We anticipate that the results will support a call for an increase in the number of flexibility-improving exercises used in post-knee injury rehabilitation.

U.14 Rhetorical Criticism of the Student Handbook: Exploring the Portrayal of Otherness

Sonia Garcia
Mentor: Beth Boser, Communication Studies

The University of Wisconsin-La Crosse (UWL) holds its values of diversity and inclusion on a high pedestal. With growing concerns regarding race relations in the United States and an increase in hate and bias reports at this University within the past three years, UWL needs to be certain these values are evident to administrators, faculty, staff, and students alike (Hate response, 2014; Hate response, 2016). Therefore, it is important that these values are reflected within and through messages the university promotes. The purpose of this research is to analyze the rhetoric of UWL's student handbook, which is a key document that contributes to the construction of the campus' identity. This analysis uncovers the extent to which UWL's stated value of "inclusive excellence" is reflected in the handbook, and explore the consequences related to how this value is represented. Specifically, the method of ideological criticism will be used to expose the values found within the text of the handbook (Foss, 2009).

U.15 The Effect of Video-Self-Modeling on a 3rd grade Child with Autism

Anna Kass and Kallie Nelson
Co-author: Lindsey Sattler
Mentor: Lema Kabashi, Educational Studies

This project employed an AB single subject research design to investigate the efficacy of video self-modeling intervention on decreasing the number of prompts before beginning and/or finishing independent class-work for a third grader with Autism Spectrum Disorder (ASD). The intervention was conducted by three undergraduate students in the special education program. They implemented the intervention during Language Arts lessons in a general education setting for three days a week. It was hypothesized that when the participant views himself beginning and finishing in-class assignments immediately after the teacher's signal he will decrease the number of prompts to start/finish the tasks. Results showed immediate improvements on the student's target behaviors. The participant maintained the skills for one month after the intervention was withdrawn. Social validity assessment was conducted with the participants' teacher supported the use of the intervention and recommended for other students with ASD.

U.16 The Effect of Jump Landing Direction on Patellofemoral Joint Stress

Katie Hanson and Cheyanne Massie
Mentor: Naghmeh Gheidi, Exercise and Sport Science, and Thomas Kernozek, Health Professions

Purpose: To compare patellofemoral joint stress during forward/backward and side jumping and landing. Methods: 12 physically active, healthy males (age 21.6±1.8years) performed single and double leg forward/backward and side jump and land over a 20cm barrier. Kinetic and kinematic data were collected by force platform and 15 motion analysis cameras, respectively, while 47 reflective markers were place on subjects' body. Inverse dynamics and then static optimization were used to estimate muscle forces. Patellofemoral joint stress was calculated by a two dimensional knee computer model. Quadriceps force was used to calculate patellofemoral joint stress by dividing out cadaveric patella and femur contact area. A repeated measures multivariate analyses of variance (α=0.05) were used to compare patellofemoral stress, peak quadriceps force, and peak knee flexion between movements. Results: Patellofemoral joint stress, quadriceps muscle force and knee flexion were different between movements. Conclusion: Jump landing directions can change the patellofemoral joint stress, so physical therapist and trainers both should consider this finding in rehabilitation strategies and during exercise training within patient with patellofemoral pain.

U.17 Reliability of Results Generated by Two Sedimentary Techniques Using Replicate Samples from a Lake Sediment Core

Emily Healy, LeAnna Bender, and Zachary Gearing
Mentor: Joan Bunbury, Geography and Earth Science

A sediment core was collected from Mud Lake, southeastern Wisconsin in early 2014. The purpose of the original core collection was to reconstruct past climate conditions in the region, to aid in the explanation as to why the site was abandoned by the Mississippian people ca. 1250 AD. Lake sediments preserve physical, chemical, and biological data that can be used to infer the environmental conditions that existed in the past. However, it is important to recognize what errors, if any, are generated through different sedimentary techniques. The focus of this project is to investigate the reliability and accuracy of the x-ray diffraction technique (XRD) for determining the mineralogy of the sediments, and the laser diffraction technique used to derive particle size analysis (PSA). A comparison of replicate samples taken from the same levels in the sediment core will be presented, as will any errors, and possible explanations. In addition, XRD and PSA laboratory processes will be presented and discussed.

U.18 Tackling Anxiety in University Level Foreign Language Classes

Bailey Hert and Sydney Cleveland
Mentor: Claire Mitchell, Modern Languages

Students feel anxiety when learning a foreign language, which can hinder their ability to learn the language and their performance in class (Lileikien, A., & Danileviien, L. 2016). The goal of this study is to examine ways to improve the environment in the classroom for foreign language learners experiencing anxiety. The study will examine introductory level university Spanish learners and teachers. A questionnaire consisting of a Likert scale and open-ended questions will be given to two classes of students (n= approximately 50) regarding their reasons for their anxiety or lack thereof. Interviews (through the use of open-ended questions) will also be conducted to the teachers of their classes regarding their classroom environment. The findings will explore the feelings of the students who regularly have anxiety in their foreign language classes and suggest certain teaching styles that could improve the anxiety levels of these students. Based on research findings, students suffer with anxiety often in their classrooms and teachers have strategies to deal with anxious students (Hsin-Yi, L. 2016). Therefore, the results of this study will expand on the variation in strategies for teaching foreign language and diminishing students' anxiety.

U.19 Developing a Robust Helium Gas Purification System

Carter Hughes
Co-author: Wanpeng Tan, Ani Aprahamian, and Shelly Lesher
Mentor: Shelly Lesher, Physics

The Institute for Structure and Nuclear Astrophysics at the University of Notre Dame depends on helium-3 for the study of Nuclear reactions. A helium-3 recovery system is necessary for the Helium Ion Source at the FN tandem accelerator, due to the prohibitive price of helium-3. An offline helium-3 recovery and purification system was built based on the previous online recovery system. The previous online system purified helium gas at a very slow rate and required the Helium Ion Source to operate. The new offline system is operated separate of the Helium Ion Source allowing for fast purification cycles. A recirculation system was added to the offline system to improve the final purity of helium-3. Different He gas flow rates were used in the offline purification system. The effects of flow rates were evaluated on their performance in the Helium Ion Source. The efficiency of the recirculation system was evaluated on its contaminant removal. Preliminary results and further improvements will be discussed.

U.21 Effects of a Multi-Ingredient Thermogenic Pre-Workout Supplement on 5K Running Performance in College-Aged Males and Females

Nora Johnston, Taylor Miller, and Kelly Sorensen
Mentor: Clayton Camic, Exercise and Sport Science

Purpose: The purpose of the present study is to examine the effects of an acute dose of a thermogenic pre-workout supplement on 5K running performance and subjective measures of fatigue. Methods: Twenty aerobically-trained, college aged individuals will be recruited to participate in two 5K running races for time on March 26th and April 2nd.

This study will utilize a randomized, double-blind, placebo-controlled, within-subjects crossover design. During the first session, the subjects will be randomly assigned to ingest one dose of the caffeine-based supplement (C4 Ripped, Cellucor®) or placebo (Crystal Light®) 30 minutes prior to running a 5K race as fast as possible. Subjects will also complete a 5-point Likert scale questionnaire to determine feelings of fatigue, alertness, energy, and focus immediately prior to ingesting the substance (baseline), 30 minutes post-ingestion (immediately pre-race), and 5 minutes post-race. For the second session, subjects will ingest the opposite substance (supplement or placebo) and undergo the same testing procedures (including time of day) as the first session. Race times will be compared between the supplement and placebo conditions using a paired-samples t-test. In addition, separate two-way ANOVAs with repeated measures will be used to compare the Likert scale questionnaire variables among the conditions (supplement vs. placebo) at the common time points (baseline, pre-race, post-race). When appropriate, follow-up tests will include paired sample t-tests. Results: Data collection will be performed on March 26th and April 2nd in Mitchell Fieldhouse. Data analysis will be completed on April 3rd. Conclusions: Pre-workout supplementation is a relatively new and popular nutritional strategy that involves consuming a mixture of bioactive compounds and dietary ingredients prior to a bout of exercise for ergogenic purposes. The present findings will provide information related to the effectiveness of these new products on their potential for improving aerobic performance and feelings of fatigue during recreational running competitions.

U.22 Analysis of Rotational Barriers of a Secondary Hydroxamic Acid in Aqueous Solution by NMR Spectroscopy

Caleb Griesbach
Mentor: Heather Schenck, Chemistry and Biochemistry

Hydroxamic acids are metal chelators with applications in biology, medicine, and industry. Two conformations occur, E and Z. Binding metal can only be accomplished in the Z conformation; however, the E conformation is more heavily favored. It is possible the barrier of rotation from E to Z could compromise the function of hydroxamic acids. We examined the long-range coupling of the hydroxamic acid, N-pentyl acetohydroxamic acid in D2O through NMR spectroscopy to determine the kinetics of the bond rotation as a function of temperature. Early results appear to be consistent with previous studies, which showed a lower bond rotational barrier than the carbonyl-nitrogen bonds in amides.

U.23 The Weeping Eye: A Spatial and Temporal Analysis

Margaret Kautz
Mentors: Amy Nicodemus and James Theler (professor emeritus), Archaeology and Anthropology

The Mississippians inhabited the Mississippi River Valley and surrounding areas between A.D. 900 and 1600. This mound building culture produced numerous symbols and motifs on a variety of media, archaeologists refer to these artifacts as being part of the Southeastern Ceremonial Complex (SECC). The Weeping Eye, or Forked Eye, motif is one of the symbols associated with this complex. Resembling the markings of a falcon, the Weeping Eye is most often found on shell face masks. Shell masks are not the only representation of the Weeping Eye, the motif has appeared on pipes, pottery, carved sandstone and other surfaces. This research examines the Weeping Eye motif both spatially, looking at its spread from the Southeastern United States into the Midwest and Great Plains, and temporally to determine the rate of diffusion for the motif. The spatial and temporal analysis will branch into a larger discussion of how and why culture is spread.

U.24 A 21st Century Approach to Motivation in Continuing Spanish

Hannah Kiiskila and Halley Lepsch
Co-author: McKenzie Lewis
Mentor: Claire Mitchell, Modern Languages

This study will analyze how a 21st century approach (Storey, 2015) to culture (Irvine, 2002) affects motivation (Guay, 2016, p.157) to pursue a foreign language at the intermediate level of foreign language learning. This mixed methods study will analyze a focus group comprised of intermediate level university students studying Spanish as a foreign

language. In particular, this study will use a pre-task questionnaire to measure students' level of motivation to continue studying Spanish before instructing them about the target culture through a 21st century approach. After the task (i.e. cultural instruction), this study will then examine participants' motivation to continue studying Spanish with a post-task questionnaire. The goal of this investigation, therefore, is to explore the impact that culture has on motivation to continue a foreign language.

U.25 Technology in Foreign Language Classrooms

Hailey Klug and Emily Sander
Mentor: Claire Mitchell, Modern Languages

This qualitative study assesses the effectiveness of mixed media technology in the classroom of intermediate-level Spanish courses. Technology has become an increasingly essential instrument in the classroom (Yeldham & Gruba, 2016). This study will investigate different types of technology used in a second language acquisition environment. These types of technology will include the use of pronunciation CDs and also the use recording technologies which are frequently used in classrooms. Participants in this study include 20-40 native English speaking students from the United States who are enrolled in multiple intermediate Spanish courses. These students will be given open ended questionnaires to assess the perceived effectiveness of the technology and their feelings and reactions to the types of technologies being used. We predict, with the help of previous research (Yeldham & Gruba, 2016), the most effective use of technology will be the use of the recording devices, and the students will have more positive reactions towards this type of technology. These findings are important because they will help instructors plan curriculum for the class, while utilizing technology to the fullest extent and obtaining positive results with the employed technology.

U.26 The Effects of Corrective Exercises on Improving Functional 5+ scores

Megan Kowalczyk
Mentor: Naoko Aminaka, Exercise and Sport Science

Functional screening tools can help to find areas where a person may need improvement to ensure they do not injure themselves in the future. If we are able to improve their movements with the corrective exercises, then it would be beneficial for all populations to complete these exercises. However, there is a general lack of evidence on the effects of corrective exercises on improving functional movement. The overall purpose of this study was to determine the effectiveness of corrective exercises on functional movement measured by a functional screening tool known as Functional 5+, along with other functional performance tasks. We recruited 38 physically active college students (13 males, 25 females, age= 19.84 years, height= 1.67 m, weight= 68.1 kg) by fliers to participate in our study. They came in for baseline testing of the Functional 5+ movements and an upper and lower extremity functional test. They then completed four weeks of either corrective exercise or static stretching exercises. After the four weeks, they will come in for a post-test of the functional tests. Currently data process is in progress, and we anticipate that the corrective exercises will improve the participant's functional scores, as compared to the static stretching exercises. We anticipate that the results of the study will make a positive impact to the healthcare professions and that this will be helpful in improving functional movement of patients.

U.27 A Comparative Study of Instructional Approaches and Their Effect on Motivation Levels

Paige Kudlik and Katti Crossman
Mentor: Claire Mitchell, Modern Languages

The present study investigates the effects of Content-Based Instruction (CBI) on intermediate level university Spanish students' motivation to participate in the classroom and continue in their future language studies. Approximately 44 undergraduate students studying intermediate Spanish at a mid-sized Midwestern University will participate in this study. The objective of this study is to qualitatively analyze motivation levels through the use of student journals, observations, and open response surveys. Based on prior research (Dupuy, 2000), it can be hypothesized that a CBI approach will positively influence students' motivation to learn the subject matter and linguistic themes. In addition, Corrales and Maloof (2011) state that instruction that uses content matter as its focus has the ability to make learning a foreign language more meaningful and interesting. It is predicted that the collected data will elicit responses which suggest that student interest and motivation levels are higher in a CBI classroom in comparison to a traditional grammar-based classroom.

U.28 Product Profit Optimization

Bria Lambert, Jack Meyers, Kelsey Frain, and Daniel Bonneville
Mentor: Song Chen, Mathematics and Statistics

Similar to many thriving businesses in the United States, Fastenal is continuously developing new, progressive strategies in order to save cost and maximize profit. Through the use of multiple large datasets and machine learning, our team has analyzed possible areas of profit growth based on Fastenal's continuing use of Special Pricing Agreements (SPAs). SPAs are an agreement that Fastenal has negotiated between their top customers and brand manufactures; it allows Fastenal to buy a product from the manufacturer at a discounted price and in return sell that product to a specific customer at a discounted price. Our goal is to analyze where there are additional opportunities to create SPAs with other customers in 2017 based on product sales and how those SPA possibilities will maximize Fastenal's profit.

U.29 The Effects of Self-Monitoring on Decreasing Off-Task Behavior

Mallory Lamers and Kelsey Vaassen
Mentor: Lema Kabashi, Educational Studies

This project employed an AB single subject research design to investigate the efficacy of Self-Monitoring strategy on decreasing off-task behaviors of a 4th grader with Attention Deficit/Hyperactivity Disorder (AD/HD). Initially, the project started with conducting a Functional Behavioral Assessment (FBA) by two undergraduate students in the Special Education Program who implemented the project. The FBA was comprised of defining the problem behavior, collecting indirect and direct data, analyzing the data, developing the hypothesis statement, and testing the hypothesis. Based on the FBA data the function of the student's off-task behavior was determined to be avoidance of work completion. The next step consisted of designing a Behavioral Intervention Plan (BIP) based on the FBA data. As a result, the self-monitoring strategy was identified as the appropriate strategy to address the student’s off-task behavior. The intervention was implemented by two undergraduates twice a week over a course of six weeks. The results show that the student displayed a dramatic decrease of the off-task behavior during the intervention compared to baseline.

U.30 Comparative Analysis of Violent Crime Events in Milwaukee and Chicago

Mitchel Larson and Jenna DeShaney
Mentor: Gargi Chaudhuri, Geography and Earth Science

The project aims to analyze the spatio-temporal pattern of violent crime and its relationship with socio-demographic structure of the neighborhood in big metropolitan cities. Changes in crime and its relationship with neighborhood demographics has received limited coverage in existing literature. Our objectives are: (i) to understand the spatio-temporal pattern of crime and compare between two metropolitan cities; (ii) to evaluate relationship between spatial pattern of violent crime and socio-economic characteristics in 2005 and 2015 in both the cities. The study will use robbery and aggravated assault from 2005 to 2015 for both the cities of Chicago and Milwaukee. To analyze the first objective, the study will test the spatial autocorrelation of crime by using local Moran’s I in both the cities at neighborhood level; and to address the second objective, the study will use Geographically Weighted Regression to understand the relationship between crime and socio-economic variables in a neighborhood. Understanding the relationship between crime events and socio-economic structure of a neighborhood will add insight to policy planning which aims at social and community level development in major urban areas.

U.31 Oxidative Stress, Antioxidant Response and Protein Oxidation in *Danio rerio* (Zebrafish)

Michael Loebertman and Carly Southwick
Mentor: Jennifer Klein, Biology

Aging is a complex process that remains poorly understood, although many studies have implied that oxidative stress and accumulation of reactive oxygen species are involved in this process. These reactive oxygen species are formed as part of the normal day-to-day functions of cells and are neutralized by antioxidants. In normal, healthy cells, antioxidants and reactive oxygen species are in a precarious balance; however, as we age it appears that some imbalance occurs causing oxidative stress, eventual pathology, and over time aging. It is these processes that we hope to study. Our research consists of exposing zebrafish to hydrogen peroxide, one of the reactive oxygen species formed in cells. Zebrafish are exposed for various amounts of time and then tested for antioxidant response. These tests employ various chemical techniques, which allow us to quantify the oxidative stress that the fish are under. These artificially stressed fish are compared to normally aged fish that exhibit normal, lifelong levels of oxidative stress. This first phase of

comparisons is designed to provide benchmarks for oxidative stress levels, which will be used in later experiments for additional analysis. The second phase consists of altering the zebrafish DNA to promote the creation of a protein normally found in cells, called calmodulin, but with the shape of the oxidized version. Our hope is to see the specific effects of oxidizing just this one protein to determine how it may contribute to pathogenesis and aging. Thus, we will use the tests from the first phase along with the benchmarks obtained to determine whether we were successful in replicating oxidative stress in our experimental, transgenic fish.

U.32 Effect of Real Time Feedback & Fatigue on Landing Kinematics and Kinetics
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Eric Machmueller, Valerie Adank, and Zarif Rahman
Mentors: Robert Ragan, Physics, and Thomas Kernozek, Health Professions

Landing is an integral component of many physical activities and sports. Altered landing mechanics due to fatigue may lead to injury. Landing feedback may contribute to altering the risk of injuries to the lower extremities with impact. Studies have shown that video feedback can be effective in altering landing mechanics in participants. Ground reaction force feedback has been less studied. Ten healthy, active, college-aged females with no recent injuries were tested. Fifteen digital cameras (180 Hz) recorded the participants' motion and impact forces using force platforms (1800 Hz). Participants performed baseline landings before any ground reaction force feedback was provided. Landing trials before training and then post fatigue were recorded. Fatigue was accomplished by repetitive jump squats. Kinematic and kinetic data were examined. Ground reaction force decreased, range of motion of knee and hip increased and anterior ligament shear decreased after training pre-fatigue. From pre-fatigue to post-fatigue, the ground reaction force and anterior ligament shear increased. The knee and hip range of motion, however, decreased. Ground reaction force feedback altered landing biomechanics; however, fatigue partially reversed these effects. We conclude that the feedback may help to decrease injury risk to the lower extremities in landing, but its effectiveness is lessened by fatigue.

U.33 "I think that's kind of your thesis, right?": Gendered Communication in Writing Center Consulting Sessions

Whitney Malin
Mentor: Darci Thoune, English

Having been a writing consultant at the University of Wisconsin-La Crosse (UW-L) for nearly two years, I have been exposed to a great deal of Writing Center theory and literature. Kathleen M. Hunzer's and Harry C. Denny's works, which focus on gender in the Writing Center (WC), have been especially interesting to me. Studies conducted at other institutions regarding gendered communication find certain feminine patterns to be common in WC practice: non-directive communication styles, socialization, nurturing, and the equalization of hierarchy. I am interested in seeing if and how these pedagogical tactics are also present in the tutoring dialogues at UWL. This study will include both qualitative and quantitative methods. I will first observe and transcribe tutoring sessions, noting language and phrases only voiced from the writing consultant to the client. From those transcriptions, hedging language, reinforcements, and tag questions will be coded and evaluated. I will also code comment card feedback to see how our consultants are being described by our clients immediately after a session. Finally, I will conduct interviews with at least 5 consultants to hear their perspectives on their tutoring communication styles and methods. To put it more simply, my aim is to see how we communicate with clients, how they view us, and how we tend to view ourselves in this role. I anticipate that we do use gendered language quite often. However, I am less certain whether our consultants are conscious of these "scripts" and how our clients view us as a result. My ultimate goal is to have a better understanding of the communication practices used in our WC and to evaluate their effectiveness. Efforts to uncover these existing patterns will be necessary in order to improve and strengthen the training of oncoming consultants in future semesters.

U.34 Machine Learning Techniques to Identify Higgs Boson Events from CERN Data

Elizabeth McMahon
Mentor: Chad Vidden, Mathematics and Statistics

The Higgs Boson, the theorized particle that gives all other particles mass, was discovered in the ATLAS experiments at CERN, Switzerland in July, 2012. The existence of the Higgs particle (the quantum excitation of the Higgs field) had been hypothesized since the 1960s, however, its large mass/high energy-125.09 GeV/C2-is correlated to an extremely short lifespan of 1.56 x10-22 s. Thus, identification of Higgs can only be made through observing the decay particles of high energy collisions, a difficult process. Scientists at CERN created a simulated data set that mimicked the results from the ATLAS experiments, and released this data to the public in the form of a Machine Learning Challenge using

the popular data science website Kaggle (kaggle.com). Machine learning methods such as decision trees, random forests, logistic regression, and K-fold cross validation were tested for their ability to accurately distinguish Higgs events from background data in the CERN dataset, with varying results.

U.35 The Effect of Food Deserts on Obesity Rates

Jeff Meckstroth
Mentor: Gargi Chaudhuri, Geography and Earth Science

Obesity, especially child obesity, is a major issue in the United States which affects millions of American citizens. Determining the correct factors that influence this major health issue is important to fight this ongoing battle with the disease. "Food Deserts" have become almost coterminous with areas of high obesity, being highly influenced by the quality of food people are consuming in their everyday diets. Thus this study aims to understand the relationship between food quality, socio-economic structure, and high obesity rates in urban areas of Denver and New York City. This study uses spatial data of urban amenities, and socio-economic data from American Community Survey to conduct spatial analysis by implementing a Geographically Weighted Regression. A spatial approach on this issue supports a different method to the topic compared to looking at statistics in a spreadsheet. By combining these statistics with spatial data allows for more precise analysis. The outcome of this project helps to explain factors defining food deserts and high obesity rates in major urban areas. This study will provide insight on accessibility to healthy food and its impact on the health and well-being of the citizens within these areas. Understanding such a phenomenon will hopefully give a better insight on what types of steps can be taken to counteract the obesity phenomenon.

U.36 Analysis of Different Hazelnut Oils

Ibraham Mounir
Mentor: Ressano De Souza-Machado, Chemistry and Biochemistry

A local hazelnut farmer gave us five different oil bottles purportedly being from different sources. Each one of those oils exhibited different colors and textures; one was even a solid at room temperature. According to him, he wanted us to perform different "tests", asking the basic question on "Why are the oils different?" This farmer brands his own hazelnut oil, which we are calling the baseline sample for our experiment. Thus far, we have run methanolysis reactions on oil samples. These reactions produce methyl esters that are typically known for being constituents of fragrances and perfumes. Because of their volatility, the methyl esters can be pushed through our gas chromatography-mass spectrometry (GC-MS) hoping to elucidate the composition of the oils. The results will be discussed in this study.

U.37 Electromagnetism in Spacetime from a Differential Form Approach

Tobias Nelson
Mentor: Roberto Salgado, Physics

Although the laws of electromagnetism were used to motivate Einstein's Theory of Relativity, the textbook treatment of electric and magnetic fields in different frames of reference is lacking physical intuition. To better understand the mathematical parts and physical picture of Maxwell's equations and their behavior according to different observers, we express electric and magnetic fields as tensors and differential forms in spacetime rather than their traditional representation as vector fields in 3D-space. Using differential forms at a fundamental level, we have a better understanding of the electric and magnetic field transformations in other frames of reference.

U.38 How Do Some Elder Champions Explain Their Experience with Optimal Aging?

Sarah Pease
Mentor: Robert Jecklin, Health Education and Health Professions

Demographers predict continued aging of the American population, and persons aged 85 years and older are the fastest growing population segment. Policymakers are concerned about the demand for health and social services that often accompanies advancing age. At the same time, policymakers would like to know more about the many elders who successfully limit their experience with illness or dependency. Unlike many researchers who assess representative population samples to discover what is important to health as people age, this researcher established relationships during in-depth interviews to answer this research question: How Do Some Elder Champions Explain Their Experience with Optimal Aging? In this research, elder champions were persons who lived beyond current life expectancy, resided in

their community, and described their health as good or better. During informal interviews, elders were asked to talk about a general topic; after the elder's comments the researcher probed about more specific areas in each topic. Elders were asked to discuss the following topics: health, activities of daily living, environmental influence, social influence, and personal practices. The researcher and elder collaborated on photographs to illustrate the elder champion, and the researcher made notes about anything that seemed important. A typist transcribed the recorded interviews. The researcher used open and closed coding to analyze transcripts, notes, and photos to identify how the elder explained their experience with optimal aging. The researcher used description, paraphrasing, direct quotes, and photos to interpret findings about how elder champions explain their experience with optimal aging. Aging adults as aspiring champions, those who help elders age healthfully, and those who do research may find encouragement in the perspectives in each elder's story.

U.39 Analysis of Transient Dynamics for Autocorrelated Population Dynamics

Jordan Pellett
Mentor: Eric Eager, Mathematics and Statistics

Population dynamics is the branch of life sciences that studies the size and age composition of populations as dynamical systems, and the biological and environmental processes driving them (such as birth and death rates, and by immigration and emigration. While long-term dynamics have been studied extensively, many of the questions pertaining to the transient dynamics of many ecological systems remain open. We studied how autocorrelation in environmental variables affect transient dynamics in plant-seed bank systems.

U.40 Development of a Diagnostic Assay for the Detection of Largemouth Bass Bunyavirus

Zachary Porior, Jake Deviley, and Cassandra Landstrom
Mentor: Michael Hoffman, Microbiology

The freshwater fish *Micropterus salmoides*, commonly known as largemouth bass, is native to the ecologically diverse Mississippi River. In a 2009 routine fish survey, Fish and Wildlife Service - La Crosse Fish Health Center in Onalaska discovered a novel virus in *Micropterus salmoides* from the Mississippi River near Prairie du Chien. When the La Crosse Fish Health Center was unable to identify the virus, it was sent to the University of Wisconsin La-Crosse Virology Lab for further study under the direction of Dr. Hoffman. Electron microscopy and genomic analysis revealed the virus to be a member of the Bunyaviridae family of viruses. Our project focused on the development of a diagnostic RT-PCR assay in order to detect the presence of Largemouth Bass Bunyavirus during routine fish surveys. Various primer pairs were tested with total RNA extracts from infected and uninfected fish cells. Our efforts to develop a diagnostic assay were successful, and we are currently in the process of finalizing the assay before submitting to the La Crosse Fish Health Center.

U.41 Habitat Mapping in the Belize Barrier Reef Using Sonar

Karl Radke
Mentor: Colin Belby, Geography and Earth Science

Few ecosystems in the world are as diverse and biologically unique as coral reefs. Many reef ecosystems are threatened by climate change and human impacts, putting organisms within them at risk. An understanding of how environmental factors affect genetic diversity within reefs will assist in their management in light of these threats. Initial research indicates changes in bed type in Belize’s South Water Caye Marine Reserve may prevent ostracod populations from genetically mixing, which may cause the evolution of unique species. It is hypothesized that genetic flow between ostracod populations in the Marine Reserve is restricted in areas lacking sufficiently dense sea grass for them to travel through safely. During January 2017, side scan sonar data was collected to map sea grass, coral, and sand bed cover in the Marine Reserve. A GoPro camera was mounted immediately above the side scan sonar transducer to capture geotagged photos of the seafloor. The GoPro photos and a high resolution satellite image were used to aid in the interpretation of the sonar data. The sonar data shows transitions between sea grass, coral, and sand bottom, enabling accurate mapping of habitats within the study site. In addition to using this data to better understand ostracod distribution, this method could be applied to the mapping of habitats in other aquatic systems.

U.42 Health Insurance Plan Education and Its Effect on Plan Choices

Joe Rogers

Mentor: Mary Hamman, Economics

Health insurance plan transparency is becoming a more and more relevant issue among health insurance providers, doctors, employers, and government officials across the nation. Consumers who do not understand the health plan options that are provided are more likely to choose a plan that is not financially optimal. Due to the reformation in the healthcare industry that may soon take place, understanding how insurance plans operate is essential. Prior research suggests many individuals are mistaken on which plan is most financially effective for them. One common explanation of this mistake is the lack of knowledge of health insurance plans. In order to further understand this explanation, this project will examine health care choices in an experimental setting, with an educational intervention. If health plan literacy is a barrier to effective choice and the intervention designed in my project alleviates knowledge deficiencies, consumer knowledge of health care may be improved. This knowledge can identify changes that can be made by insurance providers, employers, or even the government in educating citizens.

U.43 Cultural Changes in the Protohistoric Period: An Oneota Case Study

Jaelyn Roland
Mentor: Constance Arzigian, Archaeology and Anthropology

George Milner points out in his 2015 work, Population Decline and Culture Change in the American Midcontinent: Bridging the Prehistoric and Historic Divide, that reactions and changes by Native Americans during the protohistoric period are highly localized and each tribe is affected differently. The La Crosse locality was inhabited by the Oneota until c. 1625 when the area was abandoned for the Riceford Creek locality (in southeastern Minnesota). This study looks at how the Oneota are affected by European presence on the North American contact, even before direct contact was made. We see evidence of stress in a change in settlement patterns between La Crosse and Riceford to more protected areas, more utilitarian ceramic vessels, the abandonment of key resources (e.g. wild rice, large Mississippian fish, large river mussels, etc.), and an increase in catlinite pipes. Overall, during the protohistoric period we see the Oneota shifting to a more protective and secluded stance.

U.44 Tennessee Williams' Muse in Mexico

Kaitlin Seebruch
Mentor: Victor Macías-González, History

Tennessee Williams (1911-1983) was an accomplished playwright who was open about his own homosexuality and, although he included references to it in his works, often sublimating, he did not hold back on details in his published memoirs. He was a confident gay man and was not afraid of experiencing life's pleasures. Although Tennessee Williams at one point proposed to his long term adolescent girlfriend, who rejected him, he eventually came out in the early summer of 1940 and spent his days living on the beach with his first official boyfriend. After his relationship ended, he traveled to Mexico, which was a transformative experience as he subsequently met his first long-term boyfriend, the Mexican-American Francisco "Pancho" Rodríguez. Through his travels to Mexico and New Mexico, and his relationship with Rodríguez, Williams developed a series of short stories and characters that featured Hispanic themes. This project will analyze these works on Mexican themes, as well as Williams' extensive autobiographical writing and correspondence (including unpublished items), and the secondary works on Tennessee William. I posit that Mexico and Hispanic culture became a place of refuge, of inspiration, and of creativity for the playwright.

U.45 Learning with Desmos: Using Marble Slides to Develop Conceptual Understanding of Exponential Functions

Trenten Smith
Mentor: Matthew Chedister, Mathematics and Statistics

Finding ways to motivate the learning of struggling students can be a challenge. In our research, we examined the effectiveness of different strategies to work with students in a class called Algebra 2-4. This class was designed to give students an alternative path to the third credit they needed to graduate at a local high school as well as develop the students' conceptual understanding of key mathematical concepts rather than only have them memorize and practice procedures. Specifically, for this part of the research we examined students' use of online application called Desmos to learn about exponential functions. Students were asked to complete challenges called "Marble Slides" in which they were asked to use exponential functions to build ramps which would guide the marbles into hitting a certain number of slides. Successful building of the ramps was intended to develop and test students 'ability to shift and stretch

exponential functions. The question we considered was did the use of "Marble Slides" positively impact students' understanding of exponential functions and their results on a summative of assessment.

U.46 Investigating Increased IGFR1 levels in CHK1 Inhibitor Resistant Breast Cancer Cell Lines with the BCRA1 Mutation

Ryan Sokup and Alexander Reyes
Mentor: Sierra Colavito, Biology

Breast cancer is currently the second most lethal form of cancer in women and those women who have mutations the BRCA1 genes are very likely to get breast cancer at some point during their lifetime. Current treatment options have explored CHK1 inhibitors as a potential single agent treatment. However, tumor resistance to these drugs has become an increasing problem clinically. UWL graduate student Kristin Short investigated the cellular mechanisms of how these tumor cells could go from being vulnerable to CHK1 inhibition to gaining resistance to CHK1 inhibitors. Two different BRCA1 deficient cell lines were made to be resistant to CHK1 inhibition and the signaling pathways were studied. In phoso-receptor tyrosine kinase and phosphor-kinase arrays, insulin-like growth factor receptor 1 (IGFR1) had a much higher expression in the CHK1 inhibitor resistant cells lines as compared to the cell lines without CHK1 inhibitor resistance. IGFR1 is a tyrosine kinase receptor and has been previously thought to play a role in cancer due to its signaling role in the cell proliferation pathway. The purpose of this study was to quantify the overexpression of IGFR1 in CHK1 inhibitor resistant breast cancer cells and determine if the overexpression of IGFR1 leads to increased downstream effects in its signaling pathway. If the cell proliferation pathway remains activated, this means the breast cancer tumor will continue to grow with resistance to CHK1 inhibitor drugs. This will give insight into whether IGFR1 overexpression is a potential mechanism of resistance to CHK1 inhibition.

U.47 The Effects of a Ketogenic Diet on Body Composition in Resistance Training Females

Marissa Stehly
Mentor: Karen Skemp, Health Education and Health Professions

A very low carbohydrate and high fat ketogenic diets are often targeted towards a general population with the assumption of fat loss. Little is known about the impact of this type of dietary pattern on resistance trained athletes, particularly female fitness competitors. With the deficit of carbohydrates, our body's main fuel, glucose, no longer can be used as the body's main supply. When more fat is consumed in the diet, it can be broken down and metabolized to be used as a new form of energy. A sample of 20 to 40 women that use weight resistance exercises at least 3 times a week will be given a macronutrient ratio of 10% CHO, 20% PRO, and 70% Fat to produce the ketogenic effect. The control group will follow the traditional western diet. Both groups will comply with their appropriate diet for a duration of 4 weeks. All participants will have a body pod analysis before and after the trial for observation of fat to lean muscle mass ratio. During the duration of the trial, the participants will record a food log and resistance workouts each week. A ketogenic diet will produce a favorable impact on body composition for resistance trainers by producing high fat loss and maintenance of muscle.

U.48 Study of Energy and Angle Correlations of Fission Products at Oak Ridge National Laboratory

Eli Temanson
Co-author: William Peters
Mentor: Shelly Lesher, Physics

Despite the discovery of fission nearly 80 years ago and its importance to nuclear energy, national security, and astrophysics; there are very few measurements that correlate multiple fission products. A proof-of-principle experiment is underway at Oak Ridge National Laboratory in Tennessee to measure the energy and angle correlation between prompt fission neutrons, gamma rays, and fragments in time-coincidence. The angular and energy spectrum of the prompt neutrons and/or gamma rays with respect to fragment mass, could reveal new details concerning the energy balance between these products and will be vital for benchmarking advanced fission models. An array of neutron and gamma-ray detectors opposes dual time-of-flight detectors and a total-energy detector to determine one fragment mass. Preliminary results from a spontaneous 252Cf source will be presented, along with plans for future improvements.

U.49 Localization of Platelets in Tissue Samples from the 13-Lined Ground Squirrel Using Immunohistochemistry

Tanner Tenpas, Azure Kremer, Mickaela Larkin, Christina Czajkowski, Zach Mancl
Mentor: Scott Cooper, Biology

During hibernation, circulating platelet levels in the 13-lined ground squirrel drop by 90%, but return to normal levels within two hours of waking up. This was attributed to the ground squirrels sequestering platelets somewhere within their body. Immunohistochemistry was used to stain tissue samples from various organs to localize the sequestered platelets. Tissue samples were incubated in GP1Ba primary antibody. Tissue samples were collected from the heart, lungs and liver of the ground squirrel. The liver was observed to have platelets sequestered in extrasinusoidal regions during hibernation. Alternately, staining was minimal in the liver during non-hibernating periods. With decreased platelet levels in the circulating blood, the potential for strokes or cardiac ischemia is also decreased. Understanding how the liver of the ground squirrel is able to sequester platelets during periods of reduced activity has major medical implications.

U.51 Neanderthal Ornamentation: Neanderthal Art and Early Modern Human Contact

Piper Howe
Mentor: Katherine Grillo, Archaeology and Anthropology

Much of the research on *Homo neanderthalensis* focuses on the species' mental capacity to accomplish one task or another, and differentiate them from early modern humans. Displays of 'modern human behavior' and symbolic behavior, such as Paleolithic cave paintings, are used to separate early *Homo sapiens* from their cousins. Neanderthals may not have painted on cave walls, but used other forms of artwork in their past cultures. This work focuses primarily on those other artistic platforms, specifically in ornamentation. In this work I'll be considering that Neanderthals had the mental capabilities to create forms of adornment and symbolic behaviors that mimic what anatomically modern humans generate. An overview of preceding Neanderthal research is presented, along with multi-disciplinary examinations and definitions of art and symbolic behavior. It is then followed by the personal research done for this paper. By reexamining previous Neanderthal site reports from the Mediterranean coastline of both Southern Europe and Southwest Asia, I've created a database of known Neanderthal ornament types. This database, a chronological scale, and reports of early modern humans in this area will be compared. The comparison and extensive discussion will be used to evaluate several interpretations including: whether or not Neanderthals developed culture specific ornamentation, possible symbolic meanings behind certain ornaments, and if ornamentation and adornment was influenced by contact with early modern humans and the implications of that, as well as options for further and future research.

U.107 Structure of Initial Period Livestock Herds at the Bronze Age site of Pecica Şanţul Mare, Romania

Gemma Zahradka
Mentor: Amy Nicodemus, Archaeology and Anthropology

The Bronze Age in Europe was a period of emerging complexity, typified by rapid social change and the interaction of multiple distinct cultures. One of these, known as the Maros Culture, occupied the Eastern Carpathian Basin. The site of Pecica Şanţul Mare is a Maros Culture settlement located in Romania, which underwent particularly rapid and significant social changes through its occupation between 2000 and 1500 BCE. At its peak, the settlement became a powerful regional trading center that specialized in metallurgy and horse breeding. This study analyzed faunal remains from Pecica dating to Phase 7, which is the earliest phase of Bronze Age occupation at the site. Significant differences were found in the way that livestock was managed during early and later periods. These differences include a higher proportion of pigs and a lower proportion of horses than are found later when the site was at its peak. Understanding how the use of animals changed overtime will make it possible to better understand the changes that took place at Pecica and the way that social complexity increased over time.

U.108 The Effect of Naloxone Access Laws on Opioid Related Overdoses

Drew Keeley
Mentor: Mary Hamman, Economics

As a result of an increase in opioid related overdoses and deaths in recent years, many states have enacted some version of a Naloxone Access Law (NAL). NALs allow emergency responders and lay persons to administer Naloxone, which

revives the victim and temporarily counteracts the effects of an opioid overdose. The purpose of this project is to discover if the enactment of NALs in the state of Wisconsin has had a negative effect on opioid abuse, resulting in higher recorded hospitalizations and deaths cause by opioid related overdoses. The method used to complete this project will be reviewing and analyzing the Wisconsin Hospital Association's medical data on opioid overdoses in Wisconsin from both before and after Wisconsin passed its NALs. Through this data, it is expected to see a higher overall frequency of opioid related overdoses after the NALs were passed. Preliminary findings are consistent with this hypothesis. The implications of this project could show that NALs in Wisconsin are having a negative overall effect on opioid users through a higher frequency of overdoses after the drug became more accessible. This research could be significant as previous studies focus only on fatal overdoses, whereas this research will help shed light on NALs effect on nonfatal overdoses.

Poster Session B
The Bluffs: 11:00 am-12:45 pm

U.50 Influence of Injury on Asymmetry in Dynamic Postural Control in Collegiate Cross Country Runners

Kemmesha Thomas and Nate Vannatta
Mentor: Thomas Kernozek, Health Professions

Background: A high amount of injuries have been related to distance running. Hypothesis/Purpose: To examine dynamic postural control asymmetry in cross country runners with and without a history of injury. Methods: Thirteen runners were examined, six with a history of injury and seven without. Each jumped over 12 inch obstacle for both anterior and lateral directions onto force platform sampled at 1200Hz. The participant's goal was to stabilize their bodies as quickly as possible. They were allowed the use of their arms to propel themselves and for stabilization and once stabilized they would put their hands on their hips. Preceding the test each subject was allowed practiced as many jumps to become familiar with the exercise. The Dynamic Postural Stability Index (DPSI) was used to measure the variability of force following the jump landing by calculating a composite modified root mean square using each GRF component. Results: Multivariate analyses were performed on anterior/ posterior, medial/ lateral vertical and total dynamic postural stability indices. There was a leg by injury interaction (<.05) for forward and lateral barrier jumps. Greater asymmetry in postural stability indices were shown for the runners with a history of injury. Conclusion: Clinicians may need to address asymmetry in dynamic postural control through functional tasks during the rehabilitation of running injury.

U.52 Comparative Analysis of Subsistence Patterns in Lipid Residues from Tremaine and Correctionville Ceramics Using Gas Chromatography and Mass Spectrometry

Emily Abramowicz
Co-authors: Ressano Desouza-Machado, Constance Arzigian, and David A. Anderson
Mentor: Ressano Desouza-Machado, Chemistry and Biochemistry

Through excavation, archaeologists unearthed a collection of pottery sherds from two Oneota culture sites- Tremaine located in La Crosse, Wisconsin and Correctionville located in Little Sioux Valley, Iowa. Specifically, the ceramic collection from both sites offer a unique comparative study to suggest the adaptation of two different Oneota groups to their local environment. Lipid residues from unglazed pottery sherds from both sites will be extracted, transesterified to the methyl esters and analyzed using Gas Chromatography - Mass Spectrometry (GCMS). The residues may provide evidence of the types of food cooked or stored. The results from this methodology in combination with the faunal assemblages from both sites indicate the subsistence patterns and local diets of the Oneota.

U.53 Zebrafish Larvae Feeding Regimen Strongly Influences Survival

Katherine Barreau
Co-authors: Susanna Driscoll and Jennifer Klein
Mentor: Jennifer Klein, Biology

Zebrafish (*Danio rerio*) are a model organism for biological research. They reproduce frequently, reach sexual maturity relatively quickly, develop outside of the female, and can be easily mutated. When working with zebrafish that have been genetically altered for research purposes, survival of young is crucial. Cleanliness, temperature, and nutrition are vital variables in preventing larvae death. The feeding regiments for zebrafish used in laboratories have not yet been standardized, resulting in variability in studies and high rates of larvae death. This study tested two different feeding patterns to determine which resulted in higher survival rates among larvae. The results showed that feeding the zebrafish larvae four times daily drastically reduced fatality rates by approximately two-thirds as compared to groups that were fed twice daily, beginning at five days post-fertilization. This is promising for the future standardization of zebrafish care and for reduced mortality rates among larvae, increasing the number available for influential research.

U.54 Analysis of Fastenal Quoting Practices to Optimize Quoting Outcom

Kadin Browne, Derek Klein, Caleb Griesbach, and Jackson Schuette
Mentors: Chad Vidden and Song Chen, Mathematics and Statistics

Using quoting information collected by a local company from just over a week, we were asked to determine the drivers that corresponded to successful and failed quotes made by the company. From these we were to make guidelines they could use to increase the number of invoiced quotes (successes) and therefore profitability. The dataset was almost 2 million quotes and included many factors. There was also a necessity to link quotes with customer, product, and branch datasets. Using a consolidated and condensed table we acted to produce a price guidance and quoting strategy for sales quotes. We utilized logistic regression, simulation, and other analyses through the R programming language to find key drivers. Through these we formulated a quoting strategy for the company that will supersede their current quote to invoice success rate of 67%. Using our guide we hope they can utilize it quickly, on site, to increase profitability.

U.55 Hormonal and Psychological Responses to High-Intensity Exercise in Recreational Runners

Madelyn Byra
Mentor: Matthew Andre, Exercise and Sport Science

The relationship between hormonal responses to high-intensity exercise and perceived mental toughness is not well understood. Previous research examining testosterone and cortisol responses in athletes related to psychological measures has examined variables such as pre-competition anxiety, anxiety and coping, perceived stress, and self-efficacy. Minimal research has been conducted examining the relationship perceived mental toughness and hormonal responses to exercise. Determining the relationship between these variables may help us to understand the role that perceived mental toughness plays in sport performance and how the body responds when a person has low or high perceived mental toughness. Therefore, the purpose of this study is to examine testosterone and cortisol responses to a maximal-effort treadmill run at 90% of maximal oxygen uptake, and to relate those responses to perceived mental toughness. Saliva will be collected before and after the treadmill run to be later analyzed for testosterone and cortisol. Before the treadmill run, participants will be asked to rank the pain or discomfort they expect to experience during the exercise test on a scale from 0-10. Participants will then be asked to complete a questionnaire before and after the treadmill run to measure mental toughness. Finally, participants will be asked to give their session-RPE, which is a subjective rating of how hard the exercise session was for them. Pearson correlation coefficients will be calculated to determine relationships between the different variables. Paired-sample t-tests will be used to determine pre-post changes in salivary hormones and MTS. Independent t-tests will be used to determine differences in MTS, salivary hormones, and expected pain between those who have reported higher and lower session RPE. Statistical-significance will be determined a priori ($\alpha = .05$).

U.56 Inventory Optimization

Calvin Corey
Co-authors: Kaisa Crawford-Taylor, Wanquin Huang, and Edward Neville
Mentor: Song Chen, Mathematics and Statistics

Fastenal spans North America with over 2,600 locations, making them the largest fastener in the country. However, being so expansive has led the company to face inventory problems. Our group is working towards optimizing Fastenal's existing inventory. We will redistribute the inventory between Fastenal's hubs after analyzing past product consumption and stocking tables. By creating time series and GLM models using R, Excel, and mySQL, we can predict the retail locations where they will sell best and relocate those items to the nearest warehouse. While this sounds ideal, we must also factor in cost of shipping, this constraint is further complicated due to the lack of store locations in our data. Because of this, we have narrowed our scope to redistributing items between branches that are stocked by the same hubs. Currently we are focusing on forecasting the future consumption of items sold by the 9 branches of the smallest of Fastenal's hubs.

U.57 Colonization in Ancient Turkey: Defining Identity during Hittite Occupation at Late Bronze Age Sites in Southern Anatolia

Teahlyn Crow
Mentors: Mark Chavalas, History, and Amy Nicodemus, Archaeology and Anthropology

Best known for its military accomplishments, the Hittite Empire was consistently expanding and asserting political dominance in central Anatolia (what is now located in modern Turkey) from 1400 to 1200 BCE. Although imperialism and colonization have always been deeply rooted in the study of the ancient Near East and Anatolia, the impact of colonization on local identity is still underdeveloped in Hittite Archaeology. This research will focus on ways in which to assess the impact of colonization on the identity of local peoples through analyzing ceramic typography and the

distribution of administrative materials at Late Bronze Age sites which have exhibited evidence for past Hittite occupation. The distinction between materials found in domestic environments as opposed to public domains will prove especially crucial in determining how identity was being formed and maintained in the face of public displays of foreign political power.

U.58 Medical Adherence among Asthma Patients When Insurance Plans Change

Kimberly Drangeid
Mentor: Mary Hamman, Economics

Healthcare costs in the U.S are the highest among countries and are continuing to increase. Contributing to these costs is medical adherence, a measure of if a patient is taking their medications or following doctors' orders correctly. Medical non-adherence represents 3-10% of all U.S healthcare costs (Iuga & McGuire, 2014). Chronically ill patients have a higher non-adherence rate of around 50% (Chisholm-Burns & Spivey, 2003). Chronic patients with asthma especially have a high medical non-adherence rate of between 30-70% and consist of eight percent of the U.S population. Being such a large proportion of the U.S, changes in healthcare policies concerning asthma patients have a great effect on many Americans. In 2010 the Affordable Care Act (ACA) led to major restructuring in the health insurance market; new requirements led customers to look elsewhere in the market for better prices resulting in insurance plan switches, called churning. From 2015 to 2016, two-thirds of the 12.7 million people with insurance through Healthcare.gov changed their health insurance plan from the previous year (Avalere Health, 2016). Now, in 2016, a new president has been elected that threatens the ACA of being repealed or replaced in the coming years. Many evolving proposals for replacement feature consumer choice as a key factor which implies plan switching may continue or increase. It is important to examine the effects churning would have. One group of researchers found that stronger patient-provider relationships in HIV patients were associated with higher medical adherence (Schneider et. al, 2004). When patient-provider relationships are disrupted because of churning, medical adherence is likely to decrease. With asthma patients consisting so much of our population, it is especially important to examine how churning can affect their medical adherence. This study will investigate if changing insurance plans negatively affects medical adherence for asthma patients.

U.59 The Effects of Ageism Stereotypes on Older Adults' Speed of Processing

Erica Duerst and Elizabeth Garfoot
Mentor: Ellen Rozek, Psychology

Stereotypes are a normal and prevalent part of society. This includes negative stereotypes of older adults (e.g. older adults as slow, or incompetent). These stereotypes can have negative effects on the targets of the stereotyping. Previous research has found that when participants are primed with examples of negative ageism stereotypes that they perform worse on specific tasks, such as walking at a slower pace (Levy, 2003; Bargh, Chen, & Burrows, 1996). In the current study, we examined the effects of ageism stereotypes of speed of processing in older adults (65+). Participants (N = 29) were either primed using word lists that contained negative ageism stereotypes (e.g. Alzheimer's, dying), positive ageism stereotypes (e.g. wisdom, guidance) or neutral words. Participants were asked to complete two speed of processing tasks: the Stroop Test and the Trails Test. Based on the previous stereotyping research, we predict that older adults who are primed with negative ageism stereotypes will perform slower than the participants primed with positive ageism stereotypes on the speed tasks. We will also test for differences in the number of words that participants of each group recalled. In addition to performing cognitive tests, participants were given a loneliness survey to complete to avoid a possible confound. Older adults with high levels of loneliness may have slower processing speeds at baseline prior to the priming (O'Luanaigh, O'Connell, Chin, Hamilton, Coen, Walsh, Lawlor, 2012). Understanding how older adults react to stereotypes can influence future research in how cognition progresses over the aging process.

U.60 Isolation of Organisms from Invasive Aquatic Slug Gut Microbiome

Amy Enright
Co-author: Emily Green
Mentor: Bonnie Bratina, Microbiology

The invasive aquatic slug species *Arion fasciatus* was found to contain gut microbes with unique morphologies. Previous research resulted in the isolation of over 70 aerobic microbes from this species' gut, but none proved to have the unique morphological characteristics that had been observed. The goal of our research is to instead isolate microaerophiles and anaerobes, including mucin degraders, from the gut of *A. fasciatus* with hopes of identifying

microbes with these unique morphologies. To do so, *A. fasciatus* slugs were collected from a local freshwater stream and dissected to remove the gut. The slug gut contents were plated onto mucin-containing media and onto Brain Heart Infusion Agar (BHIA) and incubated either microaerobically (6% oxygen concentration) or anaerobically. Several microaerophiles and anaerobes have been isolated using this procedure. The isolated organisms will be characterized and identified by 16S rRNA sequencing. These findings will serve to increase understanding of the gut microflora in this slug species and can be used for future gut-microbe interaction studies.

U.61 A Study of 3D Photogrammetry in Archaeology: Oneota Ceramics

WIlliam Feltz
Mentor: David A. Anderson, Archaeology and Anthropology

3D photogrammetry is the process of creating a manipulable 3D model using only photos from a high-resolution camera that are then processed through computer software to extract 3D data and create a wireframe and mesh. With the right technology and program access, this process can be as accurate as being able to measure a hairline fracture along the surface of prehistoric pottery with .01mm accuracy. To further analyze the benefits of such methods, a study was conducted using ceramic artifacts of the La Crosse locality that have been curated at the Mississippi Valley Archaeology Center, with the data compiled into a virtual database. Oneota is the name assigned to prehistoric Native American sites within Wisconsin, Iowa, Illinois, and Minnesota that date to approximately A.D. 1150- early 1600s. These sites share many characteristics of, in particular their ceramics. Using typology, archaeologists have recognized differences in Oneota culture. One such regional settlement is known as the La Crosse locality and includes sites in western Wisconsin. Distinctive characteristics of Oneota ceramics are the motifs created by trailing along the surface of the still moist clay, a subtractive process that alters the morphological properties of the vessel without jeopardizing its function. The pot shape and contours can be recorded by taking photographs at multiple angles to be processed on a computer to create a digital replica that can be studied by anyone with internet access, data no longer restricted to a site whose physical artifacts are exclusively stored within the curation facility. With proper technologies, these replicas can be further analyzed to extract multiple cross-sections from different areas of a pot to reconstruct the complete vessel's original form. 3D models can also be printed to be used as aids for teaching and studying different methods of analysis, such as typology.

U.62 The Effects of Positive Learning Environments on Perceived Success in Foreign Language Learning

Emma Fischer and Melissa Holen
Mentor: Claire Mitchell, Modern Languages

This mixed methods study focuses on positive learning environments and how they affect the perceived success of students learning a foreign language (FL). Research has shown that emotions influence classroom performance. For example, Shan, Li, Shi, Wang, and Cai (2014) found that student-teacher interaction, achievement sharing, and a positive classroom environment impact learning performance. The present study examines how a positive social environment can affect perceived success in FL acquisition. The goal of this study is to examine if students learning a FL believe a positive learning environment influences their success. The study will use anonymous online surveys sent out to native English speaking undergraduate students of a mid-sized Midwestern university currently enrolled in introductory and intermediate level FL courses. The survey will consist of 25 Likert-scale questions and five free response questions. Based on previous research (Shan et al., 2014), it is expected that FL learners attribute experiencing a positive learning environment to their perceived success, but the data collected in the study will explore to what degree this claim is true. This study will consider what characteristics of a positive learning environment FL learners find valuable in their perceived FL acquisition.

U.63 First Generation College Students: Intergenerational Relationships and Differences in Definitions of Success

Sonia Garcia
Mentor: Kate Lavelle, Communication Studies

First generation college (FGC) students, a hidden population on all campuses, have lower graduation rates and higher drop-out rates than their non-first generation college student counterparts (Pell Institute, 2011). FGC students face unique challenges. Many of them are from underrepresented populations, low-income households, and have difficulty acclimating to college (Pascarella, Pierson, Wolniak & Terenzini, 2004). These students are going through an experience their parents/guardians are unable to relate to. Therefore, the goal of this research project was to better

understand the communication patterns in the parent-child relationships of FGC students from underrepresented populations at a predominately white university. Furthermore, this project explored differences and similarities in the ideas of "success" by analyzing communicative tensions between the parent/guardian and FGC student.

U.64 Interactions between Model Peptide Antibiotics and Lipid Vesicles Depend on Peptide Charge Distribution and Structure

Jack Geiger and Jake Faultersack
Co-author: Adrienne Loh
Mentor: Adrienne Loh, Chemistry and Biochemistry

Due to the increased development of antibiotic resistance and decrease of their effectiveness, there is an immediate need for new antimicrobials. A possible, yet promising solution is in the form of charged, helical, peptide-based molecules, which can function as antibiotics by interacting and disturbing bacterial membranes. We are exploring these interactions using model peptides composed primarily of the hydrophobic, branched amino acid Aib (α-aminoisobutyric acid), and large unilamellar vesicles (LUVs) composed of DMPG and DMPC to model bacterial (negatively charged) and human (neutral) cell membranes, respectively. Aib naturally occurs in antibiotics made by some bacteria and peptides of Aib adopt helical structures. Our experiments used two model peptides in which two positively charged lysine residues were located in either adjacent positions in the helix (KK45), or a helical turn apart (KK36). Interactions between the LUVs and the model peptides are investigated using Isothermal Titration Calorimetry (ITC), which measures enthalpy changes, entropy changes, and binding constants. Our preliminary results indicate both KK45 and KK36 bind in a multi-stage interaction to the DMPG vesicles, with one step that is entropically driven (possibly representing burying of hydrophobic surfaces), and another that is enthalpically driven (possibly representing charge interaction with lipid headgroups). Both driving forces are stronger for KK45 binding, but the overall dissociation constant is more complicated. Neither peptide shows appreciable binding to DMPC. We are currently investigating the binding of vesicles composed of DMPC and DMPG mixtures, to provide a more physically relevant representation of a heterogeneously composed cell membrane.

U.65 Nautical Archaeology in The Great Lakes: An Analysis of Minimally Intrusive Methods in the Archaeological Investigation of Great Lakes Shipwrecks

Eric Harmsen
Mentors: Timothy McAndrews and David A. Anderson, Archaeology and Anthropology

Nautical archaeology is a sub-field of archaeology which specializes in the investigation of shipwrecks and other submerged sites. Shortly after the introduction of this new field it was applied in the Great Lakes, where the cold fresh water contains thousands of well-preserved shipwrecks. However, there exists a very unique situation in the region. In the Great Lakes there is a strong cultural and emotional connection to the shipwrecks themselves and not just the archaeological data they can provide. Early archaeological projects in the Great Lakes left many wrecks striped, excavated, and in some cases destroyed. This lead to some backlash from the historical preservation and recreational diver communities, creating a rift that still exists today where formal archaeology is rarely done on shipwrecks in the Great Lakes. However, as the field of nautical archaeology has evolved so has its methods. Various methods currently used on projects around the world, including in the Great Lakes, do not require traditional excavation. Through the application of these minimally intrusive methods we can now conduct archaeological investigations and gather data to answer research questions from Great Lakes shipwrecks without excavating or seriously damaging the wrecks themselves. This allows for both the historical preservation and the in-depth investigation of these culturally significant sites. This project seeks to examine, compare, and contrast the methods used in the archaeological interpretation of three different shipwreck sites in the Great Lakes and the results those methods produced. The three shipwreck sites examined are: the 'Thomas Hume' in southern Lake Michigan, the "Big Bay Sloop" on the Wisconsin coast of Lake Superior, and the 'Defiance' off the Michigan coast of Lake Huron. The end result of this project is a recommended approach for individuals and organizations involved in the study of Great Lakes shipwrecks.

U.66 Trimethylamine N-Oxide Makes Microtubules Flexible

Adrienne Hester
Co-authors: Corina Valencia and Tegan Marianchuk
Mentor: Taviare Hawkins, Physics

The natural osmolyte, trimethylamine N-oxide (TMAO), stimulates polymerization and counteracts destabilization of tubulin dimers in microtubules. The persistence length of taxol-stabilized microtubules was measured while varying concentrations of TMAO. Taxol diluted in Dimethyl Sulfoxide (DMSO) is a common stabilizer shown to decrease the persistence length of microtubules. In conjunction with Taxol, it promotes the stability of microtubules. Fluorescence microscopy and thin-chambered ($<3\mu m$) in vitro assays were employed to capture images of freely fluctuating microtubules. The images taken were analyzed using Fourier decomposition written in MATLAB. Bootstrapping statistics was then employed to improve the accuracy of the measured persistence length. Here, we present the results of our study of taxol-stabilized microtubules in the presence of TMAO.

U.67 Sexual Assault Prevention Curriculum

Anna Kass
Mentor: Terry Lilley, Women's, Gender, and Sexuality Studies

Despite immense research regarding the high-rates of sexual assault in America, little has been done to carry out prevention initiatives in schools that target multiple curricular and ecological levels. Currently, majority of prevention plans offer one-time programs that focus on reducing risk factors for potential victims. Furthermore, most programs fail to address multiple of the levels of influence on sexual violence, which include individual, relational, community, and societal levels. This project is different, as it consists of a sexual assault prevention school curriculum that addresses multiple ecological levels while focusing on primary prevention instead of risk reduction. The development of the program was guided by a review on the literature regarding sexual violence, prevention programing, and school interventions, which exemplify the need for a comprehensive prevention program to be implemented in schools nationwide. The curriculum is designed for health classes at the elementary, middle, and high school levels over a total of 15 days. It is an inclusive approach based on the National Sexuality Education Standards with the primary goal being to prevent sexual assault by causing attitudinal change. The assumption is that by addressing sexual assault earlier on and more comprehensively, it may lessen societal attitudes that support rape culture. Additionally, it cultivates the development of student attitudes regarding what sexual assault is and how it can be prevented. All lessons in the curriculum use interactive, evidence-based-practices to increase retention while providing opportunities for students to apply their new knowledge through sexual assault prevention activism in the school and community, which would signify behavioral change. Until this project is implemented and evaluated, one cannot predict any attitudinal or behavioral change from this prevention curriculum program.

U.68 Testing for Cs-137 in Soil Samples Using Gamma-Ray Spectroscopy

David Kendhammer
Co-authors: Shelly Lesher and Carter Hughes
Mentor: Shelly Lesher, Physics

High Purity Germanium (HPGe) detectors at the University of Wisconsin-La Crosse are used to determine the amount of Cs-137 in soil samples through gamma-ray spectroscopy. The goal of this project is to calibrate the detectors so they are able to efficiently detect Cs-137 in unknown samples. The detectors were calibrated using a combination of Cs-137 and Co-60 and a low variance gamma source. The Cs-137 and Co-60 were used to calibrate the energies of the detectors while the low variance gamma source was used determine the efficiencies. Preliminary doped and un-doped known soil samples provided initial results of the calibrations and will be discussed.

U.69 Sedimentary Analysis of a Lake Sediment Core Collected from Mud Lake, Southeast Wisconsin

Leah Krbecek, Rebecca Horn, Michael Maziarka, Ryan O'Connor, and Juan Pablo San Emeterio
Mentor: Joan Bunbury, Geography and Earth Science

The Aztalan site in southeastern Wisconsin was inhabited by the Mississippian people between 1000 and 1250 CE, however little is known about why they abandoned the site. One theory is that climate change led to their out-migration. Past climate can be reconstructed using lake sediment cores, as the sediments store biological, chemical, and physical information in a continuous stratigraphic sequence. A lake sediment core was collected from Mud Lake, Jefferson County, Wisconsin in January 2014 for the purpose of developing a climate record for the Aztalan site. Introductory analyses in these types of studies investigate sedimentary properties, and particle size analysis of the core is currently underway. The method used for determining particle size will be presented, and the data will be compared with existing sedimentary records from the core.

U.70 The Effect of Short Foot Exercises on Intrinsic and Extrinsic Foot Muscle Fatigue

Meara Malloy
Co-author: Megan Siekert
Mentor: Naoko Aminaka, Exercise and Sport Science

Many running injuries have been attributed to foot pronation, a result of the collapse of the medial longitudinal arch (MLA). The stability of the MLA depends on both the extrinsic foot muscles, the muscles that originate in the lower leg, and the intrinsic foot muscles, the muscles that originate in the foot, with the plantar intrinsic muscles often found to be underdeveloped. Therefore, to avoid foot pronation, exercise protocols like short-foot exercises have been designed to strengthen these intrinsic foot muscles (IFM) and improve the MLA structure. However, there has been little study on the effect of strengthened IFM on the fatigue experienced by the extrinsic foot muscles (EFM) and how that may relate to lower-extremity injuries often seen in runners. The aim of this study was to compare the activation of the EFM before and after doing SFE to strengthen the IFM. The tests involved measuring the activation of the subjects' IFM and EFM with electromyography (EMG); measurements were taken at the beginning of the SFE program (0 weeks), and at the conclusion of the SFE program (4 weeks). The muscle activation was measured both before and after a prolonged run to see any change due to fatigue. We expected to find that the stronger IFM as the result of the SFE program would be presented as the increased IFM activity, as well as the decreased EFM activity during a prolonged run. We are currently in the process of analyzing our EMG data for both muscles groups, but we have found that subjects' navicular drop decreased after the 4-week SFE program, indicating that the integrity of the MLA improved possibly due to the stronger IFM. Through this study, we hoped to better understand the effects of SFE on both IFM and EFM.

U.71 A Comparative Study of Motivation Levels in Second Language (L2) Learning

Sonny Mangold and Aysia Schroeder
Mentor: Claire Mitchell, Modern Languages

The goal of this study is two-fold: to compare the motivation levels between native English speakers from the United States and international students learning English as a second language, as well as discover personal motivational factors among participants. Participants will be students at a Midwest university enrolled in advanced-level Spanish courses or advanced-level international students studying English as an L2. The students will be interviewed and given questionnaires rating their motivation levels based on a Likert scale. Drawing upon previous research (Dornyei & Ushioda, 2011), we expect that our data will show that factors between the two groups have similarities; career achievement (instrumental motivation) and communicating with others (integrative motivation) as prime components. It is predicted that motivation levels will be stronger for those participants who are studying a language for integrative reasons versus those who study a second language for instrumental reasons. We expect to find that most international students learning English as a second language will have these higher levels of motivation for integrative reasons compared to the group of students studying Spanish as an L2 (or higher) because international students are placed in an environment that predominantly utilizes the L2 language.

U.72 Expression of Perineuronal Nets in Ground Squirrel Brain

Anna Marchand
Co-authors: Michael Bonner, Kaitlin Bronk, Melissa Hammer, Reid Johnson, and Lyn Olson
Mentor: Christine Schwartz, Biology

Thirteen-lined ground squirrels undergo hibernation seasonally which significantly changes their physiology and can also change neuronal connectivity in the brain. Hibernation consists of torpor and interbout arousals (IBA). During torpor, the hibernating animal loses 50-65% of the neuronal synapses in areas of the forebrain, but upon IBA, neural synapses are regained. The effects of hibernation within the brain can be examined by quantifying the expression of perineuronal nets (PNNS), which are believed to stabilize synaptic connections and increase neuroprotection of the brain. Preliminary data demonstrated that there are seasonal and regional differences in aggrecan (ACAN) mRNA expression in the ground squirrel brain, with the highest expression in the hypothalamus during hibernation. ACAN is an important component of PNNs and increased expression within the hypothalamus during hibernation supports the fact that this region is very important for hibernation, and implies that PNNs could be supporting hypothalamic function during hibernation. Our hypothesis was that PNNs would be expressed in the hypothalamus during hibernation, while absent in other brain areas that show synaptic disconnection, like the cerebral cortex. Here, we examined PNN expression in the ground squirrel brain in hibernation (torpor and IBA) and summer (non-hibernating) using lectin histochemistry. Our analysis shows that PNNs are expressed throughout the cerebral cortex, in areas of the

hypothalamus, and in areas of the septum, epithalamus, and hippocampus during both hibernation and summer, indicating that the PNNs are not unique to the hypothalamus during hibernation. However, it is unclear if the structure of the net is changing seasonally. Future work will quantify expression of ACAN protein and other PNN components directly in the hypothalamus, cerebral cortex, and other regions using immunohistochemistry. This will help determine if net composition changes seasonally and will provide insight into how hibernator brains are protected and able to continue functioning during hibernation.

U.73 Characterization of the Ordered Domain of Epstein Barr Viral Protein BRRF2

Megan Marlowe
Mentor: Kelly Gorres, Chemistry and Biochemistry

The Epstein Barr virus (EBV) is a human herpes virus that affects many individuals through direct infection and subsequent diseases. EBV can be present in a body system and lie dormant for quite some time in a latent, or inactive, phase. Symptoms arise after the virus reactivates and switches phases into the lytic phase, unless the body's immune cells attack the virus. The cause of this switch is not fully understood, but it is clear that there is an increase in viral protein expression during the lytic phase. One of the proteins expressed that is essential to viral reproduction is BRRF2, and not much is known about its characteristics or function. The BRRF2 protein can be studied by breaking its sequence into two domains and overexpressing the protein in E. coli. The protein can then be purified and concentrated to test its characteristics, with the end goal of finding its function in the lytic phase of the EBV infection.

U.74 The Effect of Cold Water Immersion on Post High-Intensity Exercise Salivary Hormones

Brett K. McCutchin
Co-authors: Cordial M. Gillette and Matthew J. Andre
Mentor: Cordial Gillette, Exercise and Sport Science

OBJECTIVE: To determine if cold water immersion (CWI) affects salivary hormone concentrations after high-intensity training differently from passive recovery in well-trained collegiate athletes. METHODS: Each subject (n=5 males) underwent a series of high-intensity conditioning workouts consisting of 48 total sprints per session across 4 different training sessions. Saliva was collected immediately before and after training, one-hour post workout, and 24 hours post workout and later analyzed for testosterone (T), cortisol (C), and T/C ratio (TCR). A randomized crossover design was used where subjects underwent passive recovery (PR) as well as different amounts of time in the cold whirlpool consisting of 15, 25, and 35 minute intervals immediately after workouts. A 2-factor (time and condition) repeated measures ANOVA with Bonferroni adjustments and Tukey post-hoc comparisons was used to determine if there was an effect for condition over time (Î±=.05). RESULTS: There was an effect for condition across time for T(F=2.475, P=.041, ‹2=.317), but not for C (F=.582 P=.671, ‹2= .098) nor T/C (F=1.450 P=.233, ‹2= .214). There was a larger decrease in T at 1-hr post for 35 mins CWI compared to PR (P=.012, d= 1.87), as well as a trend towards a very large effect (P=.080, d= 1.42) for a larger decrease in T at 1-hr post for 25 mins CWI compared to PR. CONCLUSIONS: One hour after high-intensity exercise in male athletes, 25-35 mins CWI may lower T to a greater extent that PR. Future research should elucidate how this trend may or may not continue after an hour but sooner than 24 hours.

U.75 Choosing Assisted Death: Case Studies of the Illness Experience and Motivation

Kara Meyer
Co-author: Erica Srinivasan
Mentor: Erica Srinivasan, Psychology

Minimal research has been conducted on the topic of motivation to use assisted death. Existing research, mainly examining the perspective of healthcare workers and family members, is largely quantitative, with little to no interpretation of the meaning behind the decision to use assisted death (Ganzini, Goy, & Dobscha, 2008, 2009). The purpose of this qualitative study was to 1) explore the subjective illness experience of people who have died a legal, assisted death and to 2) explore the motivation behind the decision to use assisted death. The analysis was completed by coding narrative accounts, including online journals and essays, written by people who have died a legal assisted death under Oregon or Washington's assisted death acts. This unique perspective and approach of qualitatively analyzing self-reported accounts of terminal illness and the death and dying process, revealed themes related to diagnosis, quality of life, quantity of life, and treatment experiences, and how these dimensions ultimately play a role in the decision to pursue assisted death.

U.76 Seasonal Expression of BCAN in the Ground Squirrel Brain

Bailey Morrow
Co-author: Augustus Greife
Mentor: Christine Schwartz, Biology

Mammalian hibernation is associated with many seasonal brain changes, which allows researchers the opportunity to examine brain plasticity. The extracellular matrix plays a role in brain development and is thought to play a role in the separation and regrowth of synapses during hibernation. A previous study investigated the transcriptome of two areas of the thirteen-lined ground squirrel brain over four seasonal time points. mRNA encoding many extracellular matrix components showed significant seasonal changes in expression, including an extracellular proteoglycan brevican (BCAN), which showed a decrease in hibernation in the cerebral cortex. This suggests that there are changes occurring in brain extracellular matrix regulation during hibernation, which could be important for protection of the brain or helping to aid in plasticity. Here, we investigated expression of BCAN protein in two brain regions, cerebral cortex and brainstem, using the technique of western blotting. These two brain regions were chosen because they are very different in function and in regulation during hibernation. Brain samples were dissected and prepared from three different groups: the two extreme phenotypes of hibernation (torpor and IBA), along with a non-hibernating (summer) group. Analysis of samples from both brain areas indicated that the antibody used bound to an appropriately sized protein. However, in both cerebral cortex and brainstem, no significant difference in BCAN expression was found among the three groups. Interestingly, some samples showed an additional, smaller band, which could potentially correspond to a breakdown or degradation product. However, expression of the smaller band did not correspond to a specific group or brain region. Future work will use another different BCAN antibody to verify these results and include additional brain regions, like the hypothalamus. Additionally, expression of other extracellular matrix proteins will also be examined, to help determine the potential role of the extracellular matrix in the hibernator brain.

U.77 Tracking Population Trends in Myrick Marsh Zooplankton Populations

Aidan Murphy
Mentor: Gretchen Gerrish, Biology

It has long been understood that wetlands play a vital role in the ecosystem. They moderate flooding, filter pollutants and excess nutrients from water, and serve as breeding grounds for numerous species. The La Crosse River Marsh (LRM) is unique in that it is almost entirely encompassed by the city of La Crosse. As part of the floodplain for the La Crosse and Mississippi Rivers, the marsh not only collects extra water in times of high precipitation, but also releases water to support the river in times of drought. Current urban development and human caused pollution threaten the marsh. Our study aims to assess how environmental factors (temperature, water level, oxygen availability) correlate with the biological diversity of zooplankton within the LRM. Zooplankton, as primary consumers, serve as a strong indicator of the health of aquatic systems. When zooplankton populations experience variation, a ripple effect can occur across trophic levels. To evaluate seasonal zooplankton dynamics in the LRM, zooplankton collections and water quality measurements were taken from March through October, 2012. Zooplankton were identified to the most specific level possible based on taxonomic expertise and relative abundance was quantified. Once zooplankton counts were complete, the trends in population dynamics over time were compared to corresponding physical data for the sampling period. It was evident that some species followed a boom and bust pattern, and showed dramatic population changes from month to month. We also observed an inverse relationship between the number of zooplankton and the amount of sediment present in each sample. Our results support that future research should examine how seasonal changes of sediment present in the water column affects zooplankton population dynamics in the LRM.

U.78 Mineralogy of the Sediments of Mud Lake, Southeast Wisconsin, Determined Using X-ray Diffraction

Caroline Myhre
Co-authors: Rachel Kromrey and Elliot Keller
Mentor: Joan Bunbury, Geography and Earth Science

Indigenous peoples established Aztalan in 800 A.D., expanded their settlement in 1050 A.D. and abandoned the area approximately 200 years later. While it is not well known why the Mississippian people left the Aztalan site, it has been suggested that climate change may have been a factor. This research will assist in developing a record of past environmental conditions in the region to better understand what role climate played in the abandonment of the Aztalan site. Lake sediment cores were collected from Mud Lake, Jefferson County, WI, approximately three miles southwest of Aztalan in January 2014. Sedimentary properties of the cores, including organic content and magnetic susceptibility

have been previously evaluated to aid in the interpretation of what the environmental conditions were when Aztalan was inhabited. This study is focused on developing mineralogy records using x-ray diffraction (XRD) of the sediments. The XRD process and results will be presented and discussed, and compared with organic content and magnetic susceptibility records previously developed.

U.79 Vail Resorts, Inc., Antitrust Analysis and Economic Impact

Sophia Nelson and Leah Buttner
Mentor: Adam Hoffer, Economics

Since their formal establishment in 1997, Vail Resorts, Inc. has grown to be the largest single mountain resort operator, as well as the first global mountain resort company in history. This growth, however, has not come without antitrust and monopolistic accusation from a variety of sources. This research examines the industry standing and company structure of Vail Resorts, Inc. to determine their impact on the ski and snowboard resort industry in the US. In order to investigate the issue further, industry characteristics, company data, legal resources, and economic indicators have been collected. The findings are used to examine possible violations of antitrust laws, and the overall impact the company has on the economies of the towns in which member resorts are located, and on industry factors. Though Vail Resorts is by far the largest single operator within the ski and snowboard resort industry, allegations suggesting predatory pricing and negative economic impacts are not found to be credible. With proper research and oversight, it can be supposed that Vail Resorts is acting in a manner consistent with a competitive industry, and is increasing fair competition.

U.80 Molecular Engineering of Monometallic Materials Containing Second/Third Row Transition Metal Ions

Nicole Nelson
Mentor: Kendric Nelson, Chemistry and Biochemistry

Technology is rapidly improving with the miniaturization of components; however, it is believed that the limit to size reduction is approaching quickly. Investigating specific molecules as well as their physical properties by utilizing synthetic molecular chemistry allows for the creation of molecular compounds with multiple desired functions. Our research group has already proven that several first row transition metals (MnII, FeII, CoII, NiII, CuII, and ZnII) can be successfully coupled with a ditopic ligand 9'-[4,5-bis(methylthio)-1,3-dithiol-2-ylidene]-4',5'-diazafluorene which contains two unique binding sites (N-end and S-end) for metal coordination. Our group has successfully bound one transition metal to the N-end but when a second transition metal was introduced to the S-end the synthetic conditions destroyed the molecule. Believing this is due to the smaller size of transition metals used, our group has moved to larger, heavier transition metals (Mo, Ru, Rh, and W). We expect this should result in stronger interactions between the metal and the ligand forming a more stable complex with promising optical, magnetic, conductive, and electronic properties.

U.81 Titanic: Surviving the Disaster

Nicole Nelson
Co-author: Elizabeth McMahon
Mentor: Song Chen, Mathematics and Statistics

The titanic disaster is a well-known tragedy as two-thirds of her passengers died in her maiden voyage. Being the largest passenger ship of its time, it was especially devastating and brought along outrage at how the crisis was handled especially how the classes were unequally treated. Through the usage of mathematical modeling, we can predict whether a passenger will survive based on their demographics. By using machine learning - decision trees, random forest, conditional inference random forest, and logistic regression - we can find the most accurate model that predicts survival chances. We will test the sayings such as "women and children first" or "it pays to be rich" and see if this occurred in reality. The model we have finally chosen was able to predict survival rates with an 81% accuracy. Will you survive the disaster?

U.82 An Inordinate Fondness for Beetles

Abraham Packard
Mentor: Barrett Klein, Biology

The use of the dermestid beetle species *Dermestes maculatus* was examined for the cleaning of animal skeletons in a laboratory environment. Through this examination an efficient and versatile dermestid colony was established that both provides valuable insight into contemporary methods and creates a system from which further research may be based. Much research had been done previously into this problem but generally it was, if not contradictory, difficult to consolidate into a single procedure. Here the problem was approached from the perspective of mutual gain on the part of researcher and beetle, a paradigm that has not yet been actively applied, which allows for new paths of exploration. Applying the principles of mutual gain, or "Animal Connection", it was possible to create a colony of extreme efficiency without sacrificing product quality and to allow for future research ranging from the simulation biological systems to automated life support systems in the most literal sense. The impacts of this research are to provide UW-La Crosse with a new generation of dermestid colony for use both in specimen processing and further research with the accompanying operating procedures consolidated into a useful contemporary product.

U.83 Impacts of Triclosan on Zebrafish Metamorphosis

Alyssa Patten
Co-authors: Amanda Stenzel and Tisha King-Heiden
Mentor: Tisha King-Heiden, Biology

Despite the prevalence of personal care products in aquatic ecosystems, we understand very little about the potential dangers these compounds cause to wild fish. Triclosan (TCS) is an antimicrobial and antifungal agent present in many personal care products, such as toothpaste, soaps, and detergents. TCS is an endocrine-disruptor present in toxic levels within many aquatic ecosystems, and it leads to morphological deformities and cardiovascular toxicity in wild fish populations. However, it's unclear whether endocrine disruption occurs in the reproductive system or thyroid system, giving rise to these complications. Our goal is to gather evidence supporting the hypothesis that TCS disrupts endocrine function of the thyroid system during sexual maturation, resulting in developmental deformities and toxicity of wild fish populations. Zebrafish will be exposed to TCS at concentrations of 0.4, 4.0, and 40 ¼g TCS/L, via waterborne exposure, 21-35 dpf. Lateral images will then be taken to observe morphological markers of endocrine disruption in both the thyroid and reproductive system. Knowledge of which system is disrupted will help in understanding the mechanism by which TCS functions and how survival of wild fish populations can be supported.

U.84 Study of Stability of Immature Red Blood Cells in Ground Squirrels

Julianne Pekol, Abby Scaffidi, Danielle Thorton, and Brittney Trybula
Mentor: Scott Cooper, Biology

The proposed experiment examines the stability of red blood cells in thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*), throughout their hibernation cycle. In order to investigate red blood cell maturation, we will be looking at hemoglobin levels released after red blood cells are stored in hypotonic solutions (no saline, 0.9%, 0.75%, 0.6%, and 0.45%). When the data was analyzed, it showed that cold stored cells were the most stable. By studying the stability of mature red blood cells throughout hibernation, we could gain insight into the process by which the squirrels regulate oxygen transport. Currently, the process of storing blood is very fragile and has a short longevity; if this process can be replicated, there are possible human applications related to blood storage that would be very beneficial study of stability of immature red blood cells in ground squirrels.

U.85 Taking a Closer Look: A Comparative Study of Organic Tempers

Kaitlyn Pudenz
Mentor: Katherine Grillo, Archaeology and Anthropology

Using an experimental study and petrographic analysis this project develops a new methodological approach for studying organic-tempered pottery found in the archaeological record. Specifically, this study examines different shapes and sizes of voids which are created when organic temper is burned out during the firing process. Past research only briefly touches on how to identify organic tempers, if at all; it often plunges right into asking questions about the

functionality of organic-tempered ceramic vessels and does not describe how the temper being used was identified. A reference collection is created using ceramic tiles with different organic tempers such as horse hair, sheep dung, and chaff. The resulting identification key can be used by researchers to help identify organic-tempered ceramic vessels found in the archaeological record based on both the shape and size of the voids present. With the ability to distinguish different organic tempers, questions about organic-tempered pottery can be asked such as; why specific materials were being used over others, if they added the temper for cultural or functional reasons, and testing the strength, porosity, and usability of pots made with organic tempers.

U.86 Structural Characterization of a Periplasmic Lipoprotein Associated with Magnesium Homeostasis in *Salmonella enterica*

Damien Rasmussen
Co-authors: Basu Bhattacharyya and Cody K. Vaneerd
Mentor: John May, Chemistry and Biochemistry

The divalent magnesium cation (Mg2+) is imperative to the survival of all living organisms on earth. It stabilizes different macromolecular and cellular structures, and plays a vital role in a vast number of essential biochemical reactions. Additionally, the ability to adapt to environments with limiting Mg2+ is required by many bacteria to cause disease in humans. Gaining insight into how bacteria maintain homeostasis when in magnesium deficient environments will provide critical knowledge in finding new treatments for antibiotic resistant bacteria. Through a genetic screen we have identified a novel periplasmic lipoprotein of unknown structure and biochemical function that rescues growth of a mutant strain of *Salmonella enterica* that is unable to respond to magnesium deficient environments. Interestingly, this lipoprotein has a single domain of unknown function that is conserved among a large number of disease causing enteric bacteria. To elucidate the structural characteristics of the protein, circular dichroism (CD) and X-ray crystallography techniques are being used. CD experiments have revealed that the protein is composed primarily of beta-sheet secondary structure which confirms homology model predictions. Thermal denaturations analyzed by CD reveal a single state reversible transition with a melting temperature of approximately 71 ËšC. Additionally, we are progressing towards obtaining the first high resolution atomic structure of this protein. We have developed reproducible crystal conditions for the native protein and have successfully obtained atomic resolution X-ray diffraction data which suggests more than one monomer per asymmetric unit. Initial attempts at molecular replacement with this data have so far been unsuccessful. Selenomethionine (SeMet) was incorporated into the native protein, and has also been successfully crystallized. Obtaining X-ray diffraction data on these crystals will provide the phasing information necessary to solve the first atomic resolution structure of this protein. The structure will ultimately provide us with knowledge of its role in magnesium homeostasis within salmonella.

U.87 Driftless Area Stream Metabolism

Phoenix Rogers
Mentor: Eric Strauss, Biology

Headwater streams are critical components of nutrient and organic matter processing and retention, but little is known about the temporal variability in gross primary production (GPP) and ecosystem respiration (ER) rates as a whole and especially within our area of the Midwest. Knowing both GPP and ER you can determine the net ecosystem production (NEP), which illustrates aquatic ecosystem metabolism. Stream metabolism can be used to determine the overall condition and health of the system as well as the role of the stream ecosystem when it comes to processing nutrient and organic matter across the landscape. The open channel diel oxygen method measures the change in dissolved oxygen (DO) over time and is the most efficient way to gauge stream metabolism. This project is designed to examine temporal variability and controls on aquatic ecosystem metabolism by measuring daily rates continuously for a year in Spring Coulee Creek, a first order stream in the Driftless region. We're predicting stream metabolism to be controlled by light availability and to be predominantly heterotrophic, i.e., the ratio of GPP:ER will be less than one.

U.88 Purification and Structural Analysis of an Uncharacterized Lytic Protein in Epstein-Barr Virus

Michael Scheidt
Co-author: Kelly Gorres
Mentor: Kelly Gorres, Chemistry and Biochemistry

Epstein-Barr virus (EBV) is a human herpesvirus that causes infectious mononucleosis. EBV is associated with human cancers, such as Burkitt lymphoma and nasopharyngeal carcinoma, due to infection of the B and epithelial cells

respectively. The lytic cycle is known as the productive phase of the viral life cycle; in other terms, when the genome of the virus is undergoing transcription and new virions are being produced within a host cell. In the virion, the viral DNA is enclosed by an ordered protein capsid, which is surrounded by a layer of proteins called the tegument. This project studies an Epstein-Barr virus tegument protein of unknown function. When the gene encoding the uncharacterized tegument protein is knocked out, virion production is not observed. Though important, the structure and function of this lytic tegument protein has yet to be determined. This project has produced pure samples of this tegument protein for study of the basic structural characteristics. The histidine-tagged protein was produced in *E. coli*, including C41(DE3) and SHuffle cells. Both strains of cells contain components to promote foreign protein folding, though SHuffle cells contain chaperones specific to disulfide bond formation. When induced in C41(DE3) competent cells, signs of protein degradation were observed on a reducing SDS-PAGE gel. Successful induction of full-length protein was observed in SHuffle cells, indicating potential presence of disulfide bonds in the tertiary structure of the protein. The induced protein was purified by Ni2+-affinity chromatography. Circular dichroism and dynamic light scattering analysis will be conducted to observe structural characteristics in the protein's native state with the goal of determining the structure and predicting a function for this EBV lytic protein. Along with functioning within the lytic cycle of EBV, this tegument protein has potential ties to multiple sclerosis (MS), a central nervous system disease that causes demyelination and degeneration of neurons. From published studies, it has been found that patients with MS have a much greater antigenic response towards one of the tegument proteins. By further studying its structure and function, insight could be gained on not only the protein's effect on the lytic cycle, but also its secondary role it may play in the cause of MS.

U.89 Molecular Identification of Bacterial and Yeast Species in Kombucha, a Food Product and Potential Model for Studies in Multispecies Biofilm Formation

Benjamin Schilz
Mentor: Todd Osmundson, Biology

Bacterial-fungal biofilms are important in medicine, food production and safety, and natural and agricultural environments; however, much remains to be learned about the factors that influence the formation, maintenance, and dynamics of these multispecies communities. Kombucha, a probiotic beverage produced by fermentation of sweetened tea by a consortium of bacteria and yeasts, is a potential model system for studying multispecies bacterial-fungal biofilm formation; however, species composition may vary significantly between different starter cultures. In this study, we used high-throughput DNA sequencing of starter cultures and pure culture isolation of individual species to identify the microbes composing five starter cultures from commercial and home-cultivated sources. Successful culture isolation using an anaerobic chamber suggests the presence of at least one facultatively anaerobic species, a result not previously reported for kombucha in the scientific literature. DNA sequencing is currently in progress, and results will be used to compare isolates to one another as well as to several published surveys of microbial diversity of kombucha isolates.

U.90 The Impact of Unequal Elementary and Secondary Public School Funding on Postsecondary Degree Completion

Sara Schmidt
Mentor: Dawn Norris, Sociology

This study examines the impact elementary to secondary (K-12) per pupil funding has on six-year university graduation rates. This relationship is tested using OLS regression with data from the US Census Bureau (USCB) and Institutional Data Archive on American Higher Education, 1970-2011(IDAAHE). This study finds that in states with greater K-12 per pupil expenditure, there are higher six-year graduation rates at universities, even while controlling for state level university funding. Although SAT scores have a positive statistically significant relationship with university graduation rates, they only partially mediate the effects of K-12 per pupil expenditure.

U.91 Analysis of the Effect of Running Speed on Stress in the Achilles Tendon

Rachel Schornak and Samantha Kohnle
Mentors: Robert Ragan, Physics, and Thomas Kernozek, Health Professions

Injury to the Achilles tendon is common in runners; therefore, we investigated the effect of running speed on the Achilles tendon. Running data were collected for 18 female rear-foot strike runners. Reflective markers were placed on the subjects and motion capture recorded the subjects' motion as they ran over a force plate to estimate the Achilles tendon (AT) stress. The AT stress was established using inverse dynamics and HBM static muscle force optimization. The cross-sectional area of the AT was measured using ultrasound and the AT moment arm was gathered from past published cadaver data. Our study found that the AT stress was the greatest for slow running speed when comparing the

data to fast and medium speeds. In a previous study, the stress on the Achilles tendon was also found to be greatest for slow speeds. We took the study further to analyze what contributed to the greater stress at the slow running speeds. Analysis of variance with post hoc comparisons were used to compare the angles and power for the hip, knee, and ankle joints at fast, medium and slow running speeds. At higher speeds, ankle range of motion and power decreased. Increased effort at the hip was observed at higher speeds where the range of motion and power increased.

U.92 The Material Culture of Internment: A Comparison of Slave, Refugee, and Labor Camps

Jacob Stone
Mentor: Katherine Grillo, Archaeology and Anthropology

Archaeological examinations of interned populations have grown in popularity in the last few decades. Detailed analysis of slavery sites, labor/concentration camps, and refugee camps have offered valuable information on the lifestyle of confinement, human suffering, political institutions, and social constructions that create, or are found within, these environments. This paper aims to compare these three types of internment by examining their relative spatial layout and material good production to find any overlapping patterns that could shed light onto the universal characteristics shared by internment sites. This comparison will allow us to gain a greater understanding of the concept of forced internment as a whole and to expose specific types of good production and organization that can be applied to numerous sites in the future.

U.93 Color-Grapheme Synesthesia and Gestalt Grouping Principles

Michael Szeszol and Josh Barbara
Co-author: Alexander O'Brien
Mentor: Alexander O'Brien, Psychology

Synesthesia is a phenomenon marked by the experience of multiple sensations deriving from a single external stimulus. Color-grapheme Synesthesia, therefore, is the experience of perceiving the “extra” sensation of colors overlaying graphemes (i.e. text, letters, numbers, etc.). Gestalt laws of perceptual grouping are principles that govern the way in which visual arrays of items are perceived to be arranged. We have a tendency to break down images into groups of stimuli rather than interpreting the stimuli individually. These grouping factors include color, shape, proximity, or any identifiable characteristic common to multiple stimuli in an array. In this experiment, a group of control participants and two color-grapheme synesthetes made judgments about the perceived spatial arrangements of arrays of graphemes. Graphemes were arranged such that gestalt principles of proximity produced the perception of either rows or columns of graphemes. Control participants made judgments about the arrangement of the graphemes as the spacing between the items slowly expanded; such that the arrangement appeared to change from rows to columns, or vice versa. On half of the trials, color was added to some items in the display to produce a grouping principle that conflicted with the proximity grouping, thus altering perceptions of how the items in the display were arranged. These data were then compared to judgments made by synesthetes (who viewed only the non-colored displays), to determine whether the synesthetic representation of the grapheme’s colors exerted the same gestalt grouping conflicts as the presence of the actual color in the displays. Early results suggest that, although not actually present in the displays, the grapheme colors experienced by the synesthetes alter their perceptions of perceptual grouping, relative to controls. The proposed experiment can therefore be used as a possible test for determining whether an individual is a color-grapheme synesthete.

U.94 Effectiveness of the Marc Pro Device (MPD) in Aiding Recovery of Lower Body Skeletal Musculature Using the Rate of Perceived Exertion (RPE) and Perceived Recovery Status Scale (PRS)

Daniel Tchernev
Co-authors: Kari Emineth, and Joel Luedke
Mentor: Kari Emineth, Exercise and Sport Science

Context: Marc Pro Device (MPD) is a newer form of electrical stimulation technology designed for enhanced physiological recovery in the body. Because the MPD technology is so new, there is a lack of evidence on how effective the system is. Objective: The aim of this study is to evaluate the effectiveness of the Marc Pro Device (MPD) in aiding recovery of lower body skeletal musculature using the rate of perceived exertion (RPE) and perceived recovery status scale (PRS). Hypothesized those participants using the Marc Pro Device post-exertional exercise would recover quicker than control. Design: Crossover study. Setting: Conducted at a University. Patients or other participants: Participants were 10 females and 3 males with no current injury or illness, taken from the student population of a University.

Interventions: Participants completed a 30-minute MPD treatment 15 minutes post-strenuous activity twice a week every other week for 6 weeks. Main outcome measures: Fatigue factor (FF) measured using the Just Jump system in MPD and control groups pre-exercise as well as 24-36 hours post exercise. RPE measured immediately post exercise and PRS measured 24-36 hours post exercise. Results: MPD group did not yield statistical significance when comparing the pre-workout FF (1.0031) to the control pre workout FF (.9569) (p-value: .008) or the MPD post FF (.9862) to the control post FF (.9592) (p-value: .760). Mean RPE for MPD was 6.038 compared to mean RPE for control 5.385 (p-value: .004). Average PRS for MPD was 8.154 compared to average PRS for control 7.538 (p-value: .440). Neither showed significant difference. Conclusions: According to data there is no significant difference in MPD FF and control FF. RPE for both groups within one confidence interval. Furthermore, no significant difference between MPD PRS and Control PRS indicating MPD was no better at reducing fatigue than control element.

U.95 Effects of Varying Running Speeds on Achilles Tendon Wear

Eric Ulry and Hanna Zancho
Co-authors: Christian Christenson and Alexey Minaev
Mentors: Robert Ragan, Physics and Thomas Kernozek, Health Professions

Running has been reported to be beneficial to health; however, overuse injuries of the Achilles tendon (AT) are common. Micro damage or wear appears related to tendon injury. To explore the relationship between AT wear and running speeds, 19 healthy females ran at three speeds: 3.80 m/s, 3.31, and 2.81 m/s. Reflective markers were used to track the motion of the subjects at 180 Hz motion capture as they ran across a force plate. AT cross-sectional area was determined using ultrasound, and the AT stress was determined using inverse dynamics and static muscle force optimization. The AT wear was calculated by integrating a weighted function of the time series of AT stress. Pairwise comparisons showed a difference in the AT wear between the fast and slow speeds (p=.027) where the AT wear was lower at 3.80 m/s and higher at 2.81 m/s.

U.96 An Analysis of Physical and Chemical Soil Properties as Environmental Risk Factors in the Spread of Chronic Wasting Disease

Janek Walker
Co-author: Dustin P Martin
Mentor: Nadia Carmosini, Chemistry and Biochemistry

Transmissible spongiform encephalopathies (TSEs), also known as prion diseases, are caused by infectious agents composed of a single pathogenic protein. TSEs include a variety of fatal neurodegenerative disorders including bovine spongiform encephalopathy (BSE, “Mad Cow Disease”), scrapie, Creutzfeldt-Jakob disease (CJD) and chronic wasting disease (CWD). Previous work has shown that specific soil characteristics may influence the infectivity and longevity of the prion pathogen over extended periods of time, and the state of Wisconsin is uniquely suited for an examination of the relationship between soil properties and the prion disease CWD. The objective of this study is to determine if a link exists between the soil physical and chemical properties and the incidence of CWD in southern Wisconsin. Soil samples were collected from three specific locations inside and adjacent to a regionalized “hotspot” with chronic reports of CWD positive deer. These samples are being analyzed for possible variances in pH; texture; total organic carbon; soil minerology; and concentration of ions including manganese (Mn), copper (Cu), and zinc (Zn). Preliminary results for pH and soil texture suggest a stark difference between these two properties and their location in regards to the “hotspot” of positive CWD cases. Additional data on total organic carbon, soil minerology and soil ion concentrations will be discussed. It is anticipated that the results from this study will have the potential to shed light on the environmental factors that influence transmission of CWD, and initiate development of more extensive investigations into the relationships between soil properties and the spread of CWD in Wisconsin and surrounding areas.

U.97 Judgment and Knowing One's Past

Myranda Wallace
Mentor: Alexander O'Brien, Psychology

The purpose of this experiment is to examine the effects of a person knowing a stranger's life situation, which may have changed the way [he] acts or performs, on the amount of judgment the person has on that stranger. We will be testing if people will stay faithful to their judgments about a confederate after they hear about "a stressful life situation" which the said confederate is going through. In a past experiment [Fall 2016], all students heard the same poorly constructed and awfully delivered speech. Half of the participants were told the confederate was going through something difficult and stressful, whereas the other half were told nothing about the confederate. Though the confederate's speech was pre-constructed to be a poor display, the results of the study concluded that the students who were given the priming of a stressful life situation scored the confederate significantly higher than the control group of students.
This second experiment will use the information collected, suggesting that the prime of the confederate's life results in higher rating scores, to determine how faithful students will stay to their original judgments of a stranger. The same procedure will take place, where the confederate will give an objectively awful presentation; however, the participants will rate [him] directly after. While debriefing the students, the confederate will shortly come in with what seems like destroyed questionnaires that the participants had just filled out. We will blame the false destruction on the "stressful life situation" and record if a reevaluation of the questionnaire would call for a change of judgment on the confederate. We will also be sending a fourth of the participants a follow-up questionnaire a week later, after they hear the "excuse", and record if their judgments would be effected as well.

U.98 Communication Satisfaction and Fictional Characters

Ashley Wasson
Mentor: Daniel Modaff, Communication Studies

The purpose of this study is to understand how our own communication satisfaction is related to the communication practices of fictional characters with which we identify. Previous research has looked at how characters that media viewers identify with can influence what the viewer wears, who they choose to act like, what they choose to do in their lives, and can influence how they view their personal relationships and who they want to become (e.g., Todd, 2011; Falc³n & Diaz-Aguado, 2014). This leaves a gap regarding fictional characters and how they may play a role in our communication and communication satisfaction. I am currently in the process of collecting qualitative data through semi-structured interviews with 12 to 15 individuals (18+ years of age) who identify with a fictional character or characters. The data collected will be analyzed using thematic analysis to pinpoint specific themes in the data that can be used to understand how individuals experience the relationship between communication satisfaction and fictional characters.

U.99 Oneota and Dogs and Bears, Oh My! Faunal Analysis as an Archaeological Method to Identify Possible Ritual Behavior in Feature 307 at the Tremaine Site (47lc95), La Crosse County, Wisconsin.

Eleanor Waters
Mentor: Constance Arzigian, Archaeology and Anthropology

Archaeologists have long sought to understand the relationship between humans and animals. In every culture, there is a distinction between which animals should be consumed, those that should never be consumed, and those that should only be consumed at certain times. In the archaeological record this relationship, along with the reasons for this relationship, can be difficult to distinguish. As a test case, Feature 307, a refuse pit from the Tremaine site (47Lc95) in La Crosse County has been examined to understand the context of the feature. The remains of a domestic dog and the partial skull of a black bear were excavated from Feature 307 in 2016 during the annual summer field school held by University of Wisconsin -La Crosse. These remains were compared to other dog and bear remains excavated from La Crosse Oneota sites as well as to regional ethnographies to aid interpretations of the site. Expectations of the two possible scenarios, feasting or emergency rations, were developed and compared to Feature 307. Based on this analysis and the presence of tobacco and a copper "snake" effigy found in association with the faunal remains a possible feasting episode by the Oneota peoples inhabiting the site is suggested.

U.100 Identifying and Examining the Construction Phases at Ballintober Castle

Valerie Watson
Mentor: David A. Anderson, Archaeology and Anthropology

The days of English conquest in Ireland led to the building of some of the most noticeable architecture along the Irish landscape. One such castle is Ballintober Castle in county Roscommon. Located in what is now a small town in the middle of the rolling hills and rivers of the Irish countryside, the castle has changed hands from the English and Irish

families and rulers who sought it since its conception in the 14th century. As the seat of the last great king of Ireland and as an important English point of control, this castle was built and refurbished countless times to suit the current owners' needs, be it defense, a home, or a seat of power within the area. The recent fieldwork at this castle has uncovered countless discoveries that help us to understand what this castle was used for during its habitation. By looking at historical records, excavating within and outside of the castle, using ground penetrating radar and magnetometry, and comparing the castle to others built in Ireland, the research team has constructed a rough outline out what the castle looked like during certain periods. Excavations continue to help us gain further knowledge into what this castle looked like in its prime.

U.101 Development of First Row Transition Metal Complexes for Applications in Molecular Materials

Justin Wedal
Co-author: Elizabeth McMahon
Mentor: Kendric Nelson, Chemistry and Biochemistry

Molecular-based materials, those constructed from molecular precursors, have shown promising applications in the materials and electronics industries as a potential solution to rapidly approaching size boundaries in the specific fields. The research into these multifunctional materials has been at the front of various studies during the past few decades. The search aims to create or discover molecules with unique combinations of optical, electronic, and/or magnetic properties. Using the current “top-down” approach, industries attempt to miniaturize their components. However, there is a limit to how small current technology can be manufactured and many believe we are approaching the limits described by Moore’s Law; that growth of information storage technology will continue exponentially. 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 spectroscopic properties. Single crystals of these M-L complexes [(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 electronic absorption and emission readings, magnetic susceptibility measurements, and electrochemically with cyclic voltammetry. Ligand L has two binding ends which allows for selective binding of two unique metal ions. Our hope is that the properties of two discrete metal ions, along with the properties of the bridging ligand, can prove useful as molecular building blocks for new synthetic molecular-based materials with the desired properties. Heavier metal analogues of L are currently being synthesized in our lab, as well as investigations into the synthesis of 2- and 3-D (â€¦-M-L-M-L-â€¦) networks.

U.102 Limb Symmetry Differences in Dynamic Postural Control During Single-Leg Hops After ACL Reconstruction

Kari Willett
Co-author: Becky Heinert
Mentor: Thomas Kernozek, Health Professions

ACL ruptures are a common injury among young adult athletes. After ACL reconstruction, limb symmetry differences often remain despite extensive rehabilitation, which can negatively affect an athlete’s return to sport. The purpose of this study was to examine these limb symmetry differences in dynamic postural control during single-leg hop tests. Participants within two years of ACL reconstruction surgery were instructed to perform single-leg hops over a 12-inch hurdle; kinematic and force data were collected using a 3D motion analysis system with cameras set to 180 Hz and a force plate sampling at 1800 Hz. Three trials of the hop test were performed on each leg. Analysis involved comparison of joint angle ranges for the ankle, knee, and hip on the injured leg versus the non-injured leg, as well as comparison of calculated Dynamic Postural Stability Indices (DPSI). Multi-variate analysis of variance with repeated measures (limb: injured versus non-injured) was used with alpha set to 0.05. No differences in ankle or hip range of motion were found, but knee range of motion was reduced in the injured leg ($p < 0.05$). Additionally, DPSI was higher, indicating less postural stability, for the injured leg versus the non-injured leg ($p < 0.05$). These differences together suggest that there is a restriction in knee range of motion after ACL reconstruction resulting in poorer dynamic postural stability upon landing on the injured leg. Therefore, clinicians may want to incorporate single-leg impact-based activities on the injured leg during rehabilitation of ACL reconstructed athletes for greater success in returning to sport.

U.103 Monitoring Sleep and Menstrual Status in Collegiate Athletes

Sabrina Wolter
Mentor: Matthew Andre, Exercise and Sport Science

It is unclear how changes in sleep duration and quality affect other typical monitoring variables in collegiate athletes. Therefore, the purpose of this study is to monitor sleep duration and quality, salivary testosterone (T) and cortisol (C), training load, perceived recovery, and perceived lifestyle stress in athletes to determine how changes in sleep relate to changes in other monitoring variables. Collegiate athletes (n = 20 women) will report for testing once weekly on four consecutive weeks. Athletes will give a saliva sample (which will be analyzed later for T and C) and then will answer a brief (2-3 minutes) survey assessing sleep duration and quality, perceived recovery status (PRS), and perceived lifestyle stress (PSS). Pearson correlations will be used to determine relationships between changes in all of these variables. It is hypothesized that sleep duration and quality will be positively related to T and PRS, but inversely related to C and PSS.

U.104 Satellite Derived Greening and Browning of Vegetation in Wisconsin and Minnesota: Spatial Patterns and Associated Environmental Drivers

Zachary Woodcock
Co-author: Niti Mishra
Mentor: Niti Mishra, Geography and Earth Science

The reliable detection and attribution of changes in vegetation greenness is a prerequisite for the development of strategies for the sustainable management of ecosystems. Focusing on the geographical area of the states of Wisconsin and Minnesota, this study utilized Normalized Difference Vegetation Index (NDVI) time-series data from NASA's MODIS sensor from 2000-2016. From every year, growing season images (May-Oct) were utilized to create growing season maximum and growing season mean NDVI time-series images. Spectral masking was applied to exclude non-vegetated pixels from analysis. An ordinary least squared (OLS) regression was performed on each vegetated pixel of these two NDVI time-series matrices to derived areas that were either characterized by vegetation greening (significant positive slope) or showing vegetation browning (significant negative slope) during the study period. To examine how the spatial variability in detected vegetation greening and browning patterns, results were categorized considering per-pixel land use land cover and ecoregion classification of the World Wildlife Fund (WWF). To characterize trend causation, multi-temporal land cover maps were compared which allowed some explanations of the human role in contributing to the detected greening and browning of vegetation in these two states. To understand the role of climatic variability as a driver of vegetated greenness trend similar trend analysis on precipitation and temperature time-series needs to be conducted.

U.105 Comparison of Responses to Mental and Physical Stress between Second-Generation Hmong Americans and White American Peers

Gaokhia Yang
Mentor: Peg Maher, Biology

Animals, including humans, encounter mental and physical stressors as they live. The bodies' response to temporary stressors is adaptive, but the response to prolonged stress may increase risk of disease. Migration may be associated with both types of stress, as studied in numerous immigrant populations. As immigrant families adapt to new conditions and cultures, the stresses different generations encounter may evolve. To determine if response to stress is similar in second-generation (US born, with immigrant parents) Hmong Americans compared with White American peers, sixteen participants (8 Hmong-American; 8 White American) underwent validated mental and physical stress tests on separate days. After providing informed consent and before the first test, participants completed a psychological screening questionnaire. The first mental Trier Social Stress Test (TSST) consisted of an initial waiting period, 10-minute planning and 5-minute delivery of a speech, followed by performance of a math task. The second physical Cold Pressor Test (CPT) required participants to immerse their hand in an ice water bucket for at least 90 seconds. Before and after each stress test, a saliva sample and blood pressure and heart rate measurements were collected. Salivary cortisol will be measured by enzyme-linked immunosorbent assay. Interest versus control group heart rate, blood pressure, and salivary cortisol responses to TSST and CPT will be compared using repeated measures statistical analyses.

U.106 Faunal Remains from Structure 15 at the Site of Pecica, Romania

Gemma Zahradka
Mentor: Amy Nicodemus, Archaeology and Anthropology

The site of Pecica “Santul Mare” is one of the most significant Bronze Age settlement sites in the Carpathian Basin. It was occupied during the Middle Bronze Age, between 2000 and 1500 BCE, in present-day Romania. Pecica rapidly became a wealthy regional trading power, specializing in metallurgy and horse breeding. While the period of the site’s peak influence is understood, the events surrounding the founding of Pecica are considerably less clear. In particular, the extent of social inequality and elite activity during this time are unknown. This research focuses on animal remains found within Structure 15, an unusual building dating to between 1920 and 1900 BCE. The assemblage consisted primarily of large mammal bones which were built into the floor of the structure. The animal remains were found to represent primarily prime cuts from higher status animals, indicating possible evidence of ritual or elite activity within the structure. This may signify that the elite activity and strict social hierarchies of the site’s peak developed earlier than previously thought, and Pecica’s rise to regional prominence began as soon as it was founded.

UNDERGRADUATE ORAL PRESENTATION ABSTRACTS

UR.1 A Need for Needles: A Qualitative Examination of La Crosse County Injection Drug Use and Harm Reduction Strategies

Kristin Reque
Mentors: Nicholas Bakken and Laurie Cooper Stoll, Sociology

Previous research has shown that injection drug use across the country continues to climb. Since the mid-1980s, injection drug use has become a topic of discussion among scholars, law enforcement, and policymakers. One solution implemented across the country over the past three decades are Needle-Exchange Programs (NEPs). NEPs offer a variety of services to injection drug users including providing sterile syringes to users for injection, cookers, tie-bands, cotton swabs, and more, while also providing other resources like condoms, alcohol pads, HIV counseling and testing, and referrals to substance abuse treatment programs. The lack of empirical evidence on NEPs proves troublesome when local communities are making decisions about whether to add or eliminate a needle-exchange. This study investigated how different perspectives, attitudes, and life experiences of stakeholders who interact directly with IV-users and the local NEP in La Crosse, WI influence policy decisions in the area. Participants in the study included representatives from the local Police and Fire Departments, County Health Department, physicians who treat addiction regularly, and a representative from the NEP. While most interviewees agreed that drug use and discarded needles were a serious public health concern for La Crosse County, there were clear discrepancies among the stakeholders about how to address prevention and treatment for local users. This study addresses those discrepancies between stakeholders and identifies the most salient solutions offered to address prevention, addiction, and treatment in La Crosse County.

UR.2 Defining Rhetoric

Jack Hackman
Mentor: Haixia Lan

This project's main focus will be to offer a clearer and more refined definition of rhetoric, a definition that highlights the importance of persuasion in more fields than simply Communication and English. Through the use of classical and contemporary writers, I will attempt to explain how rhetoric is an incredibly useful and vital tool for all communication in any discourse. The ultimate goal is to explain how rhetoric is significant to all learners.

UR.3 Thirteen-Lined Ground Squirrel Hibernation Effects on the Enteric Nervous System of the Colon

Kathryn Thompson
Mentor: Sumei Liu, Biology

Background: The enteric nervous system is the intrinsic nervous system within the gut that controls gastrointestinal motility, ion secretion, and local blood flow. During hibernation, gastrointestinal motility is slowed down. The study aims to investigate the changes in the enteric nervous system that may contribute to the lowered level of gastrointestinal motility. Method: Summer active, winter torpor, and interbout arousal thirteen-lined ground squirrels were used.

Immunofluorescence staining was used to examine the changes in neurochemical codes in the enteric nervous system of the colon. Cell counts were carried out to obtain the number of cell bodies immunoreactive to choline acetyltranferase (ChAT) and nitric oxide synthase (NOS). Results: We first observed ChAT, a marker for cholinergic neurons. There was a significant decrease in the number of ChAT-immunoreactive (IR) neurons in the myenteric plexus of winter torpor ground squirrels. In the summer active group, there were 14.17 ± 1.45 ChAT-IR neurons/myenteric ganglion. In the winter torpor group, there were 8.48 ± 1.14 ChAT-IR neurons/myenteric ganglion ($P < 0.05$, $n = 5$). In the interbout arousal group, there were 11.38 ± 1.44 ChAT-IR neurons/myenteric ganglion ($P >; 0.05$, $n = 5$). We also observed NOS, an enzyme which catalyzes the synthesis of the inhibitory neurotransmitter nitric oxide. There was no significant difference in expression of NOS between summer active, winter torpor, and interbout arousal ground squirrels. Conclusion: Selective downregulation of ChAT in the myenteric plexus of the ground squirrel colon may contribute to gut hypomotility during winter torpor. "

UR.4 Impacts of Successful Reintegration for Offenders: Neighborhood Structure Versus Home Structure

Lindsey Felt
Mentor: Nicholas Bakken, Sociology

The United States has been the leader in incarceration rates for over 30 years, now surpassing every country in the world (Enns 2014). However, the problems that are experienced do not end when the individuals are incarcerated, but rather continue post-release. There is a substantial amount of research and data available regarding incarceration and complications prisoners face once released at the individual level, however the research lacks in regard to the differential impact of macro-level factors concerning successful reintegration, notably how neighborhood and household structures affect this transition. Using contemporary data from the longitudinal, multistate Returning Home study, the current project examines the correlates of neighborhood and social structure in regards to reoffending and re-incarceration among 740 male and female offenders. Within 12 months of leaving prison, men and women reporting more negative neighborhood and social environments had significantly poorer outcomes than those reporting positive social environments. Recommendations for improved policy and practice will be discussed.

UR.5 Examining the Role of Race, Risk Assessments, and Preventative Sanctions in the Pretrial Justice System

Chris Rudolph
Mentor: John Kovari, Political Science/Public Administration

This study aims to reduce the jail population by educating criminal justice stakeholders on the effects of using electronic monitoring (EM) during pretrial release, as providing more information on the role of race and risk assessments in the pretrial stage in the La Crosse County area. Pretrial refers to the stage that occurs in between the initial arrest and the final disposition of the case. Judges use EM to hold defendants accountable while also allowing them to remain in the community pending trial. This study will examine the effectiveness of EM in the pretrial stage by looking for correlations between its use and defendants' pretrial success.

The use of pretrial assessment tools has recently been called into question by a study that found a "machine bias"against black defendants in the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) tool. The methodology used in that study will be replicated to determine whether COMPAS is disproportionately misidentifying blacks as high risk compared to whites. Additionally, the underlying assumption that COMPAS is an accurate predictor of pretrial success will be examined by comparing incidences of new charges among the different risk levels without regard to race. Previous research and the results found here will be used to make policy recommendations to criminal justice stakeholders

UR.6 Shakespeare & Masculine Gender Performance

Payton Yahn
Mentor: Lalita Hogan, English

When analyzing men in literature the tendency has been to view man as representative of mankind, or as man defined against woman, based on gender essentialism. Recently, a more nuanced understanding of gender performance has allowed for analysis of masculinity as a social construct. The plays of William Shakespeare provide a notable case study in how, while our understanding of masculinity as performative is relatively recent, the anxiety produced by mandated

gender performance is not. In Shakespeare, masculinity is often shown as violent and competitive, creating a constant conflict between prescribed masculine action and the socioemotional desire. Shakespeare verbalizes ambiguities of masculinity, for instance, in Macbeth's retort to his wife, "I dare do all that may become a man;/Who dares more is none." Later, when Macduff is asked to turn grief into anger, he says: "But I must also feel it like a man." In King John (also Coriolanus), due to the presence of politically ambitious women, some of this conflicted self-negotiation is, in a sense, more radical. King John and Coriolanus, with their many male characters and tragic story arcs, poignantly show the consequences of the conflict between a violent, power-centric masculinity and socioemotional desire. The analysis offered here, interprets the conflict between masculine action and socioemotional desire as symbolic of a separation of gender and self. Such an analysis enters into contemporary questions on masculinity, which allows us to see gender as constructed by social rules of gender performance.

UR.7 Finding New Interstellar Neutral Hydrogen Shells in the Milky Way

Rebecca Taylor
Co-author: E.J. Korpela
Mentor: Shauna Sallmen, Physics

The interstellar medium (ISM) consists of low-density gas and dust and fills the space between stars in our Milky Way Galaxy. When a massive star explodes in a supernova, hot gas is blown out and interacts with the cool neutral hydrogen (HI) gas in the ISM. As this hot material continues to expand, the surrounding HI gas is pushed out and forms a shell. These shells play a part in the recycling of gas in the ISM, so that later generations of stars contain more heavy elements essential to the formation of Earth-like planets. By increasing the number of known HI shells at a variety of ages, a broader understanding of the evolution of interstellar gas can be gained. Cold neutral hydrogen emits radio waves with a wavelength of 21-cm, so these shells can be found using radio telescopes. The Galactic Arecibo L-band Feed Array (GALFA) 21-cm radio survey provides maps with unprecedented detail away from the Galactic plane. A visual search of these data is ideal for identifying previously undiscovered shells at these high Galactic latitudes, particularly shells with small angular sizes. Unlike many automated searches, this search method can identify old, slowly expanding shells. For each potential shell, the location, motion, and size were determined. Various parameters describing shell quality (e.g. shell wall completeness) were also estimated. This search of over 91,000 images revealed a total of 116 possible new shells ranging in diameter from 0.1 to 4.5 degrees. Many of these new shells are so small they could not be identified in data with lower angular resolution. The statistical properties of these newly found shells will be presented, along with details on selected examples.

UR.8 Breathing Life into Dinosaurs

Peter Roth
Co-authors: Emily Schneider, Julianna Cruz
Mentor: Eric Snively, Biology

3-D modeling techniques from two-dimensional digitization were used to recreate air spaces and lungs in extinct dinosaurs and Cenozoic mammals. The method was validated on preserved and living specimens of modern animals, giving high confidence in reconstruction accuracy for mass, centers of mass, and anatomy of some of the most massive beasts to walk the planet. We confirmed mass of large Tyrannosaurus rex at about 9 tonnes, the giant rhinoceros Indricotherium at over 16 tonnes, and tall long-necked dinosaurs at 25 to 40 tonnes depending on the individual. Using this data newer estimates of these animals' centers of mass help clarify how quickly they could turn their bodies.

UR.9 "See the Real Me" A Healthy Body Image and Body Positive Program for College Students at the University of Wisconsin-La Crosse

Alex Peeters, Alli Lovell, See Vang, and Chelsey Boldon
Mentor: Anders Cedergren, Health Education and Health Promotion

"See the Real" is a program developed to improve body image in college students by teaching skills essential to build and maintain a body positive mindset. A needs assessment conducted as part of course work in the spring of 2016 showed that negative body image was a significant health issue among college students. Primary and secondary data identified three main areas that required attention: the use of Photoshop in the media, social media, and pressure from peers. A fifty-minute, theory-based intervention was developed to address these concerns involving both informational presentations as well as interactive work. In a course required pilot program implemented in the fall of 2016, student researchers found the intervention to be successful in several areas related to body image. After taking part in the

program, participants' awareness of body positivity social media accounts increased, there was an increase in the number of participants able to explain body positive complimenting, and all participants reported being very aware of the use of Photoshop in the media. Overall, the pilot test was highly successful in meeting the program objectives and increasing participants' awareness of the importance of having and maintaining a healthy body image. By up-scaling the implementation of "See the Real "in two 200-level health education classes in the spring of 2017, student researchers aim to determine whether main effects seen in the pilot test are maintained in a larger and more diverse participant group. Though this work is yet to be completed, course instructors have given permission to use their classes to further field-test this program on the UWL campus. If positive results are maintained, this project could serve as a prime example for how work assigned in classes can lead to artifacts with real potential for student and community health improvements.

UR.10 Counseling Program for Jurors Under Serious Stress in the State of Wisconsin

Kaitlyn Zander
Mentor: James Szymalak, Political Science and Public Administration

This study addresses the prevalence of juror stress indicated by experts of the court due to exposure of evidence from high profile and violent crimes. Research has shown that the impacted jurors experience physical and/or psychological symptoms that negatively affect their well-being. Although most jurors undergo minimal stressors, some are unable to effectively deal with the information from the trial in a way that a counseling service would provide. There are a variety of existing programs used by courts in states other than Wisconsin that have been successful. The analysis of these current programs has concluded with proposal of a system to be implemented for these jurors in Wisconsin.

UR.11 Towards a Better Understanding of Communication Expectations between Parents and Schools: A Review of the Literature and Survey & Interview Analysis

Alyssa Nelson and Allison Quartaroli
Mentor: Leslie Rogers, Education

Parents and teachers share the complex task of educating children, however many researchers have found that overall effectiveness is impaired when ineffective school-home communication practices are used (Lake & Billingsley, 2000; Lasater, 2016; Vickers & Milke, 1995). Ineffective communicative practices negatively impact a parent's confidence in their child's school (Greenberg, 1982) and student performance (Moore, 2002), and is a major source of job dissatisfaction for teachers (Chase, 1985). Improving communication expectations has had positive impact on communication satisfaction (Vickers & Milke, 1995), but such investigations have not occurred within the context of analyzing effective school-home communication, especially communication that occurs between parents or caregivers of students with exceptionalities and their child's teachers. Our investigation tackled this problem head on. The purpose of our research project was to better understand the impact of communication expectations on parent-teacher communication/collaboration and the extent to which expectations for parents and teachers were or were not being met. What are communication expectations for teachers and parents of students with exceptionalities in the La Crosse area? Do these expectations differ and do teachers and parents feel that work in this area would improve home-school communication and collaboration? Are the views of these local participants similar to those expressed on a nationally distributed survey? In our presentation we will summarize the research related to this topic and share the results of our spring 2017 study (i.e., interviews and survey data).

UR.12 White Privilege in the Uptake of Black America and Hip Hop: A Rhetorical Analysis

Elena Montanye
Mentor: Bryan Kopp, English

This research project examines the work of two prominent hip-hop artists in the United States, Kanye West and Kendrick Lamar. My research includes a rhetorical analysis of West and Lamar's most popular songs as well as analysis of audience responses to those songs via highly rated comments on YouTube, iTunes, and social media sites. In addition to their musical bodies of work, my research examines the artists' involvement in social media activism. The goal of this project is to reveal where racism lies in the white public's perception of black artists, their work, and their public personas and discuss how this information might be relevant in the everyday lives of black Americans. I use the rhetorical techniques of Charles Bazerman's genre studies as well as Carolyn Miller's ideas of genre as social action. In addition to these renowned rhetoricians, I examined work by Jeff Chang, Murray Forman, Mark Anthony Neal, Michelle Alexander, and Tricia Rose, prominent researchers in the area of black studies and hip-hop studies. This

research will allow for a deeper understanding of white privilege in uptake, creating a new foundation for future studies of institutional racism in America.

UNDERGRADUATE EXHIBIT PRESENTATION ABSTRACTS

The Bluffs: 9:00 am-10:45 am

E.1 Choice in Advocacy Discourse (ChAD): Current EDS 206 Students

Students of J. Scott Baker
Mentor: J. Scott Baker, Educational Studies

As part of a multi-semester curriculum project, undergraduate students in EDS 206, Multicultural Education, are asked to address lived experiences of race, gender, economic status, sexual orientation, religion, and citizenship to prepare for their future roles as teachers in PK-12 classrooms. Through the Choice in Advocacy Discourse (ChAD) program, students explore social justice and diversity through individual assignments, projects, and presentations to enhance their future PK12 students' learning. The goal of this program is to better understand the role of social justice in teacher preparation.

In this assignment, undergraduate students create an artistic display addressing the concept: "In 2017, gender." Student-artists are expected to limit the use of words in the display, except for a single sentence from an artifact (poem, song, novel, article, or movie) they use as their primary frame of reference. This collection of art derives from the students' own experiences, understanding of gender issues discussed in EDS 206 curriculum, and what each student feels is important to the current discussion of gender in the both schools and society.

E.3 Choice in Advocacy Discourse (ChAD): A Poetic exploration of Voice in Current Political Landscapes

Olivia Roehri and Megan Vinson
Mentor: J. Scott Baker, Educational Studies

As part of a multi-semester curriculum project, undergraduate students in EDS 206, Multicultural Education, are asked to address lived experiences of race, gender, economic status, sexual orientation, religion, and citizenship to prepare for their future roles as teachers in PK-12 classrooms. Through the Choice in Advocacy Discourse (ChAD) program, students explore social justice and diversity through individual assignments, projects, and presentations to enhance their future PK12 students' learning. The goal of this program is to better understand the role of social justice in teacher preparation. The authors of this collection argue current events, while told through major news channels, often neglect to include the true emotions of citizens and their responses to political discourse in the media. Through poetry, the authors give voice to diverse populations struggling in a world of overpowering opinions, hate speech, dangerous attitudes, and inequality. After interviewing participants who have been impacted by these decisions and prejudices, the authors use poetry to articulate changes needed to emphasize the importance of voice as a mechanism for citizens who feel "othered" in our current political atmosphere.

E.4 Choice in Advocacy Discourse (ChAD): Humans of La Crosse, a Photographic Depiction

Krissie Murphy
Mentor: J. Scott Baker, Educational Studies

As part of a multi-semester curriculum project, undergraduate students in EDS 206, Multicultural Education, are asked to address lived experiences of race, gender, economic status, sexual orientation, religion, and citizenship to prepare for their future roles as teachers in PK-12 classrooms. Through the Choice in Advocacy Discourse (ChAD) program, students explore social justice and diversity through individual assignments, projects, and presentations to enhance their future PK12 students' learning. The goal of this program is to better understand the role of social justice in teacher preparation. The author questions: have you ever felt a victim of prejudice, discrimination, or any other type of adverse effect because of race, class, religion, gender, sexual orientation, bullying, mental or physical disabilities (including dyslexia or ADD)? Through a collection of images and narratives, the author explores people who currently live, attend school, or work in La Crosse County. Using a Social Reconstructivist lens, the author explores how social justice issues are both relevant and perceived by community members in to a small town in Wisconsin.

E.5 Choice in Advocacy Discourse (ChAD): Poems about the Diversity of American Schools and Students

Joshua Krings
Mentor: J. Scott Baker, Educational Studies

As part of a multi-semester curriculum project, undergraduate students in EDS 206, Multicultural Education, are asked to address lived experiences of race, gender, economic status, sexual orientation, religion, and citizenship to prepare for their future roles as teachers in PK-12 classrooms. Through the Choice in Advocacy Discourse (ChAD) program, students explore social justice and diversity through individual assignments, projects, and presentations to enhance their future PK12 students' learning. The goal of this program is to better understand the role of social justice in teacher preparation. In this project, using themes and information from EDS 206 curriculum, the author writes a collection of poems, which depict and describe multicultural topics and issues in America today. These poems are a collection of ideas about diversity and multicultural education in American schools. The author wrote them to encourage others to examine the climate of diversity in our educational system and to help people realize not all students are the same. America's students are Black and White, gay and straight, poor and wealthy. Educators as well as the public need to realize that not every student has access to the same benefits in life. Only once educators understand this inequity can they truly begin to provide a safe and caring environment for all their students.

GRADUATE STUDENT ABSTRACTS

Poster Session A
The Bluffs: 9:00am-10:45am

G.1 Using Video for Parent Training: Impacting Children with ASD

Merissa Cutter and Mikayla Mlsna
Co-author: Betty DeBoer
Mentor: Betty DeBoer, Psychology

Parents of children with Autism Spectrum Disorder (ASD) have been identified as having elevated stress levels which can have an impact on their child's functioning. This study examines the effects of online training modules on parent knowledge of various techniques that can be used in the home and on parent stress levels. Results from this study will inform school psychologists about the potential utility of online behavior management training for parents of children with autism.

G.2 Paraprofessional Burnout: Examining the Impact of Educational Team Involvement

Rochelle Zabadal
Co-author: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

As the role of paraprofessionals continues to expand, schools continue to struggle with retaining a stable workforce. This study investigates how involved paraprofessionals are with educational potentially contributes to burnout while investigating if there are significant differences between paraprofessional years of experience. With this knowledge, school psychologists will better understand the vitality of including paraprofessionals in educational team meetings and decisions, in regards to the students they work with.

G.3 Family-School Partnerships: Parent Perceptions across the Years

Lauren Nixon
Mentor: Daniel Hyson, Psychology

Evidence suggests a strong partnership between home and school is associated with increased student achievement. Establishing this partnership early on and maintaining it throughout the child's school career can maximize the benefits. This study aims to determine what parents perceive to be important in their partnership with the school across educational levels (Elementary, Middle, and High School). The results will better allow school psychologists to be leaders in anticipating and providing what parents perceive as important.

G.4 School-Wide PBIS Implementation: Impact on Behavioral and Academic Outcomes

Allison Wolf
Co-author: Robert J. Dixon
Mentor: Robert J. Dixon

School-wide positive behavioral interventions and supports (SW-PBIS) are a proactive system that promotes and supports appropriate student behavior. Fidelity of implementation has been shown to affect the student outcomes associated with SW-PBIS. This study investigates the behavioral and academic outcomes associated with fidelity of implementation of SW-PBIS. Results will prepare school psychologists to have a prominent, systems-level role within SW-PBIS leadership teams.

G.5 Mental Health Stigma in High School Athletes Transitioning to College

Matthew Molini
Co-author: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

The mental health of student-athletes is often overlooked because of benefits from physical activity. Research suggests that student-athletes are at a greater risk for poor mental health due to the pressure of commercialized sports. Additionally, the number one barrier for athletes seeking treatment is the stigma surrounding "poor mental health". This study examines collegiate coaches' perspectives of their student-athlete's mental health and explores strategies to prepare high school student-athletes for the transition to college.

G.6 Peer Coaching: Influencing Teacher Self-Efficacy and Relationships with Challenging Students

Laura Sommers
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

Staff confidence and effectiveness in working with behaviorally challenging students is critical for improving teacher-student relationships and student outcomes. This project compared the effectiveness of one-shot professional development to ongoing peer coaching in helping EBD teachers and paraprofessionals to implement Ross Greene's Collaborative and Proactive Solutions approach. With this knowledge, school psychologists will be better equipped to help school staff design or select appropriate professional development to better meet the needs of students with EBD.

G.7 Characterization of BRCA1-Deficient Breast Cancer Cells with Acquired Resistance to CHK1 Inhibitor Therapy

Kristin Short
Mentor: Sierra Colavito, Biology

Breast cancer is the second most lethal form of diagnosed cancer in women today. Approximately 90% of these cases are caused by sporadic mutations, with no link to a genetic predisposition. The remaining 10% breast cancers are hereditary, often occurring at a younger age. Women who have inherited mutations in the Breast Cancer Associated gene 1 (BRCA1) have a 70-90% chance of developing breast cancer at some point in their lifetime, and mutations in the BRCA1 gene have been reported in nearly 50% of familial breast cancer cases. These cancers often carry a highly aggressive phenotype with very few treatment options. A chemical screen conducted by Dr. Sierra Colavito during her post-doctoral work discovered that BRCA1 deficient breast cancer cells express an increased sensitivity to drugs that inhibit the cell cycle protein checkpoint kinase 1 (CHK1). CHK1 inhibitors are currently in use clinically in combination with chemotherapeutics and other DNA damaging agents, but BRCA1 deficient and a small group of other breast cancer cells display a unique sensitivity to this drug as a single agent. This gives CHK1 inhibitors promise as a targeted therapy for breast cancer patients that have developed tumors as a result of a BRCA1 mutation. However, tumor recurrence and resistance to targeted therapies is a growing issue clinically. This focus of this research is to characterize how initially sensitive cells change upon acquiring resistance to CHK1 inhibitors and determine possible mechanisms of resistance.

G.8 Trauma-Informed Care Consultation: Fostering Trauma-Informed Interaction and Instruction

Lauren Powers
Co-author: Betty DeBoer
Mentor: Betty DeBoer, Psychology

Trauma-informed care (TIC) is a school-wide approach that is designed to help students with trauma benefit from their education. This study aims to investigate the effect of TIC training and consultation on teachers' self-efficacy, knowledge, and use of trauma-informed practices. The results can be used to assess whether professional development through recorded training and consultation result in increased teacher understanding, practice and self-efficacy in trauma-informed schools.

G.9 Depression and Coping Strategies: The Effects on Academic Success

Lynsi Havens
Co-author: Robert Dixon
Mentor: Robert Dixon, Psychology

Internalizing disorders, like depression, are gaining attention in schools because of the potential impact on numerous life activities. Because of the seriousness of this growing issue, this study aims to determine the relationship between depression and academic success among adolescents, while examining the coping strategies used. Results provide important considerations of how depression affects students academically, while assessing the coping strategies used by students, in order to determine effective support strategies.

G.10 Effects of Hibernation on Blood Clot Formation and Fibrinolysis in Thirteen-Lined Ground Squirrels

Alie Bonis
Co-authors: Marcus Wise, Michelle Haldeman, Anna Koepke, and Taylor Hackel
Mentor: Scott Cooper, Biology

Thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*) enter hibernation to survive periods of low temperatures and scarce food availability. Typical ground squirrel hibernation is characterized by prolonged periods of torpor with decreased physiological activity, interrupted every few weeks by brief interbout arousals (IBA). Decreased blood flow during torpid states should increase the risk of stasis-induced blood clots. However, ground squirrels have adapted to survive repeated bouts of torpor and IBA without forming lethal blood clots. Although ground squirrels have developed antithrombotic adaptations to avoid lethal blood clots during hibernation, whether these adaptations cease all ability to form blood clots remains unknown. Thrombin-antithrombin complex, was significantly reduced ($p < 0.05$) during hibernation, and D-dimer level remained unchanged throughout the annual cycle. Tissue plasminogen activator complexed with plasminogen activator inhibitor to total plasminogen activator inhibitor ratio, was significantly increased ($p < 0.05$) during hibernation. Protein level of plasminogen activator inhibitor was significantly reduced ($p < 0.05$) during hibernation. These data suggest that ground squirrels do not form blood clots during hibernation, in-part due to suppression of coagulation. Furthermore, hibernators sustain hyperfibrinolytic states even in the absence of blood clots. Although unlikely, any clots formed during hibernation may be less resistant to fibrinolytic degradation.

G.11 The Effect of an *Escherichia coli* OmpR, OmrA, OmrB Triple Mutant on Transcription of the FimB and FimE Genes and Type 1 Pili Expression When Grown in Various pH and Osmolarity Media

Michaela Schmidt
Co-author: William Schwan
Mentor: William Schwan, Microbiology

Uropathogenic *Escherichia coli* (UPEC) are the number one cause of urinary tract infections (UTIs). They express surface adhesion organelles called type 1 pili that are critical for colonizing the surface of the bladder epithelium and lead to UTIs. The fimB and fimE genes are required for type 1 pili production. Transcription of fimB is downregulated by a transcriptional regulator protein named OmpR. OmpR expression is highest in a low pH/high osmotic stress environment, like the environmental conditions found in the human urinary tract. Besides repressing the fimB gene, OmpR can also regulate two small regulatory RNAs (sRNAs) named OmrA and OmrB. Both of these sRNAs can in turn regulate ompR expression. Previously, we have shown that in this same environment OmrA and OmrB are normally expressed, the fimB and fimE genes are downregulated, and UPEC grown in these conditions have lower type 1 pili expression. To determine if OmrA and OmrB act directly or indirectly by regulating ompR expression to regulate fimB and fimE transcription and in turn type 1 pili expression in UPEC, the transcription levels of the fimB and fimE genes and the level of type 1 pili expression in four UPEC strains when grown in various pH and osmolality media will be examined. Our results showed the omrAB ompR triple mutant had the lowest level of type 1 pilus expressed of the four strains that were tested. This suggests that OmrAB may work directly to repress fim gene transcription.

G.12 Role of HPIV-3 Matrix Protein Ubiquitination for Release

Brandon Hayes
Co-author: Michael Hoffman
Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus type 3 (HPIV-3) typically causes upper respiratory tract infections (common cold). However, it can cause severe lower respiratory tract infections in infants, children, the elderly, and the immunocompromised (ie. pneumonia, croup). There are no treatments or vaccines for HPIV-3. Insight into molecular interactions between the virus and cells may provide potential targets for therapies. One HPIV-3 protein of interest is the matrix protein. Matrix proteins (conserved between enveloped viruses) direct assembly and release of virus particles from cells. However, the specific mechanism by which these matrix proteins direct budding differs between viruses. Currently, little is known about how the matrix proteins of the Paramyxoviridae, the family to which HPIV-3 belongs, facilitate release. Ubiquitination of matrix proteins appears to be important for the budding process. In related viruses, Sendai- and Nipah, it was determined that nuclear trafficking of the matrix protein is necessary for budding to occur, and nuclear trafficking was dependent upon ubiquitination of the matrix protein. To determine if the HPIV-3 matrix (M) protein is ubiquitinated, the M protein and HA-tagged ubiquitin (HA-Ub) were co-transfected into 293T cells, and the ubiquitination status of M checked by immunoprecipitation and immunoblot assays. The matrix protein was ubiquitinated, and many matrix-ubiquitin conjugate species were observed. Virus-like particles (VLP's) were collected from the media after co-expression of HA-Ub with M. Via immunoblotting, matrix-ubiquitin conjugate species were detected within VLP's. Matrix mutants with varying budding deficiencies were tested for whether they also had ubiquitination deficiencies. No ubiquitination differences were observed, indicating that the budding deficiencies for these mutants were not ubiquitin related. These results indicate that the M protein is ubiquitinated, and provides insight into M protein-protein interactions within a cell. However, more work is need to determine the involvement of ubiquitin in nuclear trafficking, and the formation of M-directed VLP's.

G.13 21st Century Community Learning Centers: The Impact on Student Engagement

Jessica Showen
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 is positively correlated with improved academic achievement, while lower engagement is correlated with poor grades, dropout, and retention. This study will examine the influence of participation in a 21st Century Community Learning Center on overall school engagement.

G.14 Effects of the *Escherichia coli* Small Regulatory RNAs OmrA and OmrB on Global Transcription and Survival during Growth in Human Urine.

Samuel Grund
Mentor: William Schwan, Microbiology

Urinary tract infections (UTIs) are a common occurrence both in the US and worldwide, with 50-60% of women developing a UTI during their lifetime. The estimated cost of UTIs in the US is 3.5 billion dollars yearly. Around 90% of UTIs are caused by uropathogenic *Escherichia coli* (UPEC). UPEC differentially expresses a variety of genes to establish and maintain UTI in an osmotically stressful, urine-saturated environment. *E. coli* regulates some stress-related genes with small regulatory RNAs (sRNAs). Two sRNAs known to regulate UPEC virulence factors are OmrA and OmrB (OmrA/B), which are expressed in high osmolarity conditions. To investigate genes regulated by OmrA/B in UPEC grown in human urine, UPEC strains UTI89 and UTI89 omrAB grown in human urine were subjected to RNA sequencing. Genes involved in xylose transport/metabolism (i.e., xylA, xylR), a putative Na+/H+ antiporter, and a putative cystathionine Î²-lyase were found to be highly up-regulated in UTI89 omrAB compared to the parent strain after growth in human urine. The transcript levels of these genes were tested with quantitative reverse transcription polymerase chain reaction (qRT-PCR) and were confirmed to be differentially regulated in the UTI89 omrAB strain. To investigate potential roles these genes have in UPEC survival in urine, deletion mutant strains and strains overexpressing these genes will be constructed and their abilities to grow in human urine will be compared to the parent strain.

G.15 Increase of Extracellular Matrix Proteins in Hibernating Ground Squirrels Could Help Maintain Bone Health

Hannah Bergen
Co-authors: Mekaela Opsah, Tyler Billman, Maddie Wienkers, and Elizabeth Nakhla
Mentor: Scott Cooper, Biology

Bone fragility due to bone loss often occurs when patients undergo bed rest or prolonged immobility. Many different avenues have been explored to decrease the amount of bone loss during these periods but none have shown 100% success. 13-lined ground squirrels are a good model organism for bone loss due to the immobility they experience during hibernation. Previous experiments involving ground squirrels showed a decrease in bone density during hibernation while bone strength did not change. Messenger RNAs from the bone marrow of the femur were collected, quantified and compared between hibernating and non-hibernating ground squirrels. Although an increase was seen in certain genes coding for extracellular matrix support proteins during hibernation, assays to detect the actual protein must be performed to see if there was a corresponding increase in the proteins. A general stain for collagen showed no notable change between hibernating and non-hibernating ground squirrels. Immunohistochemistry (IHC) is a type of staining that uses antibodies that bind to a protein of interest and allow for fine-tuned visualization. Antibodies for four proteins (collagen, laminin, integrin and chitinase like protein) were used to visualize protein expression. Discovering how 13-lined ground squirrels are able to maintain bone strength during hibernation could lead to preventing injury in human patients after bed rest of joint immobility. Positive IHC results have shown staining for integrin and chitinase like protein in the bone marrow surrounding adipose cells. Slight staining was also noticeable by chondrocytes in the articular cartilage.

G.16 Effects of a Maximal-Effort Interval Workout on Perceived Mental Toughness and Salivary Hormones in Collegiate Swimmers

Lindsay Schleppenbach
Co-author: Matthew Andre
Mentor: Matthew Andre, Exercise and Sport Science

During maximal-effort sport training, it is typical to observe an increase in testosterone and cortisol; however, this phenomenon has not been well-studied in collegiate swimmers. One study noted a decrease in testosterone after maximal-effort swimming, suggesting that maximal-effort swimming workouts may have differing effects on human physiology as compared to other types of maximal-effort training. Another less-studied factor in swim performance is mental toughness, which is considered to be strong predictor of performance in other athletes. Those who are rated higher for mental toughness are assumed to be able to withstand greater workloads and manage challenging training days better. The relationship between hormonal responses to maximal-effort training and mental toughness has not been thoroughly defined through previous research, especially in relation to the sport of swimming. However, knowledge of this relationship may help to tailor training so that is it “hard enough”for certain athletes while not being “too hard”for others. Therefore, the purpose of this study is to explore relationships between perceived mental toughness and hormonal responses to maximal-effort interval training in collegiate swimmers. Ten female swimmers from the University of Wisconsin-La Crosse will give saliva samples in addition to completing the Mental Toughness Scale before and after a maximal-effort interval workout used during a competition peaking phase. Session-RPE will also be used to determine how each athlete perceived the effort required to complete the workout. Paired-sample t-tests will be used to determine pre-post changes within each variable, while Pearson correlation coefficients will be calculated to determine relationships between each variable.

G.17 Student Anxiety: Examining Teacher Knowledge and Perception

Joseph Hames
Mentor: Robert Dixon, Psychology

Anxiety is the most common mental disorder in the United States amongst adolescents. This study will examine the difference in the amount of knowledge that teachers (middle versus high school) hold, and how that knowledge affects their perception of anxiety disorders. It will also look at different techniques that teachers already use, as well as techniques they would like more training in. With this information, school psychologists will be better equipped to provide consultation and education to staff, thus providing better accommodations for students.

Poster Session B
The Bluffs: 11:00am-12:45pm

G.18 Effect of Hamstring to Quadriceps Ratio on Landing in Healthy College-aged Females

Carly St. Antoine and Tia Collins
Co-author: Becky Heinert
Mentor: Thomas Kernozek, Health Professions

Purpose: Females are 2-8 times more likely to tear their anterior cruciate ligament (ACL) than males in a non-contact injury. One factor that may influence the likelihood of sustaining an ACL injury is the relative strength of the hamstring muscles compared to the quadriceps (hamstring to quadriceps ratio). The hamstrings function to protect the ACL by limiting the amount of anterior (forward) movement that occurs in the knee joint during athletic activities such as landing. It is currently unknown if differences in this ratio have an effect on the knee forces or joint stresses during landing. Methods: Isokinetic and hip abduction isometric strength testing was performed on 65 healthy college-aged female students with no history of knee pain or surgery in the last two years. Participants with the most extreme hamstring to quadriceps ratios were selected to return for motion capture analysis of their landing mechanics during a single leg drop landing from 40cm. Results: 32 females were selected to return for motion capture analysis. We will be analyzing ankle, knee, and hip angles at impact, and peak knee shear forces. Conclusion: We expect differences in these landing variables between those with extreme hamstring to quadriceps ratios.

G.19 Effects of Habitual Foot Strike Patterns on Achilles Tendon Stress in Running

Tess Rademaker and Allie Knaus
Mentor: Thomas Kernozek, Health Professions

The purpose of this study was to determine differences in Achilles tendon loading between habitual rearfoot runners and habitual forefoot/midfoot runners. A convenience sample of females between 18 and 30 years old was recruited from the La Crosse, WI area via flyers and word of mouth. Subjects were required to run 10 miles per week and have no lower extremity pathology. Subjects underwent diagnostic ultrasound of the Achilles tendon to estimate cross sectional area. Using the Helen Hayes method, 47 reflective markers were placed on the participant's body. Ground reaction force data was then collected via 3D motion analysis. Each participant then ran 10 trials across the force plate at a predetermined speed. We hypothesize that there will be differences in kinematics and Achilles tendon loading between habitual forefoot/midfoot and rearfoot runners. These results would be clinically relevant to determine the ideal progression of exercises and foot strike pattern for individuals with Achilles tendon pathology.

G.20 Clinical Implications of the Hip Joint: Variation in the Orientation of the Flexion/Extension Axis

Brenna Dubick and Michelle Losby
Co-authors: Danica Vandendriessche, Hans Severson, Carli Winter, Paul Burant, and Thomas Greiner
Mentor: Thomas Greiner, Health Professions

Purpose: This study was conducted to identify differing axes of hip joint rotation during various flexion/extension motions. Methods: Sixteen female and eight male participants between the ages of 18-30 participated in data collection. An OptoTrakÂ® camera system was utilized to visualize the hip joint orientation in space during a set of flexion/extension open- and closed-chain motions. Rigid clusters were secured to each subject's right thigh and iliac crest. The separate and unique orientation of the flexion and extension axis for each evaluated motion was calculated using the Functional Alignment procedure. Hypothesis: Based on the results of other studies that have showed motion dependent axis orientation differences in the knee and ankle, we expect to find similar differences in the hip. Results: This study failed to demonstrate a difference in the hip joint axis of rotation during various flexion/extension motions ($p > 0.05$). Conclusion: Previous studies have demonstrated the importance of finding the most accurate method of locating hip joint center; however, these studies have not determined whether this axis is identical for all hip movements. If one method of calculation can be determined to be accurate, it can potentially be applied for all flexion/extension hip motions, depending on replication of the results. Thus, indicating the hip joint axis does not vary between various flexion/extension motions. In light of other findings that suggest knee and ankle joint axis orientations vary between open- and closed-chain motions, it becomes important to evaluate the hip joint axis during various

movements. Implications of this study could affect biomechanical reference systems using inverse dynamic calculations.

G.21 Clinical Implications of the Knee Joint: Variation in the Orientation of the Flexion/Extension Axis

Paul Burant and Hans Severson
Co-authors: Carli Winter, Brenna Dubick, Danica Vandendriessche, Michelle Losby, and Thomas Greiner
Mentor: Thomas Greiner, Health Professions

Purpose: In the literature, a discrepancy exists between the orientations of the axis of rotation in the knee joint. Some studies have shown that the transepicondylar axis and the functional axis of rotation are different between various motions; however, to the researcher's knowledge, there has not been a study conducted that analyzes the changes in the orientation of the knee flexion/extension axis of rotation during various activities. Therefore, the purpose of this study was to identify different orientation changes of the axis of rotation at the knee joint during different flexion/extension motions. Methods: The study consisted of eighteen participants which included males and females between the ages of 18-30 years of age. An OptoTrak® camera system was utilized to visualize the knee joint complex orientation in space during a set of flexion/extension open- and closed-chain motions. Rigid clusters were secured to the subject's right thigh and leg. Separate and unique orientations of the flexion/extension axis for each evaluated motion were calculated using the Functional Alignment procedure. Hypothesis: Each motion at the knee has unique orientation of the rotational axis for flexion/extension. Results: Each motion was shown to have a statistically significant ($p < 0.05$) difference in the orientation of the rotational axis. Conclusion: Assessments that make use of a standardized axis orientation should consider variations based on motion rather than applying a standard average. Each clinician should assess the significance of this finding based upon individual circumstances. Circumstances in physical therapy may need to be considered are the design of various knee prosthetics, orthoses, and braces.

G.22 Clinical Implications of the Ankle Complex: The Variations in the Orientation of the Plantar Flexion/Dorsiflexion Axis

Carli Winter and Danica Vandendriessche
Co-authors: Michelle Losby, Paul Burant, Brenna Dubick, Hans Severson, and Thomas Greiner
Mentor: Thomas Greiner, Health Professions

Purpose: This study was conducted to identify the variation in the orientation of the axis of rotation at the ankle joint complex during plantar flexion/dorsiflexion motions. Research has shown that the axis varies within sagittal and frontal planes during motion, but there is limited knowledge analyzing the changes in axis orientation of this joint. Methods: Ten male and twelve female participants between the ages of 18-30 years participated in this study. An OptoTrak® camera system was used to visualize the ankle joint complex orientation in space during plantar flexion/dorsiflexion open- and closed-chain motions. Rigid clusters were secured to each subject's right foot and leg. Separate and unique orientation of the plantar flexion/dorsiflexion axis was calculated for each of the evaluated motions using the Functional Alignment procedure. Hypothesis: The orientation of the rotational axis at the ankle differs with each unique motion. Results: Each motion was shown to have a statistically significant difference ($p < 0.05$) in the orientation the plantarflexion/dorsiflexion rotational axis. Conclusion: The conventional standardized orientation may not suit all patients in all circumstances. This may affect areas in physical therapy such as goniometric measurements, orthotic casting, or prescription of ankle foot orthoses. Each clinician should evaluate the implications of these findings on an individual basis. Suggested future studies should include the analysis of all joints contributing to ankle motions independently rather than as a complex, such as the talonavicular, calcaneocuboid, and subtalar joints. Future research may involve developing motion dependent standards axis descriptions that can be used for modeling plantar flexion/dorsiflexion motions.

G.23 ACL Injury Risk in Unplanned Jump and Cut Tasks

Jessica Herrmann
Co-authors: Cassandra Sauer, Alisha Maciejewski, and Drew Rutherford
Mentor: Drew Rutherford, Health Professions, PT

Background: Anterior cruciate ligament (ACL) injury is a common injury with a prevalence of nearly 100,000 incidents annually in the United States. 70% are defined as non-contact, which is when a person suddenly decelerates while changing direction during running or landing from a jump. ACL injuries are more commonly sustained in female

athletes related to significant biomechanical risk factors for ACL non-contact injury during deceleration performance. A systematic review showed that unanticipated movements are a major contributor to adverse knee mechanics during cutting tasks (Almonroeder, Gargia, and Kurt, 2015). Purpose: The purpose of this study was to determine how healthy college-aged females alter ground reaction forces and joint mechanics for an unplanned jump landing task in response to various directional visual stimuli. Methods: The study was a quasi-experimental design including active college-aged females. The task required participants to jump from a 50 cm height box onto in-ground force plates and immediately cut and run towards a target in one of three directions upon landing. During the jump, a visual stimulus was triggered to direct them towards a randomized direction (forward, left, or right). The target goal was a tether-ball suspended overhead requiring the participant to leap up and grasp the ball with two hands. Participants completed 6 baseline jump trials, 6 practice unplanned jump trials, and three rounds of 10 unplanned jump trials with a one-minute rest period. Results: Future analysis of the data will focus on the changes in ground reaction forces and joint mechanics from baseline jumps to evaluate the risk of ACL injury when reaction movements are performed in an unplanned state.

G.24 Effects of Visual Knee Joint Force Feedback on Patellofemoral Joint Stress during Squatting in People with Patellofemoral Pain Syndrome

Michael Schiller and Amanda Smith
Co-authors: Thomas Kernozek, Drew Rutherford, Chris Durall
Mentor: Thomas Kernozek, Health Professions

Background and Purpose: Patellofemoral pain syndrome (PFP) is an extremely prevalent condition, especially in runners, and is often described as pain behind the knee cap. There is no established cause of this syndrome, but the leading theories are related to patellofemoral joint stress. Stress is a measure of the pressure on the patella and is determined by the joint reaction force at the knee as well as the contact area between the patella and femur. The purpose of this study is to see if visual feedback of knee joint reaction force during squatting can alter squatting mechanics to reduce stress on the knee. Methods: The goal is to recruit 15 college-aged people with PFP, confirmed by a physical therapist. One session of multiple squatting trials was performed. Participants were fitted with 47 reflective markers for 3-dimensional motion capture and analysis by the fifteen cameras located in the LIMS lab. The three squatting trials performed included establishing a baseline squat depth, training with visual feedback of knee force to reduce stress on the knee, and retention. Lastly, a transfer trial was performed to determine if the newly learned squat pattern could be applied to more rapid squatting in time with a metronome. Results: Preliminary results from four participants indicate that the use of visual feedback does not alter squatting mechanics in a way that reduces stress to the knee joint. Data collection is ongoing. Conclusion: In summary, the use of visual feedback during squatting did not decrease the amount of stress on the patellofemoral joint based on our initial findings. Final conclusions should not be made until data have been analyzed on a larger sample of participants.

G.25 Validation of the Pedoped Insole System

Alex Ehlert
Co-authors: Mike Borst, Thomas Kernozek, and Drew Rutherford
Mentor: Thomas Kernozek, Health Professions

Historically, ground reaction force (GRF) data collection in running has only been feasible in collecting one footstrike at a time, in a confined laboratory environment. However, newly developed products such as the Pedoped Insole System (novel gmbh, Munich, Germany) allow for the collection of many more footstrikes over a longer period of time using sensors that can be placed in shoes. Before this technology can be implemented in future studies, it must be validated against the gold standard of a force plate at a higher sampling rate. In the current study, 20 participants ran along a 30 m path demonstrating various footstrike patterns at three pre-determined speeds, completing five trials in each of the nine conditions. Ground reaction force data were collected using a 40 cm x 80 cm Bertec Force Plate (Columbus, OH) for a single step in each condition and matched to the same step's data from the Pedoped Insole System for comparison. Ground reaction force peaks and impulses were compared between the two collection methods. Data analysis is in the preliminary stages currently, with intentions of applying this technology to future running studies if it proves to be a reliable method of GRF measurement.

G.26 The Effects of Visual Biofeedback on Drop Landing Technique and Retention

Elizabeth Skaer
Co-authors: Abigail Anderson, Alyssa Kompelien, Thomas Kernozek, Naghmeh Gheidi, and Drew Rutherford
Mentor: Drew Rutherford, Health Professions PT

Introduction: Significant risk factors for anterior cruciate ligament (ACL) injuries include high vertical ground reaction forces (vGRF) and knee valgus. Visual biofeedback can be used to assist individuals in developing motor control patterns that decrease vGRF and minimize knee valgus. Therefore, visual biofeedback may be a clinically relevant strategy to decrease ACL injuries. Purpose: To identify whether visual biofeedback is effective in improving landing kinetics in females presenting initially with high or low vGRF. Methods: Forty-nine college-aged females performed multiple drop landings before, during and after visual biofeedback. Participants returned one week later for a follow up session. Kinematic and kinetic data were collected using a 15-camera motion capture system and force platforms, respectively. Post-trial feedback including maximum vGRF was given. A hierarchical cluster analysis was performed to yield two different groups based on initial vGRF from the pre-test. A repeated measures mixed model ANOVA ($p < 0.05$ considered significant) was performed on vGRF to analyze group by time effects. Results: There was a significant group by time interaction ($F(2,46)=13.0$, $p < 0.001$). The group (n=16) with a high initial vGRF (4.57 ±.37 BW) demonstrated a statistically significant reduction in post and retention vGRF values from pre-test (-9.0%, 4.16Â±.64 BW, $p < 0.001$; -12.0%, 4.02 ±.43 BW, $p < 0.001$). The group (n=33) with a low initial vGRF (3.31 ±.51 BW) did not show statistically significant differences at post and retention (3.30Â±.52 BW; 3.45Â±.53 BW). Discussion: These results suggest participants starting with a high initial vGRF are able to integrate visual biofeedback to improve landing kinetics within session and at one-week retention. However, this feedback did not cause a change in vGRF in individuals presenting with a low initial vGRF. This suggests feedback needs to be tuned to an individual's unique needs determined through a pre-test screen of landing performance analyzing variables such as peak vertical vGRF.

G.27 Refugee Students: Coping, Acculturation, and Connectedness to School

Ashley Brugger
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

School connectedness is shown to have beneficial outcomes for students, such as increased academic achievement and subjective well-being. Due to the increasing number of refugee students within our schools, gaining insight into coping, acculturation, and other potential factors impacting such students' connectedness to school is particularly important. The outcome of the study will help school psychologists better understand which factors to focus upon within prevention and intervention programs for refugee students.

G.28 The Physiological & Mechanical Positional Demands of a Division III Women's Collegiate Soccer Match

Jamie Ochsenwald
Co-authors: Glenn Wright & Claire Harnell
Mentor: Glenn Wright, Exercise and Sports Science

Understanding the demands of competition are important for strength & conditioning and sport coaches to develop training programs. Our purpose was to understand the physiological and mechanical positional demands of competing during a Division III women's soccer match. Twenty-three women collegiate soccer players wore microtechnology units on a chest strap during 17 matches. Heart rate (HR), physiological load (PL), physiological intensity (PI), mechanical load (ML), mechanical intensity (MI) and movement activities were recorded during competitive matches and analyzed at different positions (forward, midfield, defender, goalkeeper) as per half values (45-minutes). As expected, there were differences between positions. Midfielders accumulated the most PL & ML along with the highest PI & MI, while goalkeepers had the lowest compared to all other positions. Goalkeepers completed a significant percentage of time (91%) in the blue zone (<75% HRmax) compared to other positions. Percentage of time spent in the red zone (90-100% HRmax) was significantly different between all positions. Forwards spent 65.9% in the red zone, while midfielders, defenders, and goalkeepers spent 60.9%,43.2%, and < 1%, respectively. The total step count for a half by goalkeepers, forwards, midfield, and defenders were 1942, 3005, 3466, and 4727 steps per half of a match, respectively. Midfielders had the highest percentage of steps in the running (63.3%) and high intensity running (2.2%) zones, followed by forwards (56.9%, 1.9%) and defenders (56.2%, 2.1%). Goalkeepers were in the running zone 7.3%

and high intensity running zone for 1.3% of their step total. With this type of information, coaches will be able prepare players for the specific demands of a Division III soccer match, although competitive style and coaching philosophy will determine more accurate information for a particular team. These results also demonstrate there may be different physical demands placed on different positions during a competitive match.

G.29 Ultrasound Imaging Assessment of Femoral Articular Cartilage Changes during Running.

Michael Borst
Co-author: Thomas Kernozek
Mentor: Drew Rutherford, Health Professions, PT

Background: There is a stigma that continuous high intensity loading causes damage to articular cartilage resulting in knee pathologies. Recent research on the effects of running on knee cartilage have used magnetic resonance imaging (MRI) to gather data on different cartilage health markers. Recently it has been suggested that another option for analyzing cartilage exists in the use of ultrasound (US) imaging. US imaging allows for cartilage thickness measures that have been suggested to correlate with joint pathologies such as osteoarthritis (OA). This presents with a more efficient, inexpensive, and mobile way to assess cartilage than MRI (Harkey et al. 2016). Purpose: The purpose of this project is to determine how running influences knee cartilage thickness measured with US imaging during a 30-minute run. Methods: Participants are asked to rest in a seated position for 30 minutes followed by a treadmill run for 30 minutes at a self-selected speed. Measurements of femoral condyle cartilage are taken every 10 minutes. Cartilage thickness is measured using a musculoskeletal probe on a GE Logiq P6 ultrasound (General Electric). All measurements are taken with participants seated on a table, back against a wall, and dominant knee in 140 degrees of flexion (Harkey et al. 2016). The run was performed with Novel Pedoped Insole Sensor system (Munich, Germany) placed within the shoes. These wireless sensors are used to measure vertical ground reaction forces (vGRF) at 100 Hz. Having vGRF measures allows an understanding of overall impact load being transmitted in running which may relate to cartilage thickness changes. Conclusion: The use of ultrasound imaging has been demonstrated to successfully measure knee cartilage thickness over the course of a run. Future analysis will focus on the magnitude and consistency of these effects with a greater number of participants, and the cumulative effect of measured impact forces.

G.30 Monitoring Workload and Fatigue to Predict Incidence of Soft Tissue Injury

Claire Harnell
Co-authors: Glenn Wright and Jamie Ochsenwald
Mentor: Glenn Wright, Exercise and Sport Science

Gaining knowledge in injury prevention is important in the career field of athletic training and sports medicine. The purpose of this study was to try to understand the prevalence of injury rates based on the loads experienced by a Division III women's soccer team and in turn aim to determine a relationship between workload and incidence of soft tissue injury. Twenty-three women collegiate soccer players wore microtechnology units on a chest strap for the duration of the season including pre-competition, competition, and late-competition phases. Team values were recorded for monotony strain (mechanical and physiological) and training stress balance ratio (mechanical and physiological) during each training and competitive sessions. Non-contact injury mechanisms were the focus and was only considered valid if the athlete missed time or participation in any aspect of the training/game session and had an evaluation/diagnosis by the athletic training staff. The findings of this study showed that there was not a definite correlation between an athlete having a large increase in their activity load and injury; however, there were trends found in linking the two together. There were multiple instances in the acute/chronic ratio team data where there was a spike in injury incidence following a drop in the previous weekly workload. This showed that during the recovery weeks, the loads may have provided too low of a stimulus to maintain fitness and in turn possibly increasing risk of injury.

G.31 Relationships Between Salivary Hormones and Perceived Recovery in Collegiate Cross-Country Runners

David Zettler
Mentor: Matthew Andre, Exercise and Sport Science

The objective of this study was to determine the relationships between subjective measures of recovery and stress, such as the Perceived Recovery Scale, and objective measures of stress, such as salivary testosterone and cortisol, in collegiate cross-country runners. The study involved 20 UWL cross-country runners (10 women, 10 men) giving saliva once weekly for the entire season. During saliva collection, athletes were asked to complete two surveys: the Perceived

Recovery Scale (Laurent et al., 2011) and the Perceived Stress Scale (Cohen et al., 1983). Weekly training stress will be assessed as the volume of running each athlete performs during the week. Repeated measures ANOVA with partial eta squared effect sizes and Pearson correlations will be used to determine weekly changes in the variables as well as relationships between variables.

GRADUATE ORAL PRESENTATION ABSTRACT

GRAD.1 Identifying Changes in the Gut Microbiome of *Biomphalaria glabrata* in the Presence and Absence of *Echinostoma caproni* Infection

Brittany Brown
Co-author: Gregory Sandland
Mentor: Gregory Sandland, Biology

Biomphalaria glabrata is a well-studied intermediate host for several medically important parasites, including *Echinostoma caproni* and *Schistosoma mansoni*. Previous work shows that infection with *S. mansoni* affects *B. glabrata* life history traits but no work has been done to determine how gut flora is impacted by parasitic infection and if these changes are associated with life-history trait expression in host snail. To test this, forty *Biomphalaria glabrata* snails were either exposed or sham exposed (controls) to *Echinostoma caproni miracidia*. Snails were then maintained in individual cups for the next 12 weeks to allow for infection progression. Host life-history traits (growth, reproduction and survival) were be quantified during this time. At the end of that period, all snails were sacrificed. Three snails from infected and control groups were dissected to check for patent infection, and their intestinal tracts sectioned and stained to check for intracellular bacteria. A second group of snails from infected and control treatments had their microbiome DNA extracted and was sent to MR DNA laboratories to have 16s PCR sequences analyzed to determine gut flora species and microbiome composition. The data was used to interpret the changes in the gut community and correlate them to life history traits such as longevity and reproduction. Since host health and resistances are being increasingly correlated to gut microflora in other animals, the interactions between gut flora and parasites prove to be a valuable insight into parasite ecology.

2016 RECIPIENTS OF UNDERGRADUATE RESEARCH AND CREATIVITY GRANTS

Name	Department	Mentor	Title
Emily Abromowicz	Chemistry and Biochemistry	Ressano Desouza-Machado	Comparative Analysis of Subsistence Patterns in Lipid Residues from Tremaine and Correctionville Ceramics Using Gas Chromatography and Mass Spectrometry
Charlotte Alexander	Biology	Anita Baines	Classification of Streptomyces Isolates and Determination of Antibiotic Producing Genes
Christina Bastian	Exercise and Sport Science	Matthew Andre	Monitoring Recovery Status in Female Collegiate Swimmers
Samantha Beilfuss	Sociology	Timothy Gongaware	Exploration of Capitalistic Encroachment on Sense of Place
Amanda Bradley	Biology	Todd Osmundson	Effects of Analytical Parameter Settings on Estimating Patterns in Diversity of Tropical Leaf-Associated Fungi
Madeline Brunner	Chemistry and Biochemistry	Daniel Grilley	Two-Partner Secretion Mechanism and Hemolytic Activity of Hemolysin Protein A, HpmA, in *Proteus Mirabilis*
Jared Buntin	Exercise and Sport Science	Cordial Gillette	The Effects of VooDoo Floss Band® Application on Ankle Dorsiflexion Range of Motion
Erin Butke	Exercise and Sport Science	Cordial Gillette	Compression with Ice Immersion: A Look at Tissue Temperatures
Taylor Caldwell	Sociology	Julia McReynolds-Perez	Homeless Patients' Healthcare Experiences in La Crosse, Wisconsin
Alyssa Cooke	Biology	Eric Strauss	The Influence of Lead Toxicity on Nitrification Rates in Myrick Marsh Sediments
Zachary Cowell	Economics	Mary Hamman	Correlation between Cigarette Tax Hikes and Adult-onset Asthma
Julianna Cruz, Peter Roth, Emily Schneider	Biology	Eric Snively	Developing Predictive Models of Biped and Quadrupeds Physiology
Katherine Davenport	Chemistry and Biochemistry	Daniel Grilley	DNA Stability as a Factor of Cation Concentration
Timothy Davie	Chemistry and Biochemistry	John May	Characterizing the Function of *Salmonella enterica* Protein DcrB
Kimberly Drangeid	Economics	Mary Hamman	Medical Adherence among Asthma Patients When Insurance Plans Change
Stephanie Drefahl	Economics	Donna Anderson	Financial Well-Being and Happiness: A Comparison of German and US Economics University Students
Jordon Drohner	Sociology	Julia McReynolds-Perez	Influence Factors in the Latinx Health Paradox
Brandon Emerson	Archaeology and Anthropology	Kate Grillo	GIS Analysis of an Auger Survey at the Archaeological Site of Luxmanda, Tanzania
Lindsey Felt	Sociology	Nicholas Bakken	Impacts of Successful Reintegration for Offenders: Neighborhood Structure Versus Home Structure
William Feltz	Archaeology and Anthropology	David A. Anderson	Amassing a Public, 3D Digital Archive of Type Specimens for Oneota Culture Ceramics

Name	Department	Mentor	Title
Marlee Frietag, Cole Tidemann	Exercise and Sport Science	Naoko Aminaka	Flexibility and Jump Performance in Previously Injured Knees
Melissa Hammer, Reid Johnson	Biology	Christine Schwartz	Regional Expression of ARC in the Thirteen-Lined Ground Squirrel Brain during Hibernation
Emma Herms, Kristina Sousou	Psychology	Alessandro Quartiroli	“Help! I need somebody” Effects of Stigma Surrounding Mental Health on Attitudes Towards Seeking Treatment
Noah Giebink	Biology	Barrett Klein	Napping on the Job? Defining A Potential Sleep State in Lazy Temnothorax Rugatulus Workers
Nicole Hoffmann	Art	Kathleen Hawkes	Female Athletes through Photography
Dylan Jester	Psychology	Ellen Rozek	Heart-Rate Variability Biofeedback: Implications for Cognitive and Psychiatric Effects in Older Adults
Drew Keeley	Economics	Mary Hamman	Naloxone Access Laws Effect on Opioid Related Overdoses
Megan Kowalczyk	Exercise and Sport Science	Naoko Aminaka	The Effects of Corrective Exercises on Improving Functional 5+ Scores
Sara Krueger	History	Ariel Beaujot	Hear, Here: Local History in the Classroom
Adam Kuhn	Political Science and Public Administration	John Kovari	Residency Laws: Explaining Its Impact on Local Property Values
Courtney Lloyd, Nicolette Scaffidi	Psychology	Grace Deason	Do Primed Prejudices Influence Helping Behavior?
Michael D. Loebertman, Carly Southwick	Biology	Jennifer Klein	CRISPR Mediated Genome Editing in Zebrafish to Study Age-Related Muscle Decreases
Whitney Malin	English	Darci Thoune	Gender and the Writing Center: Critically Evaluating Gendered Communication
Meara Malloy	Exercise and Sport Science	Naoko Aminaka	The Effect of Short Foot Exercises on Intrinsic and Extrinsic Foot Muscle Fatigue
Anna Marchand	Biology	Christine Schwartz	Seasonal Aggrecan Expression in Ground Squirrel Brain
Megan Marlowe	Chemistry and Biochemistry	Kelly Gores	Characterization of the Ordered Domain of Epstein Barr Viral Protein BRRF2
Siobhan McDonnell	Psychology	Katherine Kortenkamp	The NGRI Defense: The Influence of Neurological Evidence for a Psychopathic Defendant
Jeff Meckstroth	Geography and Earth Science	Gargi Chaudhuri	The Effect of Food Deserts on Obesity Rates
Bailey Morrow	Biology	Christine Schwartz	Seasonal Expression of HAPLN2 in the Ground Squirrel Brain
David Mueller	Biology	Faye Ellis	Inquiry Based Learning Activities: A Novel Approach to Histology Education
Tobias Nelson	Physics	Roberto Salgado	Applying Differential Forms to Electromagnetism in Spacetime
Cristian Noriega-Sagastume	Student Affairs Administration	Tori Svoboda	Managing Immersion and Integration In Identity Conscious Organizations
Sara Opffer	Sociology	Dawn Norris	The Impact of Unequal Elementary and Secondary Public School Funding on Postsecondary Degree Completion
Abraham Packard	Biology	Barrett Klein	An Inordinate Fondness For Beetles

Name	Department	Mentor	Title
Alyssa Patten	Biology	Tisha King-Heiden	Zebrafish Exposure to Triclosan and Effects of Endocrine Disruption on Thyroid Axis
Sarah Pease	Health Education and Health Promotion	Robert Jecklin	How Do Some Elder Champions Explain Their Experience with Optimal Aging?
Kasey Pesch	Art	Kathleen Hawkes	Reducing Stigmas against Tattoos
Julianne Pleshe, Rebekah Kienzle	Art	Jennifer Terpstra	Wish You Were Here Postcard Mural
Stephanie Prasser, Chelsey Windl	Psychology	Tesia Marshik	Limiting Learning: The Effect of Labeling Students as Learning Disabled on Academic Performance
Kaitlyn Pudenz	Archaeology and Anthropology	Katherine Grillo	Taking a Closer Look: A Comparative Study of Organic Tempers
Danielle Pursell	Art	Bradley Nichols	Spiritially Ecological Approach to Blacksmithing
Karl Radke	Geography and Earth Science	Colin Belby	Habitat Mapping in the Belize Barrier Reef Using Side Scan Sonar
Damien Rasmussen	Chemistry and Biochemistry	John May	Investigating the Physical Interaction between the Enterobacterial Common Antigen and WzzE Copolymerase Protein in Salmonella Typhimurium
Damien Rasmussen	Chemistry and Biochemistry	John May	Structural and Functional Characterization of a Novel Periplasmic Protein Associated with the Ability of Salmonella to Survive in Low Levels of Magnesium.
Hunter Rehm	Mathematics and Statistics	Nathan Warnberg	Anti-van der Waerden Numbers on Grid Graphs
Jessi Reidy	Psychology	Suthakaran Veerasamy	The Effect of One's Religiosity on Forgiveness of Self and Others
Kristin Reque	Sociology	Laurie Cooper Stoll and Nicholas Bakken	A Need for Needles: A Qualitative Examination of La Crosse County Injection Drug Use and Harm Reduction Strategies
Jordan Reuter, BethAnn Zenk	Psychology	Berna Gercek-Swing	Islamophobia: Not Something to Laugh About
Margaret Rippe	English	Bryan Kopp	Nudity and Sexuality: Genre Studies and Ernest Ludwig Kirchner
Joseph Rogers	Economics	Mary Hamman	The Lack of Health Insurance Literacy and Its Effect on Consumer Decisions
Phoenix Rogers	Biology	Eric Strauss	Driftless Area Stream Metabolism
Jaelyn Roland	Archaeology and Anthropology	Constance Arzigian	Houston County Minnesota Ceramic and Historical Artifact Analysis
Alanna Roesler, Trent Schafer	Psychology	Jessica Sim	The Interactive Influence of Interest and Perception on Training Outcomes
Michael Rosenberg	Art	Misha Bolstad	Moving from Controversy to Conversation: The Possibilities and Use of Interactive Design
Christopher Rudolph	Political Science and Public Administration	John Kovari	Electronic Monitoring and Its Effect on Signature Bond Recipients
Michael Scheidt	Chemistry and Biochemistry	Kelly Gores	Characterization of Epstein-Barr Virus Tegument Protein

Name	Department	Mentor	Title
Benjamin Schilz	Biology	Todd Osmundson	Who Got There First? : How Yeast/Bacterial Colonization Affects Biofilm Structure in Kombucha, a Food Product and Potential Model for Studies in Multispecies Biofilm Formation
Jaime Schmidt	Psychology	Alexander O'Brien	That Sounds Suspicious: An Empirical Investigation into the Detectable Perceptual Differences between Expensive and Inexpensive Headphones
Kaitlin Seebruch	History	Victor Macías-González	Tennessee Williams' Muse in Mexico
Marissa Stehly	Exercise and Sport Science	Karen Skemp	The Effects of a Ketogenic Diet on Body Composition in Female Resistance Training Athletes
Christine Stein	Theatre Arts	Laurie Kincman	How to Bring the Efficiency of the London Theatre Industry to the United States
Brittany Tashner	Art	Kathleen Hawkes	Through the Eyes of UWL
Kathryn Thompson	Biology	Sumei Liu	Effect of Hibernation on the Smooth Muscle Layer of the Digestive Tract of the Thirteen-Lined Ground Squirrel
Janek Walker	Chemistry and Biochemistry	Nadia Carmosini	An Analysis of Physical and Chemical Soil Properties as Environmental Risk Factors in the Spread of Chronic Wasting Disease
Valerie Watson	Archaeology and Anthropology	David Anderson	Identifying and Examining Construction Phases at Ballintober Castle
Benjamin Weinhaus	Chemistry and Biochemistry	Kelly Gorres	Epstein-Barr Virus: Cancer by Viral Influence
Drake West	Microbiology	Bonnie Bratina	Clean Energy from Magnetotactic Bacteria
Elizabeth West	Art	Karen Terpstra	Sins of the Father
Sabrina Wolter	Exercise and Sport Science	Matthew Andre	Do Changes in Sleep Quality Relate to Changes in Other Monitoring Variables?
Gemma Zahradka	Archaeology and Anthropology	Amy Nicodemus	Animal Remains as Grave Goods at the Bronze Age Sites of Mokrin and Ostojićevo, Serbia

2016 RECIPIENTS OF THE GRADUATE RESEARCH, SERVICE, AND EDUCATIONAL LEADERSHIP AWARDS

Name	Program or Department	Project Advisor	Title
Brent Anderson	Therapeutic Recreation	Susan Murray	Becoming a Certified Inclusivity Assessor to Promote Physical and Social Inclusion
Amy Baker	Microbiology	William Schwan	The Effects of a Putative Two-Component Regulatory System in *Staphylococcus aureus* on Biofilm Formation and Sontase A Expression
Hannah Bergen	Biology	Scott Cooper	Detecting Increase of Proteins Seen in Ground Squirrel Bone Marrow Transcriptome
Alison Bonis	Biology	Scott Cooper	Regulation of Neutrophil Extracellular Trap Formation during Hibernation in the Thirteen-Lined Ground Squirrel
Andrea Bruce	Biology	Todd Osmundson	Mycoremediation Potential of Diesel-Contaminated Soil by the Simultaneous Inoculation of a Brown Rot and White Rot Fungus
Ashley Brugger	School Psychology	Daniel Hyson	Refugee Students: Coping, Acculturation, and Connectedness to School
Madelyn Byra	Exercise and Sport Science	Matthew Andre	Hormonal and Psychological Responses to High-Intensity Exercise in Recreational Runners
Kathryn Cardwell	Exercise and Sport Science	Glenn Wright	A Comparison of Neuromuscular Fatigue in Division III Collegiate Baseball Catchers and Position Players
Kaylie Connaughty	Student Affairs Administration	Tori Svoboda	Early Alerts: Designing Feedback for Student Success
Robert Crowley	Biology	Anne Galbraith	Determining Mechanism of Action of Compound SK-03-92 by Gene Expression of Treated *Saccharomyces cerevisiae*
Merissa Cutter	School Psychology	Betty DeBoer	Using Video for Parent Training: Impacting Children with ASD
Samuel T. David	Biology	Tom Volk	Occurrence and Identification of Fungal Endophytes from *Carex pensylvanica* in Sand Prairies
Tim Green	Biology	Anne Galbraith	Morphological Responses of Eukaryotic Cells to SK-03-92 Treatment
Samuel Grund	Microbiology	William Schwan	The Effect of the *Escherichia coli* Small Regulatory RNAs OmrA and OmrB on Global Transcription Following Growth in Human Urine
Claire Harnell	Exercise and Sport Science	Glenn Wright	Determining the Relationship between Workload, Fatigue, and Soft Tissue Injuries
Brandon Hayes	Microbiology	Mike Hoffman	Role of Parainfluenza Virus Type 3 Matrix Protein Ubiquitination for Release
Kaela Hoecherl	Exercise and Sport Science	Andrew Jagim	Long-Term Effects of a Multi-Ingredient Pre-Workout Supplement on Markers of Clinical Health and Exercise Performance in Active Females
Matthew Hoogland	Biology	Jennifer Klein	Conformational Stability and Thermodynamic Analysis of Protein Binding in Oxidized Calmodulin

Name	Program or Department	Project Advisor	Title
Aaron Kumlien	Biology	Tom Volk	Presence of Fungal Heterotrophic Nitrification in Aquatic Sediments
Katherine Mabery	Therapeutic Recreation	Susan Murray	Becoming a Certified Inclusivity Assessor to Promote Physical and Social Inclusion
Charles Martin-Stanley II	Student Affairs Administration	Jörg Vianden	The Panopticon of Racism: The Systemic Removal of Black Men from Higher Education
Matthew Molini	School Psychology	Jocelyn Newton	Mental Health Stigma in High School Athletes Transitioning to College
Anna Nelson	Exercise and Sport Science	Andrew Jagim	The Long-Term Effects of MusclePharm Fitmiss Ignite on Resting Energy Expenditure and Body Composition in Recreationally Active Females
Lauren Nixon	School Psychology	Daniel Hyson	Family-School Partnerships: Parent Perceptions across the Years
Jamie Ochsenwald	Exercise and Sport Science	Glenn Wright	Determining the Mechanical and Physiological Demands of Division III Collegiate Women's Soccer Matches
Lauren Powers	School Psychology	Betty DeBoer	Trauma-Informed Care Consultation: Fostering Trauma-Informed Interaction and Instruction
Michael Schiller	Health Professions	Thomas Kernozek	Patellofemoral Joint Loading and Pain Response during Squat Activities
Lindsay Schleppenbach	Exercise and Sport Science	Matthew Andre	Effects of a Maximal-Effort Interval Workout on Perceived Mental Toughness and Salivary Hormones in Collegiate Swimmers
Michaela Schmidt	Microbiology	William Schwan	Determine How an OmpR, OmrA, OmrB Triple Mutant in *Escherichia coli* Affects Type 1 Pili Expression
Kristin Short	Biology	Sierra Colavito	Determination of the Role of the PI3 Kinase Pathway as a Mediator of Resistance to CHK1 Inhibitor Therapy in Mutant BRCA1/2 Breast Cancer Cells
Alec Sime	Biology	Peg Maher	Exploration of the Mechanism for Autologous Adipose-Derived Stem Cell and Platelet-Rich Plasma Combined-Therapy on Cartilage Regeneration
Laura Sommers	School Psychology	Daniel Hyson	Peer Coaching: Influencing Teacher Self-Efficacy and Relationships with Challenging Students
Carly St. Antoine and Tia Collins	Health Professions	Thomas Kernozek	Effect of Immediate Visual Feedback during Drop Landings on Impact and Joint Positions in Healthy Female Athletes
William Sustercich	Exercise and Sport Science	Andrew Jagim	Effect of Progressive Fatigue on Session RPE
Adam Vance	Microbiology	Bonnie Bratina	Characterization of Lead Resistance Mechanisms in Myrick Marsh
Taylor Vieau	Therapeutic Recreation	Susan Murray	Becoming a Certified Inclusivity Assessor to Promote Physical and Social Inclusion
Allison Wolf	School Psychology	Robert Dixon	School-Wide PBIS Implementation: Impact on Behavioral and Academic Outcomes
Rochelle Zabadal	School Psychology	Jocelyn Newton	Paraprofessional Burnout: Examining the Impact of Educational Team Involvement

Name	Program or Department	Project Advisor	Title
Brooke Zajac	Exercise and Sport Science	Andrew Jagim	The Long-Term Effects of MusclePharm Fitmiss Ignite Supplementation on Clinical Health Markers in Recreationally Active Females
David Zettler	Exercise and Sport Science	Matthew Andre	Does Perceived Recovery Relate to Hormonal Status in Collegiate Crosse Country Runners?

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Presenter Index

U=undergraduate poster; UR=undergraduate oral; G=graduate poster; GRAD=graduate oral; E=exhibit

NAME	ABSTRACT	NAME	ABSTRACT	NAME	ABSTRACT
Murphy, Aidan	U.77	Schleppenbach, Lindsay	G.16	Watson, Valerie	U.100
Murphy, Krissie	E.4	Schmidt, Sara	U.90	Wedal, Justin	U.101
Myhre, Caroline	U.78	Schmidt, Michaela	G.11	Willett, Kari	U.102
Nelson, Alyssa	UR.11	Schornak, Rachel	U.91	Winter, Carli	G.22
Nelson, Kallie	U.15	Schroeder, Aysia	U.71	Wolf, Allison	G.4
Nelson, Nicole	U.80, U.81	Schuette, Jackson	U.54	Wolfe, Jake	U.12
Nelson, Sophia	U.79	Seebruch, Kaitlin	U.44	Wolter, Sabrina	U.103
Nelson, Tobias	U.37	Severson, Hans	G.21	Woodcock, Zachary	U.104
Nixon, Lauren	G.3	Short, Kristin	G.7	Yahn, Payton	UR.6
Nordstrom, Zac	U.12	Showen, Jessica	G.13	Yang, Gaokhia	U.105
Ochsenwald, Jamie	G.28	Skaer, Elizabeth	G.26	Zahradka, Gemma	U.107, U.106
O'Connor, Ryan	U.69	Smith, Trenten	U.45	Zancho, Hanna	U.95
Pablo San Emeterio, Juan	U.69	Smith, Amanda	G.24	Zander, Kaitlyn	UR.10
Packard, Abraham	U.82	Sokup, Ryan	U.46	Zettler, David	G.31
Patten, Alyssa	U.83	Sommers, Laura	G.6		
Pease, Sarah	U.38	Sorensen, Kelly	U.21	Students of J. Scott Baker	E.1
Peeters, Alex	UR.9	Southwick, Carly	U.31		
Pekol, Julianne	U.84	St.Antoine , Carly	G.18		
Pellett, Jordan	U.39	Stehly, Marissa	U.47		
Porior, Zachary	U.40	Stone, Jacob	U.92		
Powers, Lauren	G.8	Sweetman, Mari	U.10		
Pudenz, Kaitlyn	U.85	Szeszol, Michael	U.93		
Rademaker, Tess	G.19	Taylor, Rebecca	UR.7		
Radke, Karl	U.41	Tchernev, Daniel	U.94		
Rago, Kaitlyn	U.11	Temanson, Eli	U.48		
Rahman, Zarif	U.32	Tenpas, Tanner	U.49		
		Thomas, Kemmesha	U.50		
Rasmussen, Damien	U.86	Thompson, Kathryn	UR.3		
Reque, Kristin	UR.1	Thorton, Danielle	U.84		
Reyes, Alexander	U.46	Tidemann, Cole	U.13		
Roehri, Olivia	E.3	Trybula, Brittney	U.84		
Rogers, Joe	U.42	Ulry, Eric	U.95		
Rogers, Phoenix	U.87	Vaassen, Kelsey	U.29		
Roland, Jaelyn	U.43				
Roth, Peter	UR.8	Vandendriessche, Danica	G.22		
Rudolph, Chris	UR.5	Vannatta, Nate	U.50		
Sander, Emily	U.25	Vinson, Megan	E.3		
Scaffidi, Abby	U.84	Walker, Janek	U.96		
Scheidt, Michael	U.88	Wallace, Myranda	U.97		
Schiller, Michael	Gadank.24	Wasson, Ashley	U.98		
Schilz, Benjamin	U.89	Waters, Eleanor	U.99		

ACKNOWLEDGEMENTS

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ABSTRACT BOOK EDITORS

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COMMENTS OR SUGGESTIONS?

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