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April 10, 2018
The Student Union

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

SCHEDULE OF ORAL PRESENTATIONS

	Room 3110	Room 3120	Room 3130
9:00 to 9:20		**UR.1** **Colin Giles** Mathematics & Statistics Rainbow Sums	**UR.5** **Kathryn Thompson** Biology Effect of Hibernation on the Smooth Muscle Layers of the Gastrointestinal Tract in Thirteen-Lined Ground Squirrels
9:25 to 9:45	**GRAD.1** **William Kiser** Biology Large Scale Evaluation of Reed Canary Grass Suppression across Four SE Minnesota Floodplain Sites	**UR.2** **Kelli Hirt, Michael Ericksen, and Mickey Rice** Health Ed / Health Promotion Let's Talk About Sex	**UR.6** **Haley Ingersoll** Sociology Exploring Stereotypical Expectations of Masculinity and Their Relationship to Stigmatization of Schizophrenia Using Stereotype Content Model
9:50 to 10:10	**GRAD.2** **Aaron Karo** Biology Effects of Urocortins on Intestinal Secretion in the Mouse Colon *In Vitro*	**UR.3** **Kelly Emmrich** Mathematics & Statistics Norm-Euclidean Ideal Classes in Galois Cubic Fields	**UR.7** **Sara Nagengast** Sociology Homeless Identities and Their Influence on Service Utilization
10:15 to 10:35	**GRAD.3** **Nick Faulds** Physical Education Teaching Perceptions of Universally Designed Adventure Education	**UR.4** **Jaelyn Roland** Archaeology & Anthropology Restorative Justice at Lincoln Middle School in La Crosse, Wisconsin: An Anthropological Evaluation	**UR. 14** **Taylor Franklin** Economics Culture and Female Entrepreneurship: A New Look Into Economic Development across Nations

10:40 to 11:00	No	Presentations	Scheduled
11:05 to 11:25		**UR.8** **Abraham Packard** Archaeology & Anthropology The Gills Rock Petragraphs - Origins	
11:30 to 11:50			**UR.11** **Rebecca Lenski** History Martha Bullert: An Extraordinary 20th Century Single Woman
11:55 to 12:15		**UR.9** **Maya Schulte** Sociology Pregnancy in Prison: A Doula's Perspective	**UR.12** **Steve Bonin** History Determining Patterns of Interaction between Native Americans and the Spanish, Mexican, and United States Governments throughout History
12:20 to 12:40		**UR.10** **Jordan Pellett** Mathematics & Statistics Modeling Chronic Vascular Responses Following a Major Arterial Occlusion	**UR.13** **Rebekah Bain** History History on the Go

UNDERGRADUATE STUDENT ABSTRACTS

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

U.1 Physician Dictation Times before and after Implementation of Syngo Workflow and Nuance

Hali Priest
Co-authors: Abigail Grancorvitz
Mentors: Aileen Staffaroni and Carlyn Johnson, Health Professions

Purpose: The Joint Commission (TJC) utilizes physician dictation times as a quality metric for comparing healthcare organizations. To better facilitate this metric, the Marshfield Clinic implemented Nuance, a voice recognition system along with syngo Workflow (sWF), a program used to manage workflow in a radiology department, to track procedures, enable physician dictation of patient reports, and eventually upload finalized reports to Combined Medical Records (CMR); without this process the patient reports would not be visible to referring physicians. This study analyzes the time it takes from the completion of a nuclear medicine procedure to physician report upload to CMR before and after the implementation of syngo WorkFlow and Nuance. Methods: Two hundred three patient request end times and physician dictated times were gathered 13 weeks before and 13 weeks after the go live date for sWF and Nuance. The difference between the end times and dictated times was documented and averaged for each time period. Minimum, maximum, and average standard deviation values were also calculated and documented. It is important to note that data was not analyzed four days before and twelve days after the go live date of sWF due to the WannaCry Crisis that occurred during that time period at the Marshfield Medical Center. Results: Before sWF and Nuance were implemented, the average patient turnaround time was 72 minutes with a minimum time of 2 minutes, a maximum time of 600 minutes, and an average standard deviation of ±103 minutes. After implementation, the average time is 101 minutes with a minimum time of 7 minutes, a maximum time of 534 minutes, and an average standard deviation of ±95 minutes. Conclusion: Theoretically, sWF and Nuance should decrease the patient report turnover rate; however, this is not currently being witnessed at our facility. It is presumed that overtime, once the physicians get more comfortable with the program, sWF and Nuance should indeed minimize the patient report turnaround times.

U.2 Myocardial Perfusion SPECT/CT Imaging on Patients with Dextrocardia and Situs Inversus

Tristan Maki
Co-authors: Amy Bell
Mentors: Aileen Staffaroni and Carlyn Johnson, Health Professions

Purpose: Dextrocardia with situs inversus is a condition where a patient's heart along with their chest and abdominal organs are oriented in a mirror image from the anatomical norm. Therefore, the patient's heart lies to the right of the midline with the apex of the heart pointing toward the right side of the body. SPECT/CT systems work well when performing myocardial perfusion imaging (MPI) procedures on patients with standard anatomy, but oftentimes the camera protocols fail to easily acquire dextrocardia with situs inversus patients due to their condition. The purpose of this research is to establish a MPI protocol for imaging patients who have dextrocardia with situs inversus that can be utilized by our department. Methods: A SPECT phantom with a cardiac insert (Data Spectrum Corporation) containing a mid-anterior defect was acquired using a Siemen's Symbia T-series SPECT/CT system equipped with low energy high resolution (LEHR) collimators. The cardiac insert and the phantom were filled with 0.35 mCi and 4.52 mCi of Tc-sestimibi, respectively. The camera manufacturer's acquisition protocol for situs inversus used the same parameters as a standard MPI study with the exceptions that the starting angle was at 135ï‚° and the camera heads were positioned so that Head 1 was at the right lateral and Head 2 at the anterior. Acquired images were then processed using the camera manufacturer's situs inversus processing protocol, which flipped the images to appear in standard anatomic position for easier reading by the physicians. Conclusion: Images acquired using a cardiac phantom placed in the dextrocardia with situs inversus position were successfully acquired and reconstructed, albeit with many difficulties. The camera manufacturer's protocol, which has not been validated, offered a starting point for our department to successfully develop a protocol for this type of patient.

U.3 GeoPhysical Surveys at the Jewish Cemetery on Losey Boulevard, La Crosse, Wisconsin

Brandon Emerson
Mentor: David Anderson, Archaeology & Anthropology

For many people, cemeteries are places where they go to remember loved ones that have passed on. Unfortunately, sometimes families did not have enough money to mark a grave, or without proper care and maintenance, tombstones and other grave markers either deteriorate beyond recognition or are destroyed entirely. If there is no grave marker, it makes visiting a loved one's gave nearly impossible. The members of the Congregation Sons of Abraham understand this problem well, as a portion of their cemetery is missing many of the grave markers or never had them at all. Trying to find unmarked graves has always been a struggle due to the fact that people do not want the graves disturbed. For archaeologists this can be a major issue since most of the work by archaeologists cause ground disturbances. Thanks to modern technology though, archaeologists are starting to be able to move past this dilemma. Geophysical testing, colloquially known as "remote sensing", is a series of methods that attempt to detect differences within the soil without ever breaking ground. For the Jewish Cemetery on Losey Boulevard, ground penetrating radar and magnetometry surveys were undertaken to try and locate any graves located in the part of the cemetery in which there are currently no grave markers. This poster will present the results of a geophysical surveys conducted in the cemetery during the fall of 2017. These surveys will not only provide the Congregation Sons of Abraham with a map showing where possible unmarked graves are located, but they will provide valuable information for archaeologists on how to conduct these surveys within the context of a historic cemetery.

U.4 The Influence of Perceived Parental Psychological Control and Bicultural Identity Integration on the Sense of Belonging of Latino Students in Higher Education

Micaela Julian
Mentor: Berna Gercek Swing, Psychology

Latino students are underrepresented in higher education with lower enrollment and retention rates compared to their White and Asian peers. Sense of belonging has been shown to have a profound impact on Latino students' college adjustment, which in turn could impact their retention. Perceived parental psychological control (PPPC) and bicultural identity integration (BII) have been found to have psychological effects on minority students in higher education. By using an online survey administered to about one hundred participants, the proposed study will examine the effects of PPPC and BII in the sense of belonging of Latino students in predominantly White college institutions. We hypothesize that high levels of PPPC will lead to low levels of BII, which in turn will decrease sense of belonging in Latino students. If the results support our hypothesis, possible implications to this study's findings can suggest ways in which retention rates among Latino students can be increased, as well as the enrollment of Latino students in higher education.

U.5 The Trauma of Latinxs in the iGeneration: The Blooming of a New Community

Sergio Guerrero
Mentor: Alessandro Quartiroli, Psychology

Purpose: Previous research has shown how phenomena collectively experienced by a group of individuals can be categorized as trauma if they lead to negative psychological impact on its members. The recent events in the United States political scenarios have been characterized by a series of emotional and verbal aggressions toward the Latino/a community that could be categorized as a collective social trauma. For this reason, it seems important to explore how Latinx college students have experienced these events and how they might have coped with the possible consequential psychological symptoms. Thus, the present study aims to explore the extent of the impact that the 2016 elections had on the social, educational, and working life of Latinx college students that are part of the generational cohort known as generation Z, or iGeneration. Procedure: Participants were interviewed following a semi-structured interview protocol developed based on an in-depth literature review and the support and feedback of a qualitative methodology expert. The sample size consists of nine participants. Each interview was recorded and transcribed verbatim before the data analysis. After bracketing, the data is being analyzed following a six phases thematic analysis methodology (Braun & Clarke, 2006), following an inductive approach to data. This phenomenological constructivist approach has helped identify negative psychological symptoms that are often associated with trauma and unexpected symptoms that might indicate a post-traumatic growth in these participants. Results: Findings will enable to gain a deeper understanding of the experience of Latinx college students faced during the recent political events and the extent of the impact of the election on this community. Conclusion and implications: The study will contribute to not only the existing trauma research and its understanding but will also be useful to higher education and student support services to be prepared for similar events.

U.6 Tongue Tied: Hate Speech and the First Amendment on the University of Wisconsin-La Crosse Campus

Alicia Quinones
Mentor: Nizam Arain, Equity & Affirmative Action

This research project analyzes the language used by the University of Wisconsin-La Crosse to prove if their rhetoric has either helped curb the reoccurrence of future hate speech incidents or has resulted in the exact opposite. Through the use of surveys presented to the student body, this study will uncover the student body's practical knowledge about the nature of hate speech and the First Amendment right through the use of hypothetical and real life examples from college campuses. Interviews will be given to the staff of the Hate and Bias Response Team on campus to better understand how the University handles incidents where hate speech and the First Amendment right intersect; as well as, where the University policy and procedure draws a line between the two. It is my intent to analyze the information gathered to better understand if and where disparities can be found between the student body and the University.

U.7 Women's Reproductive Health Initiative in Matagalpa, Nicaragua: A Collaboration with Gundersen Health System's Global Partners and the Lily Project

Cecilia Moreno and Mikka Nyarko
Mentor: Keely Rees, Health Education & Health Promotion

Breast and cervical cancer continues to be leading causes of cancer death in women in most Central American countries (Mitchell, 2013). Gundersen Health System's Global Partners program and the Lily Project partnered with a clinic in Matagalpa, Nicaragua, researching ways to reduce this health disparity. Our research objective was to develop and implement a program that will target the low health literacy and limited reproductive training in this region to educate the health care providers and women in ways to prevent and detect early signs of cancers. The project revealed the importance of using visual aids and modules to improve comprehension of the health issues as well as improve the patient and health care provider's relationship. Evaluation results further explored the outcome and effectiveness of the interventions implemented with the health care providers and women.

U.8 Multilingualism as a De-stressing Factor

Felipe Pincheira-Berthelon
Mentor: Elizabeth Peacock, Archaeology & Anthropology

This research project aims to further explore how the ability to speak multiple languages affects people's lifestyles and mindsets towards stress. Previous research has shown how emotions can be expressed and explained differently between languages and cultures (Pavlenko, 2006). While other research has been done on what may cause stress for multilingual speakers, there is a lack of research in viewing language as a de-stressing factor on its own. Furthermore, there is a common trend in linguistic research that demonstrates a dual/split personality that is representative of specific languages they speak (Pavlenko, 2006). An online qualitative survey on language experience was completed by 100 multilingual participants in order to gain further insight on how multilingual speakers view their own language. Survey results show that more than half of the participants have felt like a different person when speaking another language, which is congruent with past research. Currently, interviews are underway that investigate how languages are used in different contexts that involve stress and anxiety and look for associations with feelings of different personalities. The interviews are being theme coded and analyzed using the qualitative analysis software, MAXQDA, to search for common trends and themes between participant responses. Based on prior research, it is expected that participants with a stronger emotional connection to a language will opt to use it in more stressful contexts.

U.9 The Hmong People: Religious Conversion from Animism to Christianity

Mai Nue Lor
Mentor: Dena Huisman, Communication Studies

The following study analyzed the experiences of how Hmong individuals communicated about their experiences with transitioning into the Christian religious faith. The Hmong people are a large group of war refugee immigrants, and they "helped the Kennedy, Johnson, and Nixon administrations in the critical and secret Lao theatre of the Vietnam War" (Hamilton-Merritt, 1993, p. 17). Before the war, the Hmong were a people without a country of their own. They predominantly resided in Laos, Vietnam, and Thailand. Spiritually, the Hmong have traditionally been an animistic

people, believing earthly structures to have their own individual spirits (Tatman, 2004). However, the Hmong were impoverished, powerless, and economically deprived of material situations in relationship to the material situations of the numerically majority populations (Tapp, 1989). Due to this factor and other relationships existing around the Christian faith, there was a rapid spread of Christianity among the many different Hmong groups. The purpose of this research is to analyze why generations of Hmong families or Hmong individuals, who identify as animists, are converting to the Christian faith. According to the 2000 Census, there were 186,310 Hmong in the United States. With the 2010 Census, there were 260,073 persons of Hmong origin in the United States, the District of Columbia and Puerto Rico (Pfeifer et al., 2012). This represents a 40% population increase of Hmong people in the United States. With the growth rate of the Hmong community and also the wide-spread nature of Christianity, it is important to analyze how this is impacting the Hmong culture.

U.10 World-Systems Status and Access to Mental Health Care

Abigail Bishop
Mentor: Carol Miller, Sociology

While the importance of mental health to a country's overall health, social and economic well-being has been established, access to mental health care is not always guaranteed, due in large part to cost barriers and lack of coverage (Applebaum, 2003; Mojtabai, 2005; Cunningham, 2009). This cross-national study applied world-systems and dependency theories to mental health care access among countries at the different levels of the world economy. Linear regression analyses were conducted on data from the World Health Organization, the World Trade Organization, the United Nations, and the International Monetary Fund's Direction of Trade Statistics on 28 countries to evaluate the relationship between the number of mental health care facilities operating in a country and its GDP per capita, central government debt, trade partner concentration (a measure of trade dependency), total expenditure on health care (as a percentage of GDP), and world-system status.

U.11 A Sense of Belonging: Analyzing Intersectionality Theory at a Predominantly White Campus

Adele Parks
Mentor: Laurie Cooper Stoll, Sociology

Research has consistently shown that a college student's sense of belonging to a group and their sense of purpose within a community positively impacts the chances they will graduate from that same institution. My research will look at barriers to graduating and retaining students of intersecting identities at predominantly white institutions (PWI), specifically the University of Wisconsin-La Crosse (UWL). The purpose of this research is to better understand the resources that students with marginalized and intersecting identities utilize to provide themselves with a sense of belonging, including the Office of Multicultural Student Services, Campus Climate, and the Pride Center. Data will be gathered using in-depth, in-person interviews with 10-15 current and former students at UWL. The results of this study will be shared with offices on campus that work with marginalized students to increase rates of retention and graduation. This study will also provide important insights about the effectiveness of current policies and programs that are implemented at UWL and other PWIs which aim to serve students with marginalized, intersecting identities.

U.12 Understanding Causes and Solutions to Homelessness and Housing Affordability through the Lens of Activists in La Crosse, WI

Alexis Seitz
Mentor: Carol Miller, Sociology

This project explores the issues surrounding housing affordability and homelessness in La Crosse, WI, from the lens of activists who are working on these problems. Semi-structured, in-depth interviews were conducted with 10 activists who work closely with the La Crosse Collaboration to End Homelessness, as well as other activists from agencies that play a key role in helping solve homelessness in La Crosse. Study participants were asked why they think homelessness exists, what they wish society understood about homelessness, and what solutions they believe work the best at addressing the social problem. Themes emerged corresponding to their level of contact with the homeless populations and their roles in serving them. Equal amounts of individual attributes and societal influences causing homelessness were discussed by the activists. The causes they provided for homelessness did not always translate well into the solutions they offered. Most importantly, many activists were unable to look beyond the crises in front of them and people in immediate need and toward solutions related to prevention and possible policy changes. The project adds to

the current research on solutions of homelessness as well as adds to the La Crosse community's understanding of local obstacles.

U.14 Democratic Decay in a New Democracy: The Case of Hungary

Amy Weber
Mentor: Regina Goodnow, Political Science & Public Administration

Hungary was once considered a success story for a new democracy, transitioning relatively easily throughout the 1990s from a communist regime to a democracy with a free-market economy. However, things changed in 2010 when the Fidesz party came into parliament with a supermajority. The party changed electoral rules to advantage itself and gradually undermined other key democratic institutions. But how did Hungary get there? The goal of my project is to understand what caused Hungary's newly consolidated democracy to reverse course. To do this, I trace the history of Hungary's political journey since the demise of the Soviet-backed Communist government in the late 1980s. The major factor that stands out is the moderate levels of corruption that affected politics in several negative ways. For example, this constant degree of corruption has allowed certain groups to gain power in recent years and change the rules of the game. This is certainly not the only reason. The more recent refugee/migration crisis further strained the already strained democratic institutions in the country.

U.15 Using Unmanned Aerial Systems Based Infrared Remote Sensing to Identify Archaeological Features at the Termain Site

Andrew Anklam
Mentor: Niti Mishra, Geography & Earth Science

With the advent of affordable UAS or unmanned aerial systems (drones), the price and feasibility of high quality remote sensing for archaeological survey is now a possibility. Remote sensing from space based and aerial sources has been available to the archaeologist for decades in the United States but was often too costly, had too low of a resolution, or did not cover the area of archaeological research preventing its widespread use in archaeology. However, UAS are now cheaper, provide finer results, and can cover specific areas. This newly affordable platform for remote sensing will help archaeologists by allowing them to rapidly map and find new sites through identification of crop marks and soil stains that were previously too costly to undertake by remote sensing in North America. In the La Crosse area, there are several large archaeological sites that could be mapped/identified cost efficiently and accurately by application of remote sensing through analysis of the infrared bands. However, due to the structure of the La Crosse area's archaeological sites, identification of archaeological features with the infrared bands has not been attempted, as the cost of producing quality resolution images was too high. Now that access to cost efficient infrared based remote sensing is available, the feasibility of these UAS based identification methods should be tested.

U.16 *Titus Andronicus*: A Feminist Perspective

Carly Boles
Mentor: M Beth Cherne, Theatre Arts

Titus Andronicus is considered to be William Shakespeare's most gruesome play to ever be performed. The story depicts extremely graphic scenes of rape and brutality against women characters. Recent production history has shown that this show has typically been produced at the Royal Shakespeare Company (RSC) in London by male directors, such as Trevor Nunn (1972) and Peter Stevenson (1981). In the summer of 2017, Blanche McIntyre directed her interpretation of *Titus Andronicus* with the RSC. I will conduct my research by studying the play itself, literature analyzing the play, and Blanche McIntyre's production history, comparing *Titus Andronicus* to her past works. With feminism on the rise in our continuously male-dominated society, I'm interested in investigating a strong female director's influence on a show that expresses violence and sexual assault against women. I want to know how Blanche McIntyre's frame of reference as a woman in today's society influences the production of a gory play with brutality against women and sexual assault compared to when it has been directed by men. The goal of my research is to understand the impact a director has on the final product of a production and analyze the role of modern feminism on Shakespeare's work of the 1600s. During my time abroad, I will attend multiple performances of *Titus Andronicus* directed by Blanche McIntyre while it is being produced at the RSC in order to examine how the female characters are presented and how they are treated by male characters in the show. Specifically, I will pay close attention to Tamora who is often painted as a villain to see if she is portrayed in a more empathetic light. Tamora is famous for being one of Shakespeare's greatest female antagonists because she asks her sons to rape the King's daughter, but that is only after the King destroyed her family and put her

through ruthless emotional torture. Whether or not the audience feels empathetic towards Tamora is entirely up to the director's interpretation and frame of reference, which I intend to closely observe in my research. I hypothesize that a feminist director might accentuate scenes with brutality against women in order to shock the audience and make a compelling social statement. Another possible outcome may be the female director shies away from the gore of rape and sexual assault and focuses on other themes in the story. If the second hypothesis is relevant, I will analyze the purpose of her directorial choices pertaining to feminism. I am working to arrange interviews with members of the cast, crew, or production team to gain further insight on the performance.

U.17 Analysis of a Lake Sediment Core to Determine Climate

Charlotte Peters
Mentor: Joan Bunbury, Geography & Earth Science

Until about 1250 A.D., the Mississippian peoples inhabited a Southeastern Wisconsin settlement known as Aztalan. It is unclear why this once thriving community was abandoned after 400 years. One hypothesis suggests that changes to the climate may have facilitated this move. One way to determine past climates is through lake sediment analysis. In 2014, a sediment core was collected from Mud Lake, located three miles to the west of the Aztalan site. The first step in developing a climate record is to analyze the sedimentary properties of the core. Particle size analysis (PSA) determines the size of the particles in the lake sediment; x-ray powder diffraction (XRD) determines the minerals present in the sediment, and x-ray fluorescence (XRF) helps to determine the elemental makeup of the sediment. Each of these analyses complement one another and help to build a clearer picture of past climatic activity. Assigning ages to the sediment layers is essential to understanding when changes in sedimentary properties occurred. Organic material is currently being extracted from layers in the sediment core and will be dated using radiocarbon dating to aid in the development of a chronology.

U.18 Measuring the Effectiveness of Malaise Insect Traps to Estimate Phenology and Habitat Quality of Breeding Flammulated Owls (*Psiloscops flammeolus*)

Claire Sykes
Mentor: Markus Mika, Biology

Climate change may impact habitats, resources, and the timing of food availability required for breeding populations of the insectivorous flammulated owl (*Psiloscops flammeolus*). There is limited knowledge on the biology of this species, which has been designated by various federal and state agencies as sensitive. Therefore, it is important to study resources and potential conservation threats at breeding locations in a changing environment. Habitat quality may be in decline from regional climatic effects, putting breeding flammulated owls at risk. Malaise insect traps are tools that can be used to quantify foraging resources of the species near their nesting locations. The objectives of this experiment were to test the accuracy of malaise traps to prey delivered at the nest and to quantify changes in prey abundance over the breeding period in accordance with nest timing. Insect samples from malaise traps set up near nest sites were counted, weighed, and compared to prey remains obtained at nesting locations from subsequent nest boxes surveys, with the goal of finding similarities or dissimilarities between the two sampling locales. It is hoped that this study will provide useful information on the effectiveness of malaise traps on gauging habitat quality of these insectivorous owls.

U.19 Development of Assays to Screen for Novel Anti-virulence Drug Candidates in *Salmonella enterica*

Cody Vaneerd
Mentor: John May, Chemistry & Biochemistry

The decline in efficacy of modern antibiotic drug treatments against resistant bacteria is a critical health concern. In order to combat the increasing number of resistant antibiotic bacteria, it is essential that new drug candidates with novel mechanisms of action be identified. One such approach is to target the actions that bacteria regulate to cause harm. *Salmonella enterica* bacteria, one of the World Health Organization's 12 global priority antibiotic resistant bacteria and cause of foodborne illness, was used in developing several assays to screen for possible new drug candidates. The activation of the phoP gene has been established as one of the ways *Salmonella* controls virulence and causes illness. The assays presented utilize a phoP control as well as conditions known to affect phoP gene activation such as low pH, low magnesium concentration, and exposure to peptide antibiotics. Assays were performed in the presences of novel small molecule compounds from collaborators at the University of Minnesota and University of Wisconsin-La Crosse. Quantitative PCR was performed to measure the expression of the phoP gene in compound treated and untreated *Salmonella*. Several compounds have been identified for their ability to decrease the expression of the phoP gene and

limit the survivability of *Salmonella* bacteria. It is hypothesized that these assays may be further utilized to screen and optimize large quantities of potential drug candidates for novel virulence targets.

U.20 Influence of Feminine Hygiene Washes on the Vaginal Entrance Microbiota

Courtney Young
Co-authors: Margaret Maher and Anne Galbraith
Mentors: Margaret Maher and Anne Galbraith, Biology

The human body is home to trillions of microorganisms. The communities of microorganisms, mostly bacteria, on or in the human body, make up the human microbiota. Each region of the body hosts a distinct microbiota, which generally serves to protect that region in various ways. The vaginal microbiota is crucial to the vaginal and reproductive health of females. Altered vaginal microbiota has been associated with sexually transmitted infections, yeast infections, urinary tract infections, bacterial vaginosis, and pregnancy complications. The vaginal entrance primarily hosts the bacterial strain *Lactobacillus crispatus*, an alteration of which may be influenced by feminine hygiene products and practices. Two brand name feminine hygiene washes marketed to provide pH balance or odor block were compared after standardization to determine the effect they may have on *L. crispatus* and other microbe presence and abundance. Vaginal samples were obtained from twenty college-aged participants starting at a similar stage in the menstrual cycle and after five days of using a standardizing Control Wash (n=20), five days of using a pH Balance wash (n=20), and five days of returning to the Control Wash (n=10) or an Odor Block wash (n=10). DNA from vaginal sample cell pellets was extracted, and quantitative PCR is underway to determine the relative amounts of *L. crispatus*. Additionally, the microbiota present across the three conditions for at least two participants will be determined using 16s ribosomal sequencing. With this 3-period (121/123) repeated measures design, initial *L. crispatus* presence and abundance will be assessed across all participants, and differences in *L. crispatus* after Control Wash (CW), pH Balance wash (pHB), Odor Block wash (OB) and switch-back (SB) conditions will be analyzed using within participants methods. Results of this study may provide evidence to inform use or need for additional study of these feminine hygiene products on the vaginal microbiota.

U.21 Impact of Bottleneck Size on the Replicative Capacity of Influenza Viruses

Daniel Bradley
Co-author: Mike Mamerow
Mentor: Peter Wilker, Microbiology

Influenza viruses are global pathogens that infect millions of people each year and cause significant morbidity and mortality. Influenza viruses exist in infected hosts as a population of genetically distinct but related variants as a result of error-prone genome replication. Influenza genetic diversity facilitates viral adaptation, accounts for year-to-year changes in circulating influenza viruses, and contributes to the emergence of pandemic viruses from animal reservoirs. Transmission of influenza to a new host involves a reduction in the size and genetic diversity of the viral population through stochastic and/or selective processes. These transmission-associated genetic bottlenecks may strongly influence the evolutionary trajectory of influenza viruses over time. The purpose of this research is to evaluate the impact of genetic bottlenecks of varied sizes on influenza viral populations using an in vitro system of serial viral passage. A/Victoria/361/2011 (H3N2) influenza virus has been serially passaged in Madin-Darby canine kidney (MDCK) cells using defined population sizes of 1, 100, or 1000 viral particles to initiate each sequential round of infection. After 30 passages, growth kinetics and genomic sequences of resultant viral populations will be measured and compared to the parental virus. We hypothesize that there is a bottleneck threshold required for the viral population to maintain or improve replicative fitness.

U.22 The Role of Calmodulin Methionine Oxidation in Regulating Conformational Change

Daniel Walgenbach
Co-authors: Jennifer Klein and Andrew Gregory
Mentor: Jennifer Klein, Biology

We have used molecular dynamics simulations to understand the role of calmodulin (CaM) methionine (Met) oxidation in disrupting calcium-induced conformational changes associated with CaM's regulation of its target proteins. Previous work suggests that C-terminal CaM methionines, particularly M109 and M124, are critical for functional interaction with the major calcium release channel in muscle, the ryanodine receptor (RyR). Methionine to glutamine (Gln) substitutions at M109 or M124 designed to mimic oxidation of Met to Met sulfoxide blocks CaM activation of RyR at

low calcium levels and inhibition of RyR at high calcium levels (*Journal of Biological Chemistry*, 278(18), 2003). Spectroscopic distance measurements across CaM's lobes suggest that these same Met to Gln substitutions altered the equilibrium between key CaM conformations (*Biochemical and Biophysical Research Communications*, 456(2), 2015). We carried out microsecond molecular dynamics simulations of the open and closed CaM structural states with Met to Gln substitutions at M109 or M124 to gain an atomic-level understanding of (1) the role of methionines in stabilizing CaM structure, and (2) how Met oxidation might influence conformational equilibria and regulatory interactions. We found that every CaM C-terminal Met participates in a Met-aromatic interaction with nearby Phe residues with interaction energies of 4-10 kcal/mol. M109 stably interacts with F92, but only in the open structure, and M124 stably interacts with F141, but only in the closed structure. Met to Gln substitution at M109 or M124 alters interaction energies with these nearby Phe and alters the stability of the open and closed structures. We expect that these results will be applicable to understanding the general mechanism through which Met oxidation orchestrates redox cell signaling.

U.23 1,4-benzoquinone: The Poison in Our Lakes, Rivers, and Bodies

Drake West
Mentor: Sierra Colavito, Biology

When Tylenol (acetaminophen) is broken down in our bodies, rivers, and lakes, part of it is converted into a chemical called 1,4-benzoquinone (BQ) which is known to cause DNA damage and blood cancers. According to the United States Geological Survey, acetaminophen is one of the top pollutants found in surveyed streams, and water purification using chlorine converts acetaminophen to toxic BQ. Additionally, BQ enters our waterways through improperly disposed pills, human excretion, pesticides, oil production, and coal production. With this carcinogen in our bodies, waterways, and drinking water, it is essential to identify safe concentrations. Zebrafish were used as a model organism because of their relevance to both aquatic and human health. Zebrafish were raised in 1.3mg/L to 1.3 x 10-7mg/L of BQ for 48 hours to assess mortality rates and establish an LC50. Surviving embryos were assessed for DNA damage using Western blot for Y-H2AX. Zebrafish were then raised to maturity at the LC50 concentration to identify developmental issues and deformities.

U.24 Assessing the Densities of Bioluminescent *Odontosyllis sp*. Larvae in Different Marine Habitats Surrounding South Water Caye, Belize

Elexius Passante, Erin Burke, and Ruth Higbe-Harrah
Mentor: Greg Sandland and Gretchen Gerrish, Biology

Bioluminescent syllid polychaetes (*Odontosyllis sp.*) are gaining recognition as important components of tropical reef ecosystems. To date, very little is known about their habitat preferences, particularly at early stages of development when they emit bright-green flashes on the sea floor. To address this knowledge gap, we sampled syllid larvae from a number of different marine habitats (algae, sand, turtle grass and patch reef) off the coast of South Water Caye, Belize, and determined their densities using quadrats. Results showed that syllid larvae densities were highest in shallow algal habitats compared to sand, turtle grass, and patch reef substrates. We also discovered that syllid densities were extremely variable from one night to the next, particularly at shallow algal sites. This work has established a foundation for future studies aimed at understanding the importance of bioluminescent syllid polychaetes in Belizean reef ecosystems.

U.25 Effects of Salinity and Predator Kairomones on Light-avoidance Behaviors of Spiny Brittle Stars (*Ophiocoma paucigranulata*) from South Water Caye, Belize

Emily Shallow and Brittany Vils
Mentors: Greg Sandland and Gretchen Gerrish, Biology

The spiny brittle star (Ophiocoma paucigranulata) inhabits rocky intertidal zones, which are some of the most dynamic habitats in marine systems. Increasing freshwater inputs to oceans (due to climate change) are predicted to alter marine salinities across habitats, including rocky intertidal areas. To better understand how brittle stars might respond to this scenario, we initiated an experiment that first tested how different salinities influenced light avoidance behaviors of brittle stars. We then extended this design to include the effects of predator kairomones on brittle star responses. To start the study, we collected 40 brittle stars from the intertidal zone on the north shore of South Water Caye, Belize; individuals were then designated to one of six different salinity x predator treatments. Each brittle star was placed into a darkened raceway where it was subjected to sudden illumination. We then timed how long it took individuals to move

to the covered portion of the arena. Our results showed that brittle stars took significantly longer to move to cover at lower salinities, whereas predator kairomones had no effect on response times. Study outcomes suggest that changing salinities in the intertidal zones of Belize could impact brittle star biology.

U.26 Compression with Ice Immersion: A Look at Tissue Temperatures

Erin Butke
Mentor: Cordial Gillette, Exercise & Sport Science

Ice combined with compression has been suggested to help decrease tissue temperatures to help with the healing of tissues. Studies have shown that the use of compression wraps alone will increase tissue temperatures due to an insulating effect. It is unknown if using a compression wrap in an ice immersion bath will increase tissue temperatures due to an insulating effect or decrease due to the compressive forces. The objective of this study was to determine the effect of combining compression, using an elastic wrap, and ice immersion on the magnitude and length of tissue temperature changes. To test this, we used skin interface thermocouples to compare the tissue temperatures of the lower extremities of each participant put in an ice immersion bath for 10 minutes. Each participant had one lower extremity with an elastic wrap and one lower extremity without an elastic wrap. In addition, post ice immersion temperatures were recorded for 30 minutes. Previous research has shown that tissue temperatures are not significantly affected by compression and we predicted that the lower extremities wrapped in the elastic wrap and placed in the ice immersion will have lower tissue temperatures for a longer duration. The study concluded that an elastic wrap placed on the lower extremity when placed in an ice immersion bath causes an overall insulating effect causing the tissues to stay at an increased temperature compared to an unwrapped lower extremity.

U.27 Vertebrate Herbivore Browsing on Neighboring Forage Species Increases the Growth and Dominance of Siberian Alder across a Latitudinal Transect in Northern Alaska

Erynn McNeill
Co-author: Roger W. Ruess
Mentors: Roger W. Ruess and Syndonia Bret-Harte, Department of Biology & Wildlife, University of Alaska - Fairbanks

Vertebrate herbivores strongly influence plant growth and architecture, biogeochemical cycling, and successional dynamics in boreal and arctic ecosystems. One of the most notable impacts of vertebrate herbivory is on the growth and spread of alder, a chemically-defended, N-fixing shrub whose distribution in the Alaskan arctic has expanded dramatically over the past 60 years. Although herbivore effects on thin-leaf alder are well described for interior Alaskan floodplains, no work has been conducted on the effects of herbivores on Siberian alder (*Alnus viridis ssp fruticosa*), despite the increasing importance of this species to high latitude ecosystems. We characterized browsing by snowshoe hares, moose, and willow ptarmigan on dominant shrub species across topo-edaphic sequences within 5 ecoregions along a 600 km latitudinal transect extending from interior Alaska to the North Slope. Ptarmigan browsed wind-blown lowland and alpine sites devoid of trees in all regions; moose browsed predominantly willow species in hardwood and mixed forests and were absent north of the Brooks Range; snowshoe hares selected sites and forage based on their local density and vulnerability to predators. Browsing intensity on Siberian alder was either undetectable or low, limited primarily to hare browsing on young ramets. Overall, growth in height of alder was positively correlated with high herbivory. Our data support the hypothesis that vertebrate herbivore browsing is indirectly augmenting the growth, dominance, and possible spread of Siberian alder throughout its northern Alaskan range. Given the potential rates of N-fixation inputs by Siberian alder, we believe herbivores are also having strong indirect effects on biogeochemical cycling and possible C storage in these landscapes.

U.28 Testing the Sacrificial Leaf Hypothesis in Red Mangroves (*Rhizophagus irregularis*) from Southwater Caye, Belize

Gabriel Ross
Mentor: Gregory Sandland, Biology

Mangrove trees are a ubiquitous feature found across tropical shorelines of the Caribbean. Their ability to tolerate semi-marine environments is facilitated through adaptations such as salt-filtering roots and salt-excreting leaves. There is a popular, yet highly-debated hypothesis that red mangroves (*Rhizophagus irregularis*) also regulate internal salinity by allocating salt to specific "sacrificial" leaves, which eventually turn yellow and die. To test this hypothesis, I collected sacrificial and non-sacrificial leaves from red mangrove trees around Southwater Caye, Belize. Leaves were steeped in

freshwater, and these solutions were subsequently measured for salinity content. Results suggest that sacrificial leaves have significantly higher salinity than non-sacrificial leaves found at the same branch location, providing support for the sacrificial leaf hypothesis.

U.29 The Effect of Stress Peptide Urocortins on the Intestinal Epithelial Barrier Function

Hafsa Qazi
Mentor: Sumei Liu, Biology

The intestinal epithelium serves as an important line of protection that prevents invasion of pathogens or antigens into the body. Stress is known to disrupt the intestinal epithelial barrier function and makes the gut "leaky". Corticotropin releasing factor (CRF) is a neuropeptide that mediates body's overall responses to stress. The CRF peptide family also includes urocortins (UCN1, UCN2, UCN3). CRF has been implicated in stress-induced disruption of intestinal epithelial barrier function. However, the roles of urocortins in intestinal epithelial barrier function are still unknown. The purpose of this project is to determine if UCN1, UCN2, or UCN3 have any effects on intestinal permeability to macromolecules by using horseradish peroxidase (HRP) as a model protein. We will use a Ussing chamber system to measure HRP flux across mouse colonic epithelium after treating the tissues with UCN1, UCN2, or UCN3. The information obtained from this project will help us in understanding the possible effects of urocortins in intestinal permeability to macromolecules. Understanding of the effects of urocortins in intestinal barrier function will aid in the advancement of treatments of stress-related gastrointestinal disorders by targeting these signalling pathways mediated by urocortins.

U.30 Persuasion in Marketing: Is It Ethical?

Jack Purvis, Nicholas Janco, and Lucas Schroeder
Mentor: Nese Nasif, Marketing

This paper explores the ethics of persuasion using three different categories, as well as an overall philanthropic approach. The product context, source context, and persuasion industry as a whole all play large roles when deciding if persuasion in marketing is ethical or not. The product context dives deeper into the product itself that is being marketed. Vaccines are often a topic of controversy when it comes to determining if it is right to persuade parents into getting their children vaccinated at a young age. The source context focuses on who is delivering the message of persuasion. For example, beautiful women have been shown to sell better compared to men, which can be seen in pharmaceutical sales. There is also an undefined persuasion industry that exists. Biased opinions and facts can be taught through professors if money, such as grants, are awarded on a regular basis by larger corporations. Persuasion can be seen for its good and bad, but do its ethical uses trump its unethical uses?

U.31 Species Level Mapping of Treeline Vegetation in Nepal, Himalaya Using Unmanned Aerial System (UAS) Imagery for Monitoring Climate Change Impacts

Jackson Radenz
Mentor: Niti Mishra, Geography & Earth Science

Between montane forest and alpine vegetation, treeline ecotone represents the upper limit of forest on a mountain. The Himalayan region in south Asia has the highest and most biologically diverse treelines in the world. The impact of climate change is projected to be high along the Himalayan treeline ecotone due to their high sensitivity to changing temperature and precipitation patterns, leading to significant ecological changes. This study acquired and analyzed multi-spectral imagery acquired using Unmanned Aerial Systems (UAS) at treeline locations in Langtang National Park, Nepal to examine the suitability of the ecological proxies derived from UAS imagery for mapping of treeline vegetation at genus level, and their green biomass in a spatially explicit manner. The UAS images were analyzed following semi-automated Object Based Image Analysis approach to develop objects to derive spectral and textural variables. A hierarchical approach decision tree algorithm was utilized first to semi-automatically distinguish between vegetated and non-vegetated parts in the imagery. At the second hierarchical level, four woody vegetation genus types were mapped. Results showed that mapping accuracy varied not only between hierarchical levels of classification, but also among different species types. These results highlight the potential of UAS acquired imagery for detailed mapping of vegetation properties in inaccessible and understudied areas, which will also enable understanding of ecological patterns and the underlying processes along the treeline in the Himalayan mountain range.

U.32 Understanding the Potential Relationship between a Novel Anthelmintic and Oxidative Stress

Jacob Lindstrand
Co-author: Jennifer Miskowski
Mentor: Jennifer Miskowski, Biology

Parasitic worms can cause health problems, loss of life, and economic burdens for both livestock and humans if they are not controlled with anthelmintic drugs. Resistance to anthelmintics was documented as early as the 1950s, and resistant strains already affect 40% of livestock in the southern United States (Kaplan 2000). There is a pressing need for new anthelmintic drugs to combat this problem, and an interdisciplinary group at UW-La Crosse has turned to plants and fungi to identify candidates. *Comptonia peregrina* (sweet fern) has been used medicinally in Native American cultures, and a chemical was isolated from the plant that showed anti-infective activity. A number of derivatives were synthesized, and one called CL-5 was shown to have anthelmintic activity against *Caenorhabditis elegans*. *C. elegans* is a non-parasitic nematode, which is a model system for studying anthelmintic drugs. Currently, the Miskowski lab is exploring the cellular stress caused by CL-5, which appears to be through an increase of reactive oxygen species (ROS). Reactive oxygen species are created through normal metabolism, and they can be damaging to cellular components. We have been investigating different molecules that are known to be part of the oxidative stress response in nematodes to see if they are necessary for the anthelmintic effects of CL-5 that we observe. If a connection is established, it would further support our working model that CL-5 works by causing oxidative stress.

U.33 Towards a Better Understanding of Parent-Teacher Partnerships during Individualized Education Program Meetings: Year 1 Survey and Interview Results

Jaycelin Chan, Allison Quartaroli, and Emily Thorpe
Mentor: Leslie Rogers, Educational Studies

All students, regardless of abilities, have the right to receive a free and appropriate public education in the least restrictive environment (US ED, Individuals with Disabilities Education Act [IDEA], 2004). Since the original passing of the IDEA in 1975, to its latest reauthorization in 2004, school-home partnerships that promote successful creation and implementation of individualized education programs (IEP) have been the cornerstone of students with disabilities receiving educational opportunities. These meetings are incredibly important and require that parents and teachers communicate and collaborate (Fish, 2008). The Parent-Teacher Relationship Scale II (PTRS-II, Vickers & Minke, 1995) is a validated assessment that has been used to examine teacher and parent partnerships and the extent to which perceptions about shared expectations and beliefs about each other and the child match. To date this has not been used to evaluate partnerships that occur during IEP meetings, although such an examination could prove beneficial. Our research addressed this need. Specifically, we examined how national survey participants (N=309; Rogers, Butler Modaff, & Nelson, in preparation) responded to five specific IEP questions (e.g., "Did others provide information or sit down with me ahead of time to help me prepare for the meetings?"). We also used thematic analysis to analyze how a subsection of survey participants (N = 24) responded to follow-up interview questions related to their IEP experiences. Theoretical thematic analysis, based on the PTRS-II, was used to code interviews. Methods used, conclusions drawn, and suggestions for future practice will be shared during this poster presentation.

U.34 Rate of Haptotropic Rearrangement in Ethyl-Amino-Biphenyl Chromium Tricarbonyl

Joshua Jensen
Mentor: Curtis Czerwinski, Chemistry & Biochemistry

In organometallic chemistry, haptotropic rearrangement is the sliding of a metal between two carbon-based rings. Molecules capable of such rearrangements have important potential applications in nanotechnology, where they could act as molecular devices such as molecular switches. In this project, a series of organic and organometallic compounds have been prepared and characterized spectroscopically, to study the effects of steric hindrance and electron density on rates of haptotropic rearrangement. Previously, molecules that contained a biphenyl molecule bonded to chromium were shown to rearrange when heated, and incorporation of an electron-rich -NH2 group was shown to increase the rate of rearrangement. In this project, we applied existing methods in organic synthesis to make new compounds with additional carbon-based alkyl groups on nitrogen to increase its electron density. A slower rate of rearrangement would indicate that steric hindrance is more important than electronic effects, since the larger size of the alkyl group would be inhibiting rearrangement. Conversely, a faster rate of rearrangement would indicate a greater importance of electronic effects, in this case through the donation of extra electron density from the alkyl group. Studies have so far indicated

that steric hindrance is the more important factor in this rearrangement. Ongoing work focused on placing a second alkyl group on nitrogen is expected to confirm these results.

U.35 Synesthetic Stroop Effects Can Be Mimicked in Trained Non-synesthetes

Julia Schumann
Co-authors: Michael Szeszol, Joshua Barbara and Joshua Wolff
Mentor: Alex O'Brien, Psychology

Employing a within-subject design, college students will rate the attractiveness of preferred sex photos. Participants will then be presented with a distraction task. Finally, participants will be presented with each photo again, along with personality traits (being either desirable, undesirable, or none), and then will rate the photos for physical attractiveness, desirability as a friend, and desirability as a dating partner on one to ten scales.

U.36 36 Optimization of Provider Assignment

Kathryn Swiecichowski, Megan Degn, and Simon Ulik
Mentors: Song Chen and Chad Vidden, Mathematics & Statistics

The purpose of this paper is to address a challenge facing Logistics Health Incorporated (LHI) using statistical analysis and a machinery algorithm. LHI is seeking an optimal method to assign their service members to providers. The goal to our approach is to minimize service member travel distance while minimizing reschedule requests. Our algorithm will assign a provider score to each provider within a calculated radius from the service member. The service member will be assigned to the provider with the highest provider score. The radius will be determined by consideration of LHI's maximum contracted distance, the service being requested, and the population density of the service member's registered city. The result of our approach is a way to assign service members to providers that will minimize the amount of reschedule requests LHI will receive. In addition, LHI will be provided a list of the next most optimal providers. This list will assist their reschedule rate by reducing the cost incurred from reschedules.

U.37 DANGER! NO HIKING! The Role of Normative Warning Messages and Self-Justifications on Risky Hiking Decisions

Kathryn Truell and Ellie Miller
Co-authors: Katy Kortenkamp and Colleen Moore
Mentors: Katy Kortenkamp, Psychology, and Colleen Moore, Department of Psychology, Montana State University

Background: Natural resource managers are often mystified and dismayed that visitors disobey warning signs. Past research found that warning signs with negatively worded descriptive norms were least effective in promoting pro-environmental behavior by hikers, whereas negatively worded injunctive norms were most effective (Cialdini, 2006; Winter, 2006). Positively worded descriptive and injunctive messages yielded intermediate results and showed no significant difference between each other. Furthermore, research has identified factors that predict participating in risky health behaviors despite warnings; specifically, self-justification beliefs (skeptic, bulletproof, "worth it", and jungle beliefs) act as a shield for engaging in risky health behavior (Oakes, 2004). Our goals for this study were to discover which norm type and which belief type were most effective in predicting risky decisions in hiking scenarios.
Method: An online experiment of 200 college students who had recent hiking experience was conducted to test the effectiveness of social norms presented on warning signs in hiking settings. Students read four hiking risk scenarios and were presented with a sign urging them to stop hiking because of danger. Each sign displayed one type of norm combination (positive vs. negative; injunctive vs. descriptive). Participants were asked their likelihood to hike and get hurt and then completed several risk and self-justification scales. Results: A factor-analysis on the self-justification questions identified three factors: skeptic (the risks are exaggerated), bulletproof (I can avoid risks by being careful), and worth it (the risk is worth it) beliefs. Regression analyses revealed that different normative messages did not have significant effects on participant' perceived likelihood of hiking or getting injured. However, self-justification beliefs did predict the dependent variables. Conclusion: The present study provides some hints about why visitors disobey warning signs. Further field studies of the self-justification beliefs, and ways to counter them, would be useful to natural resource managers.

U.38 Let's Talk about Sex: Sexual Health Outcomes of American Youth in Abstinence Only versus Comprehensive Sexual Education Programs

Katie Kautzer
Co-author: Mackenzie Ritchey
Mentors: Casey Tobin, Psychology, and Keely Rees, Health Education & Health Promotion

This study examines the relationship between sexual health outcomes and types of sex education provided in grade school. A multiple-choice exam will be administered to assess knowledge of sex-related concepts along with a demographics survey. Expected results include a positive correlation between positive health outcomes and receiving comprehensive sex education.

U.39 Marine Habitats Predict Parasite Communities in Stocky Cerith Snails from the Coast of Southwater Caye, Belize

Kayla Halveson and Katharine Shebesta
Co-author: Kallie Smith
Mentors: Gregory Sandland and Gretchen Gerrish, Biology

Snails play a crucial role in harboring and transmitting flatworm parasites; however, the degree to which marine habitat features predict snail infections remains unclear. To better understand this potential association, we conducted a study that investigated the parasite communities in the marine snail, *Cerithium litteratum* (stocky cerith) from two different habitats around South Water Caye, Belize. One habitat was primarily comprised of sand, whereas the other was dominated by sea grass. Snails were collected from three locations within each habitat and then assessed for infection. Results indicated that the snails collected from sea grass harbored flatworm parasites, whereas those from the sand exhibited no signs of infection. Snail behavioral responses, along with differences in habitat features, may help to explain these flatworm infection patterns.

U.40 An Analysis of Ritual Activity during the Early Bronze Age Occupation of Pecica Şanţul Mare, Romania

Kyle Willoughby
Mentors: Amy Nicodemus, Connie Arzigian, and David Anderson, Archaeology & Anthropology

Bronze Age Europe is a period that marks many significant changes in early societies. These changes include the emergence of trade centers, stratified social systems, and complex polities. However, religion and ritual during this important period are poorly known. My research seeks to better understand this Ritual activity the Bronze Age through the examination of potential ritual deposits at the archaeological site of Pecica Şanţul Mare, Romania. One specific structure (Structure 12), constructed during the Initial Period of site occupation (1950-1900 BC), is uniquely shaped and contains unusual artifacts, including pierced pig mandibles and stone axes embedded within its floor. Could this be a special ritual building? My analysis of the animal bones found within this structure can answer this question. In my study, I will look at the composition of the faunal remains within Structure 12 and compare them to those found in contemporary households to examine any possible differences. If differences are present, could these represent ritual or feasting remains? By looking at variables including deposit context, which species and skeletal elements are present, the age/sex of the animals, and any bone modification, I can ascertain whether or not these animal bones are likely to represent ritual activity. This study has the potential to shed new light on Bronze Age religious practices across the region.

U.41 Utilizing Micro-CT Scanning versus CT Scanning for Investigating a Fetal Mummy

Madeline Eggert
Co-author: James Schanandore
Mentor: James Schanandore, Department of Physical Therapy, University of Jamestown

Micro-CT scanning can be a useful tool to examine the small, fragile nature of fetal mummies. Regular CT scans lack slices thin enough to show significant detail, resulting in loss of data. Micro-CT scanners have slices with smaller width, giving researchers more detailed, accurate anatomical reconstructions to determine pathology and internal structures of fetal mummies. A GE v|tome|x s micro-CT scanner (200mAs and 100kVp) was used on a fetal mummy to produce roughly 1000 slices, each approximately 0.08mm in thickness. A second scan completed on the same fetal

mummy mimicked a traditional medical CT scanner, resulting in slices 0.6mm in thickness. Mimics, a medical grade post CT scan evaluation software, was used to complete segmentation of the fetal anatomy. The resulting models were compared to observe differences in detailed observable anatomy between the two types of scans. Gestation period could also be estimated using quantitative measurements. Slices from the regular CT scan did not offer critical details essential for studying internal systems and structures. After interpolating micro-CT slices, we were able to highlight and analyze details that would have been otherwise missed with a thicker slice. The micro-CT scan increased the accuracy of 3-D model reconstructions of structures such as the bronchial tree, heart, and spinal cord, all displaying great detail. Based on the models created from the micro-CT scans compared to those from regular CT scans, it was determined micro-CT produced more accurate anatomical reconstructions. Micro-CT scans provide far more details in imaging fetal mummies compared to regular CT scans. This non-invasive method preserves internal and external structures of the fetus, allowing us to better determine pathology and/or cause of death. When CT scanning fetal mummies, micro-CT should be considered because of the increased accuracy of virtual reconstructions, resulting in an increased chance of identifying potential pathological conditions.

U.42 The Effects of Vision Enhancing Strobe Goggles on Contact Injuries in Collegiate Wide Receivers

Malcolm Driessen
Mentor: Sheldon Wagner, Exercise & Sport Science

This research attempted to see if improving a collegiate football wide receiver's vision through the use of strobe goggles can lead to a change in number of contact injuries. This was done by working with 15 collegiate football wide receivers over the course of 10 weeks, for 1 session per week. Ten wide receivers participated in the study, while the other five served as a control group. The tasks and level difficulty of the goggles were increased at the same rate for all athletes, at certain intervals over the course of the 10 weeks. These tasks challenged the subject's reaction time, peripheral vision, and depth perception. Contact injuries that required further treatment were recorded throughout the season to be compared to the control group at the conclusion of the research. The results were inconclusive, perhaps due to the small sample size and unforeseen events occurring throughout the season. Further research is needed.

U.43 Rationally Designed Mutations of *E. coli* Alkaline Phosphatase Confer Selective Purine Derivative Binding

Mitchell Malecha
Mentors: Daniel Grilley and Todd Weaver, Chemistry & Biochemistry

Alkaline phosphatases (APases) are biological catalysts that accelerate dephosphorylation reactions; the enzymes are utilized by a wide array of organisms, including humans. Small organic molecules, like phenylalanine and theophylline, are effective inhibitors of mammalian alkaline phosphatases, such as calf intestinal alkaline phosphatase (CIAP). However, organic compounds do not hamper *E. coli* alkaline phosphatase (EcAP) kinetic activity. Sequence and structural analysis of alkaline phosphatase isozymes revealed a lack of conservation at EcAP residues that may be important for organic inhibition, thereby providing a potential explanation for the contrary inhibition. By mutating these EcAP residues to mimic analogous residues in mammalian APases, inhibition of EcAP by a class of aromatic molecules was conferred. While variants with single mutations are unaffected by organic effectors, variants expressing multiple mutations are inhibited, suggesting a synergistic relationship essential for organic binding. Circular dichroism was utilized to verify similar stability and kinetics for each variant; Michaelis-Menten experiments were used to identify inhibition and confirm similar pH and cofactor dependence. The importance of key residues was determined based on their ability to confer organic inhibition. Furthermore, utilization of a set of purine derivatives allowed determination of the structure-activity relationship for inhibitor binding. Specifically, this analysis enabled identification of hydrogen bonding requirements for organic inhibition. In total, designed substitutions altering EcAP residues near the active site to mimic analogous residues in mammalian APases confer inhibition by specific derivatives of a class of aromatic organic molecules.

U.44 The Role of DcrB, a Novel Protein Used in *Salmonellas* Survival in Toxic Metals

Nicholas Berg
Mentor: John May, Chemistry & Biochemistry

Bacteria's resistance to treatments is becoming, now more than ever, a danger to the human race. To overcome this imperative threat, we must first understand the mechanistic aspects of how bacteria acquire resistance. The purpose of conducting my research project was to observe how a protein (DcrB) helps *Salmonella* survive in otherwise toxic

concentrations of metals such as copper, zinc, and magnesium. To determine how much the DcrB protein contributed to the survival of *Salmonella* in high metal-stress environments, I compared the growth of wild-type *Salmonella* with the growth of a mutant strain that has the dcrB gene removed in liquid media containing high amounts of copper, zinc and magnesium. The results from these experiments allowed for us to determine variation in survival and attribute differences exclusively to the lack of the dcrB gene. The dcrB gene is not only found in *Salmonella* but is also found in several other species of infectious bacteria, such as *E. coli*. Therefore, scientific findings about the DcrB protein are important in helping to understand more about its physiological role in many bacterial species. Implications of this knowledge could lead to innovative treatments of *Salmonella* and other related bacteria that cause infectious disease.

U.45 The Effect of Personally Relevant Words on the Attentional Blink

Nicholas Glodosky and Patrick Fischenich
Mentor: Bart VanVoorhis, Psychology

The Attentional Blink (AB) is a phenomenon in which attentional processing of an initial target (T1) leads to impaired processing of a second target (T2) presented within a time frame of 200-500 ms. Reducing the AB could have life altering effects in real world situations such as attention processes while driving a car and reacting to threatening environmental stimuli. Different words, digits, images, and auditory stimuli have all been used as targets in order to test for reduction of the AB. The purpose of our study is to determine the effect of using names and personally relevant words as T2 on reducing the AB. Approximately 50 participants will be tested using a Rapid Serial Visual Presentation (RSVP) system on SuperLab. After the initiation of T1, T2 will be presented at different lag positions, between 1 and 8 positions after T1, depending on the trial. T2 will be either the participant's own name, a random name, a personally relevant word as indicated by the participant, or another random noun. The SuperLab program needed to collect data is currently complete, and we are in the middle of data collection and expect to be done by mid-December. We plan to use ANOVA to determine which of the targets had the best reporting rate, which would suggest it reduced the AB. We expect that using personally relevant words will reduce the effect of the AB to a greater extent than random words, and that a participant's own name will reduce the effect of the AB to a greater extent than personally relevant words. If it is determined that names and personally relevant words do indeed reduce the AB, we will have taken the process of reducing the AB one step further which may have significant real-world applications as we learn more about attention.

U.46 Developing an Assay to Differentiate between Endocrine Disruptors and Hepatotoxicity in Zebrafish

Noah Jacobson
Co-author: Megan Eberle
Mentor: Tisha King-Heiden, Biology

Endocrine disruptors alter normal hormonal balances by either mimicking or disrupting hormone levels, and this is important because hormones control most of the required bodily processes. The Environmental Protection Agency (EPA) currently has guidelines in place for companies to conduct tiered toxicology studies in order to make sure products are not possible endocrine disruptors. A common assay uses the increased expression of vitellogenin (vtg) as a biomarker for an estrogenic compound, and the reduction of vtg as a biomarker for an anti-estrogenic compound. We hypothesize that certain compounds cause a reduction in vtg due to hepatotoxicity rather than anti-estrogenic activity. Therefore, we are working to develop an assay to distinguish between hepatotoxicants and anti-estrogenic compounds. To start, we are working with known hepatotoxicants acetaminophen (APAP) and amiodarone to develop an assay to screen for hepatotoxicity, and are comparing this to the suspected anti-estrogenic compound, triclosan (TCS). Our long term goals are to develop a suite biomarkers that can be used to distinguish between anti-estrogenic compounds and those that are hepatotoxicants.

U.47 Influence of Hamstring/Quadricep Ratio on Knee Loading during Drop Landing

Rachel Zastrow
Co-authors: Tia Collins, Becky Heinert, and Carly St. Antione
Mentors: Thomas Kernozek, Health Professions, and Robert Ragan, Physics

Purpose: Females are 2-8 times more likely to tear their anterior cruciate ligament (ACL) than males in 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 stressed during

landing. Methods: Isokinetic and hip abduction isometric strength testing was performed on 80 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: Forty females were selected to return for motion capture analysis that had the highest and lowest ratios. 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.

U.48 Analyzing Consistency in Measuring New Galactic Interstellar Neutral Hydrogen Shells

Rebecca Taylor
Mentor: Shauna Sallmen, Physics

The interstellar medium (ISM) consists of low-density gas and dust and fills the space between stars in our galaxy. When a supernova occurs, hot gas is blown out and interacts with the cool neutral hydrogen (HI) gas in the ISM. As the hot gas continues to expand, this surrounding HI gas is pushed out and forms a shell. These shells can be found using Galactic Arecibo L-band Feed Array (GALFA) 21-cm radio data. A visual search of these data can reveal new HI shells of small angular diameter located away from the Galactic plane. For each potential shell, the location, velocity, angular size, and velocity range were determined, and various parameters describing shell quality (e.g. shell wall completeness) were estimated. The search found a total of 113 possible new shells ranging in size from 0.1 to 4.5 degrees. Those results were previously presented at the 2017 Celebration of Undergraduate Research. Because the measurement process is somewhat subjective, this poster will focus on the consistency of measurements for each shell. After the initial search, 30 randomly selected shells were re-measured and compared to their original measurements. A total of 7 errors in the 30 randomly selected shells have been found so far. Out of the 7 errors, 5 were found in the original measurements and 2 were found in the new measurements. For each shell, a total of 17 measurements were made and 2,431 measurements were made in total. The statistical properties of these errors as well as extrapolations to the total shell catalog are presented. In addition, this re-examination shows how consistent measurements were and how often errors were made. The size of typical uncertainties in the measurements will be discussed.

U.49 New Findings in Chimpanzee and Baboon Cruro-Pedal Anatomy

Riley Friederichs and Abraham Packard
Co-author: Thomas Greiner
Mentor: Thomas Greiner, Health Professions

Introduction: Which are more similar; the baboon and the chimpanzee, the chimpanzee and the human, or the human and the baboon? A comparative dissection was conducted on chimp and baboon hindlimbs, with reference to human data, in order to further explore this question. Our dissection results suggest a more complicated relationship. Methods: Primary observations were drawn from gross dissection of the leg and foot of 7 Chimpanzees, representing 5 individuals (4 females, 1 Male), and 19 Baboons, representing 10 individuals (7 Females, 3 Males). Observations were then compared with records from the dissection of over 90 human specimens. Results: We obtained seven anatomical observations that distinguished the three studied groups. At least three of these observations were unique to only one species. Other observations were shared between two or more genera. Discussion: Considering the impact that these anatomical variants have on form and function could offer insight on an interpretation of the evolutionary relationships among these primates. Many of the identified muscular differences would leave no bony impression. Therefore, it is unlikely that these differences would be identified within the fossil record. Similarly, textbooks describe more bony differences among these groups than could be supported by our investigation of the muscular anatomy. Therefore, bony features that are commonly identified as significant in fossil specimens may instead have limited interpretive value.

U.50 Racial Disparities in Wisconsin: How Freedom Schools Can Close the Gap

Sadie Halfrich
Mentor: Lisa Kruse, Sociology

Racial inequality continues to be a significant issue in the United States. The Wisconsin Council of Children and Families (2014) found that the state of Wisconsin ranks worst for African Americans across several markers of well-being. Related to this study, the graduation rate is 66% for Black students and only 8% of Black students are math proficient by 8th grade. The National Center for Education Statistics (2015) found that in Wisconsin 44% of white students were proficient in reading compared to 11% of Black students. Further, the achievement gap for students of

color, particularly Black students, was partly reproduced through disproportionate suspensions, expulsions and other disciplinary measures in public schools (Morris & Perry 2016: 81). These measures take away days in the classroom, affecting students' ability to learn; with Black students disproportionately affected, the achievement gap persists. Studies have shown that the Children's Defense Fund's Freedom Schools help increase reading scores and have a positive effect on social skills (Ewing Marion Kaufmann Foundation, 2013; Taylor et al. 2010). The following study uses qualitative methods to interview and gather the perspectives of key stakeholders involved in the Freedom School movement regarding the process of starting the schools, the perceived benefits, and the challenges. Pre-existing data on evidence of Freedom Schools' effectiveness along with collected qualitative data is used for policy recommendations about implementation in Wisconsin.

U.51 Von Willebrand Factor as a Mechanism of Platelet Storage in the Bone Marrow of Thirteen-Lined Ground Squirrels

Tyler Billman and Zachariah Piper
Co-authors: Vanessa Mbuyi and Katie Krien
Mentor: Scott Cooper, Biology

Thirteen-lined ground squirrels, *Ictidomys tridecemlineatus*, inhibit blood clotting by reducing the volume of circulating platelets during hibernation (Cooper, 2017). We hypothesized that it is possible that once the squirrels enter the hibernating stage of their life cycle they are able to store these platelets within their bone. Glycoprotein 1B (GP1B) is a surface protein on platelets that binds to von Willebrands factor (vWF) which attaches it to collagen (COL4A2) in a normal clotting cascade. Using fluorescently tagged antibodies of vWF, GP1B, and COL4A2 and immunohistochemistry (IHC) techniques, we fluorescently imaged cross-sectioned lung and bone marrow tissues with microscopy. The product of our IHC showed fluorescent co-localization of vWF, GP1B, and COL4A2 between hibernators and non-hibernators in both lung and bone marrow tissues.

U.52 Stability for Poly-A Tract Sequences of DNA with Varying Types and Concentrations of Cations

Thomas Shultz
Mentor: Daniel Grilley, Chemistry & Biochemistry

Each of our cells has several feet of DNA inside. This DNA is often wrapped in nucleosomes (protein-DNA complexes) and inaccessible for expression. Improper packaging of DNA can lead to many human genetic diseases. It has been observed that some DNA sequences, specifically poly-A tracts, do not wrap around proteins and are accessible for gene expression. These sequences have a unique structure that does not allow them to form nucleosomes. The unique structure of poly-A is thought to be stabilized by positive cations that lessen the repulsion of DNA's negative phosphate backbone. Because of the dimensions of the DNA double helix, it is proposed that these stabilizing effect should be influenced by the size of the cation used for stability. The increased stability of poly-A with various cations can be measured using DNA melting profiles and circular dichroism which can provide quantitative and qualitative evidence of DNA structural changes. These experiments have already shown that different sequence types of DNA are stabilized differently by the same cationic salt and that different cationic salts stabilize identical DNA sequences differently. By investigating the unique characteristics of poly-A tract DNA, its role in nucleosome placement can be better understood.

U.53 Confirmation of HPIV-3 Reversion Mutations

Zachary Porior
Co-author: Michael Hoffman
Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus (HPIV) is a common cause of respiratory illness in children, elderly, and immunocompromised individuals. Of the four serotypes of HPIV, HPIV type 3 (HPIV3) may be the most common and virulent, sometimes causing bronchiolitis, bronchitis, or pneumonia. It is thought that the HPIV3 M protein may contribute to the virulence of HPIV3. The Hoffman lab has done work looking at the role of the M protein in the assembly and release of HPIV3 particles from cells into the environment. As a part of this work, three mutant HPIV3 viruses were created each with a different mutation in the M protein. These mutations were previously studied and were shown to reduce the release of virus-like particles and virus particles from cells. While studying these mutants and their decreased ability to form virus particles, two of the mutants underwent apparent reversion mutations, as evidenced by increased ability to form virus particles. When each of the revertant viruses was sequenced, separate, second-site changes (causing an amino acid change) were observed in the M gene. This project examined these two revertant

viruses. Work had been done for confirmation that the second-site mutations are responsible for the increased release of the revertant viruses, and their growth against wild type virus and the original mutants was compared via a growth curve. Preliminary results indicate that the engineered revertants closely resemble the natural revertants in their virus particle formation, indicating that the observed second-site mutations are responsible for the increased virus particle formation of the original revertant.

U.54 Comparative Analysis of Copper Age and Bronze Age Livestock Morphology at Pecica Şanţul Mare, Romania.

Mekaela Opsahl
Mentor: Amy Nicodemus, Archaeology & Anthropology

The Copper and Bronze Ages marked a major transformational period in prehistoric Europe. The introduction of an elite group altered social organization and changes are seen in social hierarchy, trade, and agriculture. Along with broader agricultural shifts there are changes seen specifically in animal husbandry techniques and livestock morphology. Although a change in livestock morphology during this transitional period was mentioned in the literature, there has been no discussion as to what the change was or why the change occurred. At the archaeological site Pecica Şanţul Mare, Romania, large fauna deposits were discovered that will allow further insight into answering those questions. This research will explain what changes occurred in the livestock morphology between the Copper Age and Bronze Age at Pecica Şanţul Mare as well as potential causes for this change. The greater significance of this research will help understand the broader agricultural changes that occurred between the Copper and Bronze Age periods of prehistoric Europe.

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

U.56 Inhibition of Epstein-Barr Virus by an Atypical Antipsychotic

Abbie Anderson
Mentor: Kelly Gorres, Chemistry & Biochemistry

The Epstein-Barr Virus (EBV) is a member of the herpes virus family and causes infectious mononucleosis. Epstein-Barr Virus was the first virus discovered to cause cancer in humans. After infection with EBV, the virus maintains a lifelong dormant infection within the host. The virus's life cycle consists of two phases, the latent and the lytic phase. The latent phase allows the virus to lie dormant within the host without presenting any symptoms, while during the lytic phase the virus reproduces and spreads among cells. The virus switches between the latent and lytic phases in response to environmental stimuli, including some pharmaceuticals. We investigated the response of the virus to atypical antipsychotic drugs. Antipsychotic drugs are used to treat conditions such as schizophrenia and bipolar disorder. Atypical antipsychotics, also known as second generation antipsychotics, have a different chemical structure and are generally more effective than the typical (first generation) antipsychotics. The effects of varying concentrations of the drugs on the reactivation of EBV into the lytic cycle were tested. The degree of viral reactivation was measured by expression of the viral BZLF1 gene, a regulatory gene expressed during reactivation into the Epstein-Barr Virus lytic cycle. Quantitative polymerase chain reaction (qPCR) monitored BZLF1 gene expression. Expression of the BZLF1 gene and viral reactivation was found to be inhibited. Understanding the conditions and cellular pathways that inhibit the lytic phase of the virus will help to better understand the virus's life cycle in order to develop treatments for cancers caused by Epstein-Barr Virus.

U.57 GadE May Repress Flagella Expression in Uropathogenic *Escherichia coli* Growing in an Acidic Environment

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

Uropathogenic *Escherichia coli* (UPEC) use flagella to ascend the human urogenital tract, causing infection. Flagella are composed of FliC protein monomers encoded by the fliC gene. Within the human urinary tract, human urine is typically slightly acidic. To withstand this acidic growth environment, UPEC cells express the GadE protein for acid tolerance. In this study, we have examined the effect of a gadE mutation on flagella expression in a UPEC strain. A wild type parent strain, a gadE mutant strain, and a complemented gadE mutant strain were tested for motility on soft agar plates. All three strains were grown overnight either in pH 5.5 or 7 Luria broth (LB). After incubation in the different pH environments, motility agar plates were inoculated and motility zones were measured after an overnight incubation at either room temperature or at 370 C. Very little motility difference was noted between the wild type strain and the gadE mutant from the cultures that had been grown in pH 7 LB; however, the complemented gadE strain has a smaller zone of motility. On the other hand, the gadE mutant had a larger zone of motility than the wild type strain when the cultures were grown in pH 5.5 LB and the complemented gadE mutant had the smallest zone. Together our data suggests that GadE may be repressing transcription of fliC when the UPEC cells are grown in the pH 5.5 environment, leading to less expression of flagella and less motility.

U.58 New Site Typology on Oneota Sites in La Crosse and Vernon Counties

Brandon Emerson
Mentors: Constance Arzigian and David Anderson, Archaeology and Anthropology

The Oneota are one of the most recognizable and best studied archaeological cultures in La Crosse, Wisconsin. Even with the great deal of research that has been done within the La Crosse area, very little focus has been placed on the sites themselves. In past analysis of Oneota culture, the sites have only been talked about as having two different types, villages and agricultural fields, but that is a typology that is too vague to understand the true importance of the different Oneota site types and their spatial attributes. We can now propose that within Oneota society there are four categories for settlement types, and each is found within a distinct environmental setting. The four different site types present within Oneota society are: villages, farmsteads, residential camps, and logistical camps. The sites are located on different soil types, are found near different physical features on the landscape, and are sized differently. Using various

geographical information science (GIS) techniques, I will categorize the sites by looking at: proximity to good farm land, wind cover, size, and land quality. These revelations will lead to a better understanding of Oneota society through the La Crosse region.

U.59 TRPM7 and Thirteen-Lined Ground Squirrels

Abby Scaffidi and Kyle Studey
Co-author: Mattie Krause
Mentors: Scott Cooper and Jackie Wisinski, Biology

TRPM7 is a transient receptor potential cation channel that is heavily expressed in the bone marrow of thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*). Previous work into the study of coldshock genes of the squirrels notes the correlation between body temperature and gene or protein expression. During the summer, with body temperatures around 25˚C, the gene TRPM7 has a very low expression. During hibernation and interboutal arousal (IBA), when temperature is around 5˚C, TRPM7 is expressed exponentially higher. In our research, we investigated in this Ca+ and serine/threonine-protein kinase channel to compare if the megakaryocytes and furthermore platelets of the squirrel show its expression to humans with the DAMI cell.

U.60 A Comparison of Core, Lower Body Strength, and Biomechanical Factors between Basketball and Volleyball players

Alex Sperber, Brian Bartletti, and Peter Koopnans
Mentors: Naghmeh Gheidi, Exercise & Sport Science, and Thomas Kernozek, Health Professions

Anterior cruciate ligament (ACL) injury is a common injury among basketball and volleyball players. During landing, core and lower extremity muscles work synergistically to attenuate the stress of landing. Impact of forces during landing has been associated with ACL stress. It has been shown that deliberately soft landing applies less stress on the ACL. Published articles show the biomechanical differences between the landing of basketball and volleyball players. However, to the best of our knowledge, there is a lack of information on how biomechanical differences can be associated with muscle strength and drop height. The purpose for this study was to compare the lower body and core strength including biomechanical differences between two sports involving two drop heights.

U.61 Using CRISPR to Investigate Calmodulin M109 Oxidation in C2C12 Cells

Alex Steil and Jacob Kailing
Co-author: Jennifer Klein
Mentor: Jennifer Klein, Biology

This project serves to investigate and offer a gene therapy solution to oxidative muscular aging, by using CRISPR to develop mutants that either sterically mimic or resist oxidation. Our molecular target is Calmodulin, a protein that plays a vital role in Ca2+ signaling and consequently muscle function. CRISPR/Cas9 is a genome editing technology that uses customizable gRNA's and Cas9 endonuclease to make highly specific double stranded breaks (DSBs) in genomic DNA. Upon creating a DSB, the genomic DNA repairs itself by one of two methods: either non-homologous end joining, or homology directed repair (HDR), in which a provided donor DNA serves as a template for DNA repair. By utilizing HDR with a specific donor DNA, this system allows precise mutations to be incorporated into the genome. Here I have used CRISPR to develop the mutant cell line C2C12 CALM1 M109Q, which has a methionine to glutamine mutation at position 109 on the CALM1 gene to sterically mimic oxidation of M109. Our preliminary experiments with this mutant line suggest M109 oxidation leads to total failure of myoblast differentiation, marked by complete absence of both myosin heavy chain and myogenin, which is consistent with the literature on the topic. Our current aim is to further elucidate the molecular mechanisms by which this occurs, and our next objective is to develop mutant cell line C2C12 M109L, which would remove the site susceptible to oxidation.

U.62 Comparing Patellofemoral Joint Stress during Varying Athletic Activities

Alexey Minaev
Co-authors: Sarah Frank and Madeline Sandheinrich
Mentors: Naghmeh Gheidi, Exercise & Sport Scienc, and Thomas Kernozek, Health Professions, and Taviare Hawkins, Physics

Patellofemoral pain syndrome (PFPS) is a main cause of anterior knee pain between active people. It is reported that PFPS is reinforced through movements in running, squatting, lunging, and stair climbing. Now, it seems that PFPS hinders peoples' ability to perform everyday tasks. Current studies show that increasing patellofemoral joint stress (PFJS) corresponds with an increase in PFPS. There are many published articles comparing PFJS in different exercises, but there currently is no published study comparing PFJS within everyday activities. Our study aims to compare the PFJS, quadriceps force (QF), and knee range of motion (KROM) between walking, running, front lunge (FL), single leg standing (SLS), and unilateral jumping (UJ). For the study, sixteen healthy adult males (Age: 22.0 ± 1.54 yrs.; Height: 178.40 ±6.28 cm; Mass: 74.74 ± 9.93 kg) were selected as participants. To be considered, the subjects were required to have a score greater than 5 on the Tegner activity scale and no previous knee pain associated with PFPS. Those with a traumatic knee injury within the last six months, lower extremity injury within the last twelve months, or having a known history of cardiovascular pathology were excluded from the study. Data was collected from five successful trials of five different exercise variations that most attribute to PFPS in an active person including running, walking, FL, SLS, and UJ. Bertec force platforms were used to record ground reaction forces while data of total body kinematics was collected using a 15-camera motional analysis system with 47 reflective markers. Utilizing human body model, quadriceps forces were determined from the joint moments, and the PFJS calculated from the mean of the five trials for each exercise. The results showed the highest level of PFJS occurs during UJ and SLS assigned for the lowest level of PFJS.

U.63 The Effect of Caffeine on the Specific Gravity of Urine

Allison Prew, Amber Kingsley, and Noah Dahl
Mentor: Scott Doberstein, Exercise & Sport Science

The purpose of the study was to investigate the effects of caffeine on hydration status as measured by urine specific gravity (USG), which is a quantitative measure of the concentration of solutes in the urine. A specific gravity less than 1.025 indicates that an athlete is hydrated. The subjects of our study included college age males with no history of cardiovascular conditions. The study was a single-blind crossover in which we measured the subjects' USG before giving them either a dose of caffeine or a placebo. Subjects self-dehydrated before data collection and the variable was not administered until USG was measured to be greater than or equal to 1.025. After the initial collection and administration of variable, subjects returned to daily activities, avoiding actions that could further hydrate or dehydrate themselves, which could affect USG later on. Once the subjects had to urinate again, they returned to the testing center to do a second urinalysis, re-evaluating their USG, after which they were instructed to rehydrate. Subjects had a week to recover from the acute dehydration before they were retested using the other condition. Our goal is to provide more knowledge to athletic trainers, coaches, and officials to ensure the safety of athletes in their respective sports and the importance of being in a hydrated state during competition.

U.64 Improving School-Home Communication Practices for Young Adolescents: Interview and Survey Analysis

Alyssa Nelson
Mentor: Leslie Rogers, Educational Studies

Parents and teachers share the complex task of educating children; however, numerous researchers have found that effectiveness is impaired when ineffective school-home communication practices are used. Improving communication will increase parents' confidence in the school, improve student performance, and boost job satisfaction for teachers. Having a school-home relationship is defined as, "a child-centered connection between individuals in the home and school settings who share responsibility for supporting the growth and development of children" (Clarke, Sheridan, & Woods, 2009, p. 61). Previous research in this area has not involved a longitudinal analysis of families' perceptions to investigate whether the perceived effectiveness of communication strategies remains stable over time and school placements. Additionally, previous research has not investigated the relation between parents' perceptions of their son's or daughter's success in school (e.g., doing well with accommodations) and the extent to which these impact preferred communication methods improved student performance. Our research tackles these problems head on. Are there

different home-school communication expectations for families based on their perceptions of how well their children are doing and the types of supports received? For those participating in the longitudinal research, do those expectations remain stable over time? To answer these questions, we used a mixed-methods approach. During "Year One", surveys were completed by 134 families across the nation. Additionally, 17 survey respondents completed an hour-long semi structured interview. Survey responses from year one indicate a statistically significant difference in communication expectations based on expectations. Review of interview transcripts support these findings and add additional information to improve future practices. These results will be shared and direction for future research discussed.

U.65 Examining the Role of the Pirwa's After-school Program for Children as a "Gap-Filler" in the Community of Huancarani, Bolivia

Ashley Schwartz
Mentor: Christine Hippert, Archaeology & Anthropology

This research examines how the Pirwa, a local development organization founded in Huancarani, Bolivia, aids youth and their families in the community with their after-school program, and how this program fills the gaps of needs not being met by the state. Anthropologist Mark Schuller (2009) describes “gap-filler” non-governmental organizations as organizations that serve as a source of aid when the state cannot provide them. This means that these private organizations are “filling in the cracks” of social and developmental needs being left open by the state government. In the case of Bolivia, much of this is due to neoliberal policies introduced during the 1980s. Under neoliberal policies, structural adjustment programs were put in place by the World Bank and International Monetary Fund that cut social spending and increased financial inequality. Because of these structural adjustment programs, it has become difficult for the Bolivian government to provide services to civilians while also paying back loans to the WB and IMF. This concept of “gap-filler” has become the role of the Pirwa in Huancarani, which was founded after the passing of the 1994 Law of Popular Participation in Bolivia, in order to accomplish development projects in the community. This research demonstrates that the Pirwa program "gap-fills" by providing tutoring to students, access to needed materials and food, and supervised childcare. Investigating how the Pirwa's program "gap-fills" in place of a retreated state addresses critical questions about the benefits and limitations of private-public partnerships that have become prevalent in international development. Within international discourse on development, private-public partnership has been perceived as the best way to achieve development globally, but its model has problematic aspects. For the Pirwa, limitations of this partnership are often from the need to rely on international donors rather than the state for funding.

U.66 Theoretical Investigation of the Configurational Preferences of Guttiferone G Synthetic Intermediates

Brandon Atkins
Co-author: Janet Kirsch
Mentor: Janet Kirsch, Chemistry & Biochemistry

Guttiferone G is a naturally occurring enzyme that has been linked with tumor suppression. Although this enzyme is naturally occurring, its laboratory synthesis has proven to be quite difficult and has been achieved only recently through a series of steps involving the formation of a radical intermediate. One of these synthetic steps results in the formation of two isomeric products, only one of which has the correct orientation to form the bicyclic core of guttiferone G. We seek to explain the preferential formation of one isomer over another in this crucial step through the use of computational chemistry. In this study, we report the results of single point energy calculations of a guttiferone G precursor and its stereoisomeric products. These calculations are then used to determine the preferential formation of one isomer over another. The ultimate goal of our theoretical treatment of this system is to develop a predictive model that will allow synthetic chemists to identify the simplest (and thus synthetically easiest) substituents that will still result in the formation of the desired isomeric product.

U.67 Effects of Decreasing Salinities and Physical Abrasion on Golf Ball Corals (*Favia fragum)* from South Water Caye, Belize

Bria Theodore
Co-authors: Olivia Kulaszewicz, Anna Mayer, and Gregory Sandland
Mentors: Gregory Sandland and Gretchen Gerrish, Biology

Tropical reef habitats are recognized as some of the most productive (and therefore important) ecosystems on earth. Yet, they are currently threatened due to a number of different factors, including climate change (leading to reduced salinities) and tourism (which results in physical damage to the corals themselves). Although the effects of these

stressors have been investigated in certain areas of the world, little information exists on reef responses off the coast of Belize. To better understand this, we designed a multifactorial experiment assessing the responses of golf ball coral (*Favia fragum*) to differing salinities and physical disturbances (abrasion). To initiate the study, we first collected 36 golf ball corals from seagrass beds around South Water Caye, Belize. Each coral colony was then haphazardly allocated to 1 of 4 salinity treatments and 1 of 2 abrasion treatments. Polyp vigor was monitored for salinity responses every 3 hours and abrasion responses every 6 hours. Observations were performed over a period of 24 hours. Results showed that both time of day and physical abrasion had significant influences on coral responses. Contrary to initial expectations, salinity did not influence polyp vigor. Our work demonstrates that increasing tourist activities in and around Belizean reefs may have negative consequences for ecosystem health in the region.

U.68 Effect of Salinity on Tube Foot Expression in Rock-Boring Urchins (*Echinometra lucunter*) Surrounding South Water Caye, Belize

Briannae Theodore
Co-author: Gregory Sandland
Mentors: Gregory Sandland and Gretchen Gerrish, Biology

Sea urchins (*Echinometra lucunter*) are important keystone organisms in marine ecosystems because they help to control algal growth, sustain predator populations, and filter water from the surrounding environment. Urchins are typically sensitive to changing environmental conditions such as pH, temperature and salinity. Because of this, global changes in marine salinities (due to increasing freshwater inputs) may have important consequences for sea urchin life histories. Unfortunately, such responses are not well-understood, particularly for species in tropical regions. To better understand this effect, I investigated the tube-foot responses of Belizean rock-boring urchins (*E. lucunter*) exposed to different salinities. Sea urchins were first size-matched and then immersed in one of three salinities: 100% sea water, 65% sea water and 55% sea water; dilutions were achieved by adding rain water to the sea water samples at the appropriate volumes. For each urchin, I counted the number of tube feet that were expressed after 1 minute of exposure. Results showed that *E. lucunter* extended fewer tube feet at lower salinities. Under these conditions, urchins also moved less and became weakly attached to the substrate. Although my work demonstrated that reduced salinities influenced tube-foot responses in rock-boring urchins, it will be important for future studies to elucidate whether such responses have consequences for survival in this species.

U.69 Effect of Velocity on Patellofemoral Joint Stress

Bryce Ertman and Matthew Guhl
Mentors: Naghmeh Gheidi, Exercise & Sport Science, and Thomas Kernozek, Health Professions

Patellofemoral joint pain (PFJP) is a common problem in runners. It has been published that PFJP is associated with patellofemoral joint stress (PFJS). Running velocity is a factor which can affect PFJS. So, our goal is to assess the effect of velocity on PFJS. The results displayed that our larger velocities exhibited a concurrent increased stress on the patellofemoral joint.

U.70 Optimizing Appointment Assignment for Healthcare Provider Networks

Cameron Robaczewski, Beth Harlos, and Haley Klundt
Mentors: Chad Vidden and Song Chen, Mathematics & Statistics

LHI is a national healthcare organization that acts as a connection between American service members and healthcare providers. Given data from across the country, we are creating an algorithm to optimize patient assignment and reduce the number of rescheduled appointments to save LHI time and money. Our algorithm will assign a weighted score to specific providers and specific appointments and the sum of those two scores will determine the best provider to assign to a specific appointment. These results will be simulated against actual provider/appointment data given by LHI to determine the effects of our model.

U.72 Structural and Functional Analysis of Kreb's Cycle Enzyme Fumarase

Colton Berger
Co-author: Todd Weaver
Mentor: Todd Weaver, Chemistry & Biochemistry

Fumarase plays an important role in the reversible and stereospecific conversion of fumarate to L-malate as part of the Krebs cycle. Site-selective variants have been engineered to study structural and functional effects of altering active site amino acids, serine 98 (S98), threonine 100 (T100), asparagine 141 (N141), histidine 188 (H188), and glutamic acid 331 (E331). S98, T100, N141, and H188 are all known to interact with a structurally conserved active site water, and E331 is necessary for the activation of H188 through a low-barrier hydrogen bond. By changing the residues that interact with the active site water, which plays a role in catalysis, we have altered the kinetic and structural the properties of fumarase C. S98, T100, N141, and H188 were all replaced with alanine, while E331 was replaced with alanine and aspartic acid. Michaelis-Menten kinetic analysis of the T100, N141, and E331 variants noted significantly diminished catalytic efficiency. Structurally, the T100, N141, H188, and E331 variants reported altered protein unfolding in the presence of guanidine hydrochloride. It is proposed that the location of this active site water and the surrounding residues are necessary for catalysis and also for enzyme stability.

U.73 Sleep Loss May Adversely Affect Maze-Learning in Honey Bees

Dylan Baldassari and Daniel Reinhardt
Mentor: Barrett Klein, Biology

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

U.75 GC/MS Residue and Ceramic Function Analysis on Oneota Cooking and Storage Vessels

Emily Abramowicz
Co-authors: Ressano Desouza-Machado and Constance Arzigian
Mentors: Ressano Desouza-Machado, Chemistry & Biochemistry, and Constance Arzigian, Archaeology & Anthropology

Previous residue studies illustrate visible surface and absorbed lipid residues contained within a pot preserve in the archaeological record. Furthermore, they are an important source of information to analyze past cultures. Specifically, cooking pots contain food residue contained in lipids that suggest possible subsistence strategies and vessel use of past cultures. On the other hand, storage pots used for food or water do not contain lipid residues because the lipids have not been heated. Therefore, the lipids cannot absorb into the vessel walls or form deposits to analyze. This concept distinguishes storage from cooking pots in the archaeological record. For example, the Oneota culture provides both cooking and storage pots that reflect these distinguishing characteristics. Approximately 1,650 years ago, the Oneota culture arrived in the Midwestern United States and settled along major waterways. They are known as Wisconsin's first farmers because they relied heavily upon agriculture and domesticated corn and beans. Characterized by their large, shell-tempered, globular pottery with chevron and punctuated designs, it is assumed the pottery is utilized for cooking and/or storage. However, researchers have not tested the distribution of lipid residues on large, globular, closed-mouth vessel forms to distinguish between cooking and storage pots of the Oneota.

U.76 Comparing Statistical Methods with Unmet Conditions

Emily Hauri
Mentor: Barbara Bennie, Mathematics & Statistics

Randomized controlled trials, “trials where the subjects are randomly assigned a method or treatment that includes a placebo or control group and are measured before and after the method or treatment”, are a useful design to assess many types of treatments. We are comparing the effectiveness of various statistical methods for analyzing randomized controlled trials, when usual conditions are not satisfied, by observing the power of a method, or the probability of rejecting the claim that there is not a treatment effect. Usual conditions of these methods call for approximately symmetric or normal population distributions; however, we applied these with non-normal, skewed distributions and small data samples. Additionally, we applied different levels of correlation between the pre-test and post-test scores to observe the effects of correlation and skewed data on the power of each method. Using seven methods, we ran simulations and calculated the power for each method within every skew and correlation combination. At a 5% significance level, the ANCOVA method was significantly better than all of the other methods tested in 13 out of the 14 conditions, with an average power of approximately 48%. On the contrary, the Wilcoxon percent-change method, a non-parametric method, was consistently one of the lowest powers across all correlations and skews, with an average power of approximately 29.7%.

U.77 A Cross-National Comparison of College Students Attitudes towards Populism and the Outcome of the U.S. 2016 Presidential Election

Fiona Boler
Mentor: Carol Miller, Sociology

The most recent election of Donald Trump in the 2016 U.S. presidential race has raised the question of the rise of populism in the West for many scholars. In my research, I first proposed that not only are populist ideologies on the rise in the West, but also in Eastern industrialized nations, specifically Southeast Asia, making this a global phenomenon. Second, I proposed that it is important to understand how contemporary college students’ ideologies about populism influence their opinion of the 2016 election, as some research suggests that young adults hold contradictory political views. My research is a cross-national comparative study focused on college students attitudes towards populist philosophies including: authoritarianism, nativism, and anti-establishment, while examining whether those beliefs influence students attitudes towards the 2016 U.S. presidential election at my home University of Wisconsin-La Crosse and my abroad University of Mahidol in Salaya, Thailand. I have collected data quantitatively using Qualtrics survey software at UWL and handed out paper surveys in Thailand. I then entered all data collected by the paper surveys into SPSS in order to conduct a statistical analysis and compare results from data collected via Qualtrics. Data produced by this research has the potential to suggest that trends in populist philosophies are not just a local or a national phenomenon, but a global one, or at least a cross-cultural one. My research also raises more questions about how college students conceptualize populist philosophies with their own political ideologies in an increasingly globalized world.

U.78 Structural and Functional Effects of Altering the Non-Polar Core of Hemolysin A

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

Hemolysin A (HpmA), a 1577 protein found in *Proteus mirabilis*, functions as a hemolysin and targets the destruction of red blood cells. HpmA is a member of the two-partner secretion pathway (TPS), which is used by gram-negative bacteria to export predominantly virulent proteins outside of the cell. Through this mechanism, the A-component (HpmA) is translocated, folded, and activated by its cognate B-component (HpmB). To study HpmA, a truncated version of the protein, termed HpmA265, was implemented. HpmA265 has been identified to have three structural subdomains associated with folding and unfolding: C-terminal, nonpolar core, and polar core. Together, these three subdomains form a right-handed, three sided, non-globular, parallel β-helix that functions in red blood cell lysis upon secretion outside of the cell. This research project aims to identify parts of the nonpolar core that are important for the structure and function of HpmA265. Specifically, locations within the nonpolar core have been selectively targeted and modified using a standard molecular biology technique. The structural effects on HpmA were measured via circular dichroism, a technique that quantifies protein stability. The functional effects of HpmA were measured via Template Assisted Hemolyitc Assay (TAHA), a hemolysis experimental procedure that measures red blood cell lysis over time. The results of this research will help further identify regions of HpmA critical for secretion, stability, and hemolytic

function. This new knowledge could be used to expand the current understanding of how TPS pathways are used to invade host cells, and ultimately may assist in the design of preventative therapies for gram-negative infections like whooping cough, meningitis, and urinary tract infections.

U.79 TPS Domain Folding Causes Hemolytic Activation of a Newly Defined Functional Domain

Gina Wage
Co-authors: Daniel Grilley and Todd Weaver
Mentors: Daniel Grilley and Todd Weaver, Chemistry & Biochemistry

Proteus mirabilis is a pathogenic opportunistic gram-negative bacterium that produces and secretes a toxic protein called hemolysin A (HpmA). *P. mirabilis* utilizes a two-partner secretion (TPS) pathway to simultaneously transport and activate HpmA across its outer membrane and release it into the blood of a host where it destroys red blood cells (hemolysis). Like all other TPS proteins, HpmA contains an N-terminal TPS domain (â‰ˆ300 residues) essential for secretion and a separate C-terminal functional domain (>1000 residues) responsible for virulent functions. To understand the functional relationship between these domains and define the boundaries of the virulent hemolytic domain in HpmA, we made N-terminal, internal, and C-terminal deletions. In the absence of secretion, the unfolded full-length HpmA requires a folded TPS domain to act as a template protein to achieve its hemolytically active form. Using a Template Assisted Hemolytic Activity (TAHA) assay, we can quantitate the effect of the deletions on HpmA function. Unfolded proteins lacking a TPS domain at the N-terminus show no activity in TAHA assays. This suggests that TPS domain folding is required for activation of hemolytic activity. To determine if there is a direct linkage between TPS domain folding and hemolytic activation, we created internal deletions immediately C-terminal to the TPS domain. These demonstrate how TPS domain folding is coupled to activation of hemolytic function. We also show that a significant segment (>300 residues) can be removed from the C-terminus and not affect the hemolytic function. These results have allowed us to define the C-terminal boundary of the hemolytic functional domain. Results of this research have allowed us to locate regions of HpmA necessary for its hemolytic function and characterize how TPS domain folding is required to induce hemolytic activation. These studies have expanded our working model for HpmA secretion, activation, and function.

U.80 Lysine Position Affects Binding of AIB-rich Model Antibiotics to Lipid Vesicles

Jack Geiger
Co-author: Aditya Ailiani
Mentor: Adrienne Loh, Chemistry & Biochemistry

Due to the increased development of drug resistance and decrease of antibiotic drug effectiveness, there is an immediate need for new antimicrobials. A possible, promising solution is in the form of charged peptide-based molecules, which can function as antibiotics by interacting with and disturbing bacterial membranes, often forming pores in which internal components can leak. We are exploring these interactions using model peptides composed of hydrophobic, branched amino acid Aib (α-aminoisobutyric acid), and large unilamellar vesicles (LUVs) composed of DMPG, DOPG, DMPC, or DOPC lipids. When extruded, these lipids form model bacterial (negatively charged) and non-bacterial (neutral) cell bilayers. We present results using two model peptides in which two positively charged lysine (K) amino acids were placed in either adjacent positions of the helix (KK45) or a helical turn apart (KK36). Interactions between the LUVs and peptides are investigated using Isothermal Titration Calorimetry (ITC), allowing us to measure binding enthalpies (changes in heat) and binding constants, therefore, allowing binding entropies (changes in disorder) to be calculated. Our initial results indicate that both KK45 and KK36 bind in a multi-stage interaction to the DMPG vesicles (bacterial models), while showing very little affinity when binding to DMPC (non-bacterial models). One stage appears to be enthalpy-driven and is consistent with electrostatic interactions between positively charged Lys sidechains on the peptides and negatively charged lipid headgroups; while the other stage appears to be entropy-driven and is consistent with hydrophobic interactions. Recent experiments suggest that KK45 binds more favorably to DOPG vesicles in the second equilibrium, which is interesting given that DOPG creates a thicker bilayer. In this project, we will compare KK45 and KK36 binding to the DMXX vesicles and DOXX vesicles to determine whether membrane peptide structure and lysine positioning affects peptide and bilayer interactions.

U.81 The Effects of Added Weight on Achilles Tendon Load in Running

Jessica Ahrens and Katherine McGinley
Co-author: Christian Christenson
Mentor: Thomas Kernozek, Health Professions

The purpose of our study was to compare the Achilles tendon stress during running with different amounts of added weight. Previous studies conducted have shown that an increased load during running will create increased stress to the Achilles tendon. We wanted to determine how adding greater load would influence Achilles tendon loading. Participants completed multiple running trials down a 20m runway with 10 and 20 pounds of added weight using a weight vest. Reflective markers placed on participants skin and clothing allowed us to track the movement of the individual's body during testing. As they ran, they also contacted one foot on a force platform. These kinematic and kinetic data were used in a musculoskeletal model to calculate muscle force. These muscles forces were then used in a custom program to determine Achilles tendon loading. Preliminary data appears to show that adding greater 20 pounds of weight increases stress on the Achilles tendon stress in running by about 15%.

U.82 Optimizing Local Company's Nationwide Provider Network

Joseph Wade and Bradley Johnson
Co-author: Brandon Brunner
Mentor: Chad Vidden and Song Chen, Mathematics & Statistics

This research project focuses on optimizing a patient and provider network using historical data from a local company. Logistics Health Incorporated (LHI) is a La Crosse-based company that designs and manages a nationwide healthcare provider network for veterans and active military members. Across the nation, LHI has a huge network of patients and providers, and they have an obligation to cover 95% of services to their patients within driving distance (60 miles). Some areas of the country are lacking providers and some areas have an excess. Areas that don't have enough providers leave patients uncovered, and areas with too many providers cause unnecessary maintenance costs to LHI. This research sets out to automatically detect undercovered and overcovered areas, make recommendations about where to add and remove providers, and simulate the consequences of those recommendations.

U.83 Investigation of the Synthesis of Curcumin and Curcumin Derivatives

Josh Christensen
Co-author: Valeria Stepanova
Mentor: Valeria Stepanova, Chemistry & Biochemistry

In our project, we study the conventional approach to curcumin and improve it. Curcumin is a natural colorant used in food and pharmaceutical industries. Beyond that, it has displayed very promising antioxidant, anti-inflammatory, antibacterial, and chemotherapeutic properties. There are two approaches to obtain this compound: 1) extraction from natural source (Curcuma longa Linn plant) and 2) industrial organic synthesis. The second approach is more efficient to meet the rising demand. However, the synthetic procedure was developed in 1964 and is not well understood. This procedure is outdated with respect to growing impact of chemical industry on the environment. Our focus is to optimize the synthesis so it can be applied to a variety of different molecules. We have already improved the synthesis from an environmental and reaction yield standpoint, and we now want to generalize so that we can create a library of curcumin derivatives. In order to generalize the procedure, we will be using the same starting materials, but we will alter the side groups in order to make a different molecule. This new compound will then be characterized using 1H NMR spectroscopy to determine if the desired product has formed. The workup will then be modified to obtain the purest sample possible. After a library of new curcumin derivatives has been obtained, these molecules can then undergo testing for valuable biological properties as listed above. In the end, we hope to create a simple, transparent, and versatile synthesis that can be applied on an industrial scale and be less harmful on the environment.

U.84 The Personality of Attraction

Joshua Wolff
Mentors: Alexander O’Brien, Psychology, and Mary Krizan, Philosophy

When using the word "attractive", it is assumed that this word is in reference to physical attributes. However, the physical aspects of something or someone have quite less influence on perceived attractiveness than what is currently

understood. This research implicates a significant impact on the introduction of personality traits in perceiving attractiveness, rather than simply by perceiving physical attributes alone. Prior research has implied personality to be a key factor in the evolutionary process by allowing innate inference of a person to reveal their trustworthiness and their willingness to cooperate within a culture. What a person looks like is significantly less important than how that person interacts with a culture.

U.85 Site-Selective Alterations in the Hemolysin A Non-polar Core

Julian Grosskopf
Co-authors: Todd Weaver and Daniel Grilley
Mentors: Todd Weaver and Daniel Grilley, Chemistry & Biochemistry

The secretion of virulence factors often aids bacterial pathogenesis. The two-partner secretion (TPS) pathway, harboring both A (TpsA) and B-components (TpsB), is the most commonly used gram-negative virulence factor secretion system. Whooping cough, meningitis, and certain food-borne illnesses have been attributed to TPS pathway-containing gram-negative bacteria. Systematically, TpsA members are activated concomitant with Tps-dependent secretion across the outer membrane. Upon secretion, TpsA members may display functions including cytolysis, adhesion, contact-growth inhibition, and iron sequestration. These TpsA functions provide advantageous invasion and proliferation strategies within hosts. Structurally, TpsA members can be divided into a TPS domain and a functional domain. All TPS domains are constructed from a 300-residue right-handed, parallel β-helix structure, and recognize their cognate TpsB partner. To further understand the relationship between TPS domains and TpsA structure and function, we use a truncated form of hemolysin A (HpmA265), a TpsA member from *Proteus mirabilis*. HpmA265 was structurally separated into three sequential folding subdomains: polar core, non-polar core, and carboxy-terminus. These research investigations targeted valine 158 (V158) and phenylalanine 215 (F215) located within the first and last parallel β-strands of the non-polar core subdomain. A series of site-selective variations were established at both V158 and F215. These variant forms of HpmA265 were characterized structurally via protein folding techniques, while functionality was ascertained within a template-assisted hemolysis assay. Structurally, V158 variants destabilized the unfolding transitions associated with the polar and non-polar core subdomains, while leaving functionality unaffected. Site-selective variants at F215 selectively destabilized the non-polar core subdomain, while leaving the unfolding transition attributed to the polar core subdomain unaffected. Additionally, the F215 variants do not affect template-assisted hemolysis. Therefore, our results have demonstrated to dissect the structural stability within the non-polar core subdomain from template-assisted function. These results have expanded the understanding for the implementation of TPS domains within gram-negative bacteria.

U.86 Study of Stability of Immature Red Blood Cells in Ground Squirrels

Julianne Pekol, Brittany Trybula, Felipe Bernal, and Erin Balthazor
Mentor: Scott Cooper, Biology

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

U.87 Tangibility's Influence on Service Industry Customers

Kara Stushek
Mentor: Nese Nasif, Marketing

This research synthesis examines the moderating effect that tangibility has on customers of service industries. Tangible promotional and/or appreciation items have a physical form, and as such, their perceived value to the customer can be more easily defined in the mind of the consumer. Moreover, the exact cost of tangible product delivery to the customer

can be identified and measured with more accuracy than intangible promotions or gestures of goodwill. Prior research has found that tangibility increases customer satisfaction, emotional attachment, generosity, and willingness to pay. When obstacles must be overcome to obtain the tangible item it also raises the overall appeal of the item. Thus, tangibility can help predict customer loyalty as it has a considerable impact on the customer's evaluation of service quality. The current research is based on these past findings and advances this body of knowledge by looking at the specific context of gestures of appreciation by the service provider and whether the tangibility of these gestures affects customer satisfaction, and in turn, customer loyalty. Scales are created or adapted from prior literature to measure appreciation, tangibility, customer satisfaction, and customer loyalty. Potential managerial implications are also provided.

U.88 The Equal Rights Amendment and Its Advocates in the Women of Wisconsin

Katelyn Rigotti
Mentor: Jodi Vandenberg-Daves, Women, Gender, & Sexuality Studies

I am examining the work and accomplishments of the La Crosse County Women's Political Caucus. Their purpose was to encourage women to run for state and local office and to provide support and information on campaigning. They also worked to educate the public on important issues like the Equal Rights Amendment and Affirmative Action. I am focusing on their efforts to secure the passage of the Equal Rights Amendment for the federal and state constitution. In addition, I have analyzed the work of the Wisconsin Women's Political Caucus of which the La Crosse County Women's Political Caucus was a branch. My research is a study of the Equal Rights Amendment, and the way it would have actually affected the condition of women. There was a lot of opposition to the Equal Rights Amendment for various reasons; some people understood what changes the amendment would make, while others were making assumptions. My research dissects the reasons people opposed it and the way proponents failed to correct these misconceptions surrounding the amendment, resulting in the lack of successful ratification.

U.89 Confidence in Healthcare in South Africa and the Netherlands as a Result of the World-System Status

Katherine Craig
Mentors: Carol Miller, Sociology

The purpose of the study was to investigate whether world-systems theory can explain the confidence in health care systems in the Netherlands and South Africa. Using data from ISSP- 2011 (International Social Survey Programme: Health and Health Care- ISSP 2011), 3,004 South Africans and 1,472 Dutch were surveyed on their perceptions about their country's healthcare system. A binary logistic regression analysis was conducted through SPSS to test whether being in a country that was either colonized or the colonizer affected confidence. Results supported the hypothesis that the odds of having confidence are 52.6% lower for South African respondents who were the colonized country.

U.90 White Perceptions of Black Social Movements

Kyleigh Hall
Mentors: Laurie Cooper Stoll and Nicholas Bakken, Sociology

Racial justice movements such as the Civil Rights Movement (CRM) and Black Lives Matter Movement (BLM) have historically been perceived as contentious by whites in American society. This study explores white perceptions of Black social movements such as the Civil Rights Movement and Black Lives Matter movement utilizing survey research with a random sample size of 5,000 UWL undergraduate students. Through an analysis of the variable police response, the collected data will explore how these factors influence white college students' perceptions. By using Eduardo Bonilla-Silva's frames of colorblind racism (abstract liberalism, naturalization, cultural racism, and minimization of race), I will examine how covert racism is still an underlying factor in the current 'post-racial society.'

U.91 Provider Coverage Method

Laura Kaiser, Jordan Pellett, and Cassandra Quinn
Mentor: Song Chen, Mathematics & Statistics

Logistics Health Incorporated (LHI) is a La Crosse based company that contracts with hospitals and clinics nationwide to provide healthcare services to both active service members and veterans. By contract, LHI must be able to provide every patient with 95% of services within a specified driving distance, while optimizing the provider-patient

relationship. Having too few providers in an area leaves patients uncovered, while too many providers leads to an increase in administrative costs and dilution of services. Using the mathematical approach of graph theory, we have created a base model of the patient-provider relationship. By analyzing the change in percentage of services covered and provider overlap for each patient, we identified areas in which the current number of providers offered by LHI is not optimal. In areas where providers are in excess, we created a ranking of providers that will dictate a removal strategy. In areas where providers are lacking, we provided guidance for adding providers.

U.92 Employee Engagement of Hourly Employees

Lauren Hoefgen
Mentor: Christa Kiersch, Management

Employee engagement, or the level of an employee's commitment and connection to an organization, can help promote employee retention, improve customer loyalty, and increase the overall performance of an organization. The goal of this research was to examine the key drivers of employee engagement in both hourly and salaried employees. A review of the existing empirical literature revealed that employee engagement strategies differ based on the type of worker (hourly vs. salaried employee), but there are also commonalities between the type of employee. The engagement strategies supported in the literature are further explored by examining local La Crosse area organizations and how they are implementing employee engagement strategies in their businesses.

U.93 Millennials' Social Class of Origin, Mastery, and Depression Symptoms

Leah Foltman
Mentor: Dawn Norris, Sociology

Past research has shown that the Millennial cohort (born 1981-1997) has had high rates of mental illness, including depression (Twenge 2014). However, few authors have studied the role of mastery, which varies systematically by social class (Lareau 2014), in this process. I examine this with correlations based on secondary quantitative data from the 2016 version of The General Social Survey (GSS) ($n = 246$ Millennials). Initial correlations revealed no significant relationships between social class of origin and depression symptoms or between class of origin and perceived control over one's life (mastery). Further findings showed a statistically significant ($p < .001$) negative correlation between depression symptoms and mastery. Analyses also included multivariate stepwise regressions to examine the effects of control variables (age, sex, participant's current education level, etc.) on these relationships. The social class a Millennial was raised in and their related experiences are not predicting how they perceive their life chances.

U.94 I'm Not Sexist but...": Female College Students' Experiences of Gender Microaggressions

Sydney Yarbrough
Mentor: Laurie Cooper Stoll, Sociology

Since the social movements for equality in the nineteen-sixties and nineteen-seventies, an increasingly pervasive and covert form of sexism has emerged. Today, in addition to reports of blatant sex discrimination, there are increasing reports of subtle forms of sexism. Gender microaggressions are one form of subtle sexism. Microaggressions are everyday, subtle experiences that convey a negative message and cause targets to question the intent of the perpetrator (Sue, 2010). The purpose of this study is to explore the nature and extent of gender microaggressions experienced by female-identified students at UWL. Female students recorded their daily experiences of gender microaggressions over a fourteen-day period in an online diary log.

U.95 Fifty Shades of Rape Culture: Rape Culture Salience on College Campuses

Lisa Hady and Brittany Raven
Mentor: Ryan McKelley, Psychology

This study explored the awareness of components of rape culture on college campuses. Past research has shown how rape myth acceptance varies by gender, but has failed to address how individuals adhere to rape myth acceptance and how this adherence affects how salient rape culture is to a person. The purpose of the present study was to increase our understanding of rape culture awareness, its prevalence, and factors influencing students' ability to recognize it. Specifically, we examined how college students were able to recognize manifestations of rape culture based on varying degrees of rape-supportive messages.

U.96 Do Future Computer Scientist's Dream of the Jobless Future?

Lucy Putnam
Mentor: Carol Miller, Sociology

Previous research illustrates that automating the workforce will have major social effects. While we can see the impacts of automating the workforce formulate currently, there is still uncertainty about the outcomes of automating the workforce. Furthermore, there is limited research on how computer scientists view the relationship between how their software development affects the automation of employment. Through in-depth interviews with computer science majors from UWL, this research provides insight on whether or not computer scientists are considering the direct impacts their software development has on employment. I found that the majority of computer science majors at UWL do not consider the effects their work has on society, specifically employment. This project contributes to previous research by analyzing this issue through the perspective of computer scientists and encourages future research to explore possible actions computer scientists can take to combat the issue of the jobless future.

U.97 Frequency of Emerging Adult Marijuana Use as a Result of Coping with Stress and Mental Health

Madeline Cordle
Co-author: Alessandro Quartiroli
Mentor: Alessandro Quartiroli, Psychology

Emerging adults (Arnett, 2001) are being found to suffer from more stress and lower levels of mental health than ever before (Piercall & Keim, 2007; Sifferlin, 2013; Holmes & Silvestri 2015). Speculation has been made that emerging adults, and college students specifically, seem to be seeking out different coping methods to overcome their stress, including things like alcohol and drug use (Ashton & Kamali, 1995). This cohort of individuals is also the largest consumers of marijuana in the United States, with 40% saying they have at least tried in the past 12 months, and 6% saying that they use it daily (Lin et al., 2016; Schulenberg et al., 2016). Chronic marijuana use is often comorbid with low levels of mental health (Lai & Sitharthan, 2012; Buckner, Ecker, & Cohen, 2010). Therefore, it is possible to speculate that emerging adults might use marijuana to cope with stress and mental health related issues. Adams, Bezner, and Steinhardt (1997) point out 6 facets of wellness: psychological, emotional, social, physical, spiritual, and intellectual, which can be negatively impacted by abuse of marijuana (American Psychological Association, 2000). Exploration of levels of perceived stress, mental health, and frequency of marijuana use is warranted. Based on the potential impact that marijuana use has on wellness, exploring potential differences between users and non-user's wellness is also warrated. Participants were asked to complete an online survey including the Depression Anxiety Stress Scale (DASS) (Lovibond & Lovibond, 1995) and the Perceived Wellness Survey (Adams et al., 1997). Depending on their use (or lack thereof) of marijuana, users were asked to also complete the Marijuana Motives Measure (Simons et al., 1998). Of the 1,359 participants, 55% reported current or past marijuana use, and 45% have never used marijuana.

U.98 Where Are the Children?: An Analysis of Childhood in a Museum Context

Madeline Younce
Mentors: Katherine Grillo and Elizabeth Peacock, Archaeology & Anthropology

What is a child? Each culture creates their own definition of what childhood is and what roles children have. There has been little research done on the archaeology of childhood until the past three decades and few artifacts that have been associated with childhood have made it into museums for public display. The amount of information artifacts can convey about childhood is questionable, as well as how meaningful or the accuracy of the information. Since museum exhibits rarely present artifacts and information about childhood in the past, an incomplete understanding of childhood is created. Additional artifacts and explanatory materials would give a more holistic understanding of their culture. We must look at the possible ways we can convey meaningful information about childhood in a museum setting through the addition of more artifacts or displays, and whether any aspects of culture could be enhanced by highlighting the important role of childhood. To look at the issue of childhood in a museum setting, I will present a set of case studies comparing childhood of Ancient Mesoamerica, Native North America, and Ancient Mediterranean as found at the Chicago Field Museum. I will compare the number and contents of artifacts and displays to determine how childhood is currently represented in the exhibits. In addition, this data creates a foundation to add other artifacts to create a more meaningful perspective and an increase in quality of information presented in museums. Supplementary research can reveal deficiencies by providing details and artifacts with the potential for display which would ameliorate the understanding of what is childhood. In analyzing the data in museum settings, it is possible to advocate for an increase in inclusion of material related to childhood in exhibits and the discussion of culture.

U.99 Living and Coping with the Diagnosis of Early-Onset Dementia

Madilynn Wintlend
Co-author: Erica Srinivasan
Mentor: Erica Srinivasan, Psychology

Alzheimer's disease, the most common form of dementia, impacts more than five million Americans (Alzheimer's Association, 2018). Two hundred thousand individuals, or five percent, are diagnosed before age 65 (Alzheimer's Association, 2018). The population of those living with early-onset dementia experience symptoms and losses uniquely different than someone who might be diagnosed after age 65 (Clemerson, Walsh, & Isaac, 2014). The subjective experience of those living with the diagnosis first hand has been explored very minimally, resulting in a lack of research and resources for those individuals. Research conducted previously has mainly focused on late-onset diagnosis as opposed to early-onset. Prior research has also focused more on the caregivers' perspective rather than those living with the diagnosis. The purpose of this qualitative study is to further explore what it is like to live and cope with the diagnosis of early-onset dementia. Through qualitative data analysis of transcriptions from two focus groups, themes emerged related to the diagnosis, coping skills, symptoms, losses, changes in relationships, expression of their diagnosis, thoughts about the future, and support within the group.

U.100 Invertebrate Colonization of Seagrass (*Thalassia testudinum*) from Mangrove and Reef Habitats off the Coast of Belize

Marissa Despins and Allison Greene
Co-author: Isaac Eugster
Mentors: Gregory Sandland and Gretchen Gerrish, Biology

Caribbean macro-invertebrates form the base of tropical marine food webs and thus have the potential to influence the entire marine ecosystem. These organisms often establish on a variety of aquatic plants, algae, and other substrates. To gain insight into colonization patterns, we quantified the diversity and abundance of macro-invertebrates found on seagrass (*Thalassia testudinum*) collected adjacent to mangrove and reef habitats around Belize. Seagrass samples were collected at a fixed distance from both mangrove (n=3) and reef (n=3) sites. Once acquired, each seagrass blade was cut into 4 equal sections and macro-invertebrates were enumerated for each section. Our results showed that macro-invertebrate diversity and species richness differed significantly between seagrass collected from the two habitat types (mangrove versus reef). Moreover, there was a general trend of increasing invertebrate diversity and richness from the base to the top of seagrass blades irrespective of habitat type. Together, our work highlights the macro-invertebrate diversity that often goes unnoticed in tropical areas and suggests that such assemblages may vary predictably based on habitat type.

U.101 Non-Classical Hydrogen Bonding in Halogenated Biphenyl Chromium Tricarbonyl

Marissa Soto
Mentor: Curtis Czerwinski, Chemistry & Biochemistry

Classical hydrogen bonding is a powerful inter- or intra-molecular force of attraction between -OH and -NH groups in organic molecules. It is responsible for boiling point trends, solubilities, three-dimensional structures of proteins, and many other physical and chemical phenomena. Non-classical hydrogen bonding is a weaker force of attraction that is typically observed between halogens such as fluorine and hydrogen atoms in adjacent molecules. In this project, we have been studying the potential role of non-classical hydrogen bonding in chromium biphenyl compounds. Understanding these interactions could lead to future development of variations of these molecules that act as molecular wires or molecular switches. In this project, we have utilized the Suzuki coupling and other known synthetic procedures to prepare a series of substituted biphenyl chromium tricarbonyl compounds. We have used spectroscopic and crystallographic studies to determine the extent of non-classical hydrogen bonding in fluorinated and brominated versions of these compounds, to determine the extent to which non-classical hydrogen bonding impacts dihedral angles in the structures. These studies show C-H…F-C non-classical hydrogen bonding can be detected in the solid state, but not in solution or by calculation. Bromine analogs show much weaker non-classical hydrogen bonding than the fluorine analogs.

U.102 Characterization of the Ordered Domain of a Tegument Protein Required for Epstein-Barr Virus Production

Megan Marlowe
Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein Barr virus (EBV) is a human herpes virus that can cause cancer and mononucleosis, among other symptoms of viral infection. Within the viral life cycle, the virus can switch between latent and lytic phases. In the latent phase, very few genes are expressed, new virions are not produced, and symptoms of viral infection are not shown. During the lytic, or active, phase there is an increase in viral gene expression, proteins are produced, and infectious viral particles are released from the cell. This project investigates the EBV tegument protein BRRF2 which is expressed in the lytic phase of the EBV infection. The BRRF2 protein impacts virus production, but its role is unknown. In order to study the protein in a lab setting, it must be isolated and purified to determine its function and characteristics. More specifically, truncated versions of the protein were created using an early stop codon to isolate a conserved domain within the protein common to the herpesvirus family. The conserved domain is more likely to determine the function of the protein. Growth conditions were optimized to maximize protein yield needed for characterization assays. The variant protein was overexpressed in *E. coli*, separated from the cell by sonication, and purified by nickel affinity chromatography. When pure protein yield was still very low, it was discovered that a high percentage of the protein was insoluble, leaving it trapped within the cell matter inside inclusion bodies. New cell lysis techniques must now be attempted in order to successfully isolate the BRRF2 protein.

U.103 Seeing the 4est for the 3rees: Using Gestalt Grouping to Identify Color-Grapheme Synesthesia

Michael Szeszol and Josh Barbara
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 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 vise 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 synesthetes' representations of the grapheme's colors exerted the same gestalt grouping conflicts as the presence of the actual color in the displays. Results indicate that the grapheme colors experienced by the synesthetes alter their perceptions of perceptual grouping, relative to controls. Therefore, the proposed experiment can potentially be used as a test to determine color-grapheme synesthesia in an individual.

U.104 Sleep and Learning in Jamaican Fruit Bats

Mitchell McCloskey
Mentor: Barrett Klein, Biology

Evidence shows that sleep is essential. Researchers have yet to find an animal that does not exhibit sleep behavior. Meanwhile, sleep restricted animals show a significant decrease in cognitive function if not death. Yet, conclusions on how and why sleep evolved still remain elusive. One hypothesis is that learning and memory consolidation is an important function of sleep. So far this hypothesis has held true in human subjects who, when tested experimentally, had a greater difficulty learning tasks when sleep restricted. In this study, we asked if this hypothesis would hold true in other mammals using Jamaican fruit bats, *Artibeus jamaicienus*, as model organisms? By exploring groups of distantly related organisms, we can draw conclusions about the evolution of sleep. We ran two experiments one helped us describe Jamaican Fruit Bat sleep, and another explored how sleep impacts Jamaican Fruit Bat learning. The first experiment allowed us to define distinct sleep stages in the bats by finding correlations in certain behaviors and

resistance to arousal induced by auditory stimuli. The second experiment explored the impacts of sleep restriction on learning and memory of the fruit bats. We tested for the proportion of correct decisions, as well as time to decision, made by bats trained in a simple maze before and after sleep restriction. This work is currently being expanded on at UWL with an even more distantly related group of organisms, honey bees.

U.105 The Acute Effects of Instrument Assisted Soft Tissue Mobilization versus Foam Rolling on Range of Motion of the Low Leg

Mychaela Parker
Mentor: Scott Doberstein, Exercise & Sport Science

Multiple techniques are used to treat fascial restriction in order to increase range of motion (ROM). There are many studies examining each technique individually, but a deficit in studies comparing them to one another. The purpose of this study was to expand the literature by comparing the acute effects of two popular fascial release techniques on ankle ROM. Instrument Assisted Soft Tissue Mobilization (IASTM) and foam rolling (FR) were studied because they are commonly employed by athletic trainers in clinics. Seventy recreationally active subjects (females = 48, males = 22, age = 20.2 ± 1.2 years, height = 67.3 ± 3.8 in, weight = 155.6 ± 31 lbs) completed the study. Subjects were randomly assigned to one of two interventions: IASTM or FR. Following a 5 min warm-up on the stationary bike, each subject completed a three minute period utilizing the first intervention. Ankle dorsiflexion (DF) ROM was measured passively using both a goniometer and a digital inclinometer. Measurements were taken pre-intervention, immediately post-intervention, and 24 hours post-intervention. Following a 7-day washout period, each subject returned for the other intervention following the identical protocol. All measurements were performed by the same investigator to eliminate intertester variability. Overall, passive ankle DF ROM significantly increased with both IASTM and FR ($p = .000$) but neither intervention was significantly more effective than the other ($p = .529$). It appears that these results indicate that neither method is superior to the other, showing either modality could be used interchangeably in clinical practice to produce an acute increase in ankle DF ROM. With this information, athletes can utilize FR and know they are getting the same increase in ROM compared to IASTM administered by a clinician. These findings suggest that a clinician's time may be freed up by limiting one on one patient interactions, thus allowing the clinician to work with multiple athletes simultaneously.

U.106 Oneota & Dogs: Friends or Food?

Nicole Reske
Mentors: Amy Nicodemus and Constance Arzigian, Archaeology and Anthropology

Whether it was simply for companionship, hunting or subsistence, domesticated dogs (*Canis familiaris*) have played a role in the lives of humans for thousands of years. They have served diverse roles in the daily lives of pre-historic cultures across the world. In many countries, eating certain animals are strictly prohibited and in contrast, some societies have strict ceremonial rules that call for the revered use of those animals. One culture may consume an animal for religious beliefs, while another culture may consider that consumption taboo. Many of these societies that come to mind have been extensively researched, but the Oneota was not one of them. For my Honors thesis, I will identify and describe the different roles canids had in Oneota society. In order to do so, I have collected published and unpublished information, in addition to conducting my own faunal analysis on selected features from the La Crosse area to better understand Oneota culture and their specific subsistence practices. In addition, this thesis can help aid in the understanding of, more broadly, the role dogs played in prehistoric Native American culture and daily life.

U.108 Neuroanatomical Changes in the Brain of a Seasonal Hibernator

Reid Johnson and Melissa Hammer
Co-author: Anna Marchand
Mentor: Christine Schwartz, Biology

Ground squirrels employ different physiological strategies for neuroprotection and energy conservation during hibernation. It is well known that during torpor, the number of connections between neurons in the brain decrease, presumably to reduce energy required for maintenance. Another potential strategy to conserve energy in the brain during hibernation would be to reduce cell number and/or cell size. This study examined seasonal changes in neuron number in the ground squirrel cerebral cortex, specifically focusing on anterior cingulate cortex. Additionally, cortical thickness was also measured as an estimate of potential changes in cell size. Our hypothesis here was that cell number and size would be lowest during torpor. Coronal brain sections from ground squirrels in spring (non-hibernating),

interbout arousal, and torpor were stained with cresyl violet, which is a common neuron stain. Images were then taken throughout the anterior cingulate cortex of each ground squirrel brain. These images were analyzed to detect changes in cell number and cortical thickness across the three phenotypes using ImageJ software. The preliminary cell count data from a small sample size suggested smaller cells become more prominent in the anterior cingulate cortex during torpor compared to spring and interbout arousal specimens. Additionally, preliminary cortical thickness data indicated that torpor animals exhibited the largest cortical thickness compared to the other groups. Interestingly, this preliminary data suggests that cell number and size actually increase during torpor, contrary to what we hypothesized. This increase in cortical thickness and cell number could instead represent a neuroprotective strategy to counter any potential cell losses during hibernation. However, these initial findings represent a small sample size and warrant further investigation. We plan to increase our sample size, along with using a direct measure of neuron size.

U.109 Hear, Here: Local History in the Classroom

Sara Krueger
Mentor: Ariel Beaujot, History

"Hear, Here: Local History in the Classroom" brings the stories of Hear, Here into local eighth grade classrooms through student centered, education standards aligned lesson plans. Hear, Here is an award winning audio-documentary project in La Crosse's downtown that allows people to call a toll free number posted on orange street signs to hear past and present stories that happened at the exact spot they are standing. Though used extensively by the public, Hear, Here has not yet been used in the classroom. This project created lesson plans that teach local history utilizing the Hear, Here stories, culminating in a field trip to downtown La Crosse to listen to stories on a guided tour, or an alternative in-classroom field trip experience. Students also write their own Hear, Here style personal narrative, connecting their experiences to their city and to history. This curriculum engages students in local history, brings diverse voices into the mainstream classroom, introduces students to oral history as a primary source, and relates La Crosse's history to their own lives.

U.110 Interactions between Divalent Cations and a Periplasmic Lipoprotein Involved in *Salmonella* Magnesium Homeostasis

Ross Soens
Co-author: John May
Mentor: John May, Chemistry & Biochemistry

All living cells require magnesium to generate biochemical energy during metabolism and for maintenance of essential structures. A recently discovered protein of unknown function, DcrB, plays a role in magnesium homeostasis within *Salmonella enterica*, which must adapt to low external levels of Mg^{2+} to cause food-borne illness. DcrB is a small protein attached to the periplasmic face of the cytoplasmic membrane. Given this location, one possible model for the function of DcrB is that DcrB brings Mg^{2+} to membrane Mg^{2+} transporters in the cytoplasmic membrane. Currently, *Salmonella* phenotypic assays have shown DcrB to promote growth in low Mg^{2+}. The hypothesis of this project is that DcrB binds magnesium and possibly other divalent cations. To test this hypothesis, we examined whether Mg^{2+} and other divalent cations affected the thermal stability of purified DcrB protein. We examined the effect of divalent cations using a fluorescence-based thermal shift assay and circular dichroism techniques. Furthermore, we are using our recent crystallographic structure of DcrB to identify and test specific metal binding sites. Our results have established the specificity of DcrB for binding divalent cations, which we anticipate will shed light on the role of DcrB in metal homeostasis in pathogenic bacteria.

U.111 Combination Treatment Is an Effective Strategy in Targeting Claudin-Low Breast Cancer Cells

Ryan Sokup
Co-author: Sierra Colavito
Mentor: Sierra Colavito, Biology

Recent breast cancer treatments have focused on targeted therapies, meaning the treatment is focused on the properties of specific tumors. Several of these treatments have been effective; however there is still a lack of treatment options for certain subtypes of breast tumors. Claudin-low breast cancer is a particularly aggressive subtype for which few effective therapies exist. This subtype is closely related to cancer stem cells, which have been implicated in the processes of metastasis, resistance, and tumor recurrence. Our targeted therapy approach for claudin-low breast cancer cells focused on a combination therapy. Recently, our laboratory has identified a susceptibility of claudin-low breast cancer cells to a

Checkpoint Kinase 1 (CHK1) inhibitor in combination with a pro-apoptotic agent. Using immunofluorescence imaging and western blotting techniques, our research found an increased expression of H2A.X and p53BP1 in claudin-low breast cancer cells compared to normal mammary cells when exposed to the combination treatment. These proteins are common biomarkers of double strand DNA damage in the cell. Additionally, we found significantly increased rates of mortality in the claudin-low cancer cells. These results suggest that the combination treatment could be an effective strategy for patients with the claudin-low breast cancer subtype.

U.112 Benefits of Visual Feedback in Reducing ACL Injury Risk in Landing

Samantha Kohnle, Trevor Geerdts, Kendra Kreienbrink, Logan Breuer, and Susan Weiss
Mentors: Robert Ragan, Physics, and Thomas Kernozek, Health Professions

A wide range of physical activities and sports require frequent landing. Anterior cruciate ligament (ACL) injuries often occur during landing, especially in female individuals. Receiving real time visual feedback may help improve technique and reduce injury risk. To test the efficacy of visual feedback training, thirty healthy, active college aged females were tested. Reflective markers were placed on the subjects and a motion capture system recorded the subjects' motion as they dropped onto force plates from a height of 50 cm. Participants performed baseline landing trials before ground reaction force feedback was provided. The subjects then underwent two training trials; both included visual feedback of joint angles, landing symmetry, and maximum ground reaction force. A fourth trial was then conducted without visual feedback to assess if training improved landing technique. One week later, performance trials tested retention rates. Since ACL tension occurs early in the landing, only the first quarter second was examined. Preliminary results show that participants made the following changes via training: reductions in peak quadriceps force, ankle range of motion, increase in peak hamstring force and hip range of motion. These changes resulted in a significant reduction in ACL tension post feedback. These benefits were not retained after one week.

U.113 That's a Rap: An Analysis of Rap1b in Human Megakaryocytes

Samuel Korger, Tam Nguyen, Alexis Grover, and Tylar Kirch
Co-authors: Kyle Studey, Carter Veleke, and Marlene White
Mentor: Jaclyn Wisinski, Biology

Platelets are specialized cell fragments that circulate in the bloodstream and clot to prevent blood from leaving damaged vessels. The number of circulating platelets is governed by the balance of platelet production by mature megakaryocytes and clearance of platelets from the bloodstream. Normal platelet function requires the small GTPase, Rap1b, whose protein abundance also increases as megakaryocytes mature. The importance of Rap1b in megakaryocyte survival and maturation remains unclear. To identify the role of Rap1b in megakaryocytes, students in the Fall 2017 Molecular Biology Lab course used CRISPR/Cas9 DNA editing technology to specifically disrupt the rap1b gene in the human megakaryocyte cell line, DAMI cells. The disruption of the rap1b gene was confirmed qRT-PCR and western blot analysis, indicating reduced mRNA and protein abundance, respectively. Changes in overall morphology of normal, wild-type DAMI cells and Rap1b-null DAMI cells were analyzed by flow cytometry and fluorescence microscopy. To determine if Rap1b plays a role in megakaryocyte replication, wild-type and Rap1b-null DAMI cells were compared in proliferation assays and by cell cycle analysis using propidium iodide. The analysis of the role of Rap1b in megakaryocytes has the potential to increase our collective understanding of circulating platelets.

U.114 A Separation of Church and State: When Religious Values and Political Beliefs Conflict

Susie Schoenrock and Gretchen Iverson
Mentor: Grace Deason, Psychology

When people are made aware that they hold conflicting ideas, they often experience cognitive dissonance (Festinger & Carlsmith, 1959). This study investigates the potential for cognitive dissonance among individuals who hold traditional Christian beliefs and political attitudes that conflict with those beliefs. We will explore how conflicting religious and political values are balanced, and how beliefs are prioritized. Approximately 200 participants completed a two-part online survey. Participants completed a questionnaire that included a religiosity scale and a scale to assess individual motivation to resolve cognitive dissonance. Following this, participants responded to a range of questions regarding current social issues, political party preferences, and identified candidates they have supported in past elections. One week later, participants were asked a series of questions regarding policy beliefs about welfare, immigration, and environmental protections. These questions were phrased in a conservative and a liberal position, and participants chose the one that best corresponded to their own beliefs. Following this, participants saw Bible verses selected to clearly

align with one of the previous statements, and conflict with the other. Participants were asked how much the verse conflicts with their belief and then asked to explain their answers. Following this, participants retook the religiosity scale, the series of social issue questions, and reported their political leanings. Data was collected through Amazon Turk Prime. A series of independent-samples t-tests will be conducted to examine differences between participants who report experiencing dissonance and those who do not. We hypothesize that when made aware of conflicting beliefs, individuals will report lower levels of religiosity, a shift in political attitude, or will justify their conflicting beliefs in their open-ended explanations to reduce cognitive dissonance. Results will provide insight as to how individuals manage cognitive inconsistency. Results may also suggest ways to productively manage cognitive dissonance.

U.115 Iron Age Settlement Pattern Studies in the Region Surrounding Pecica, Romania

Tessa Snell
Mentor: Amy Nicodemus, Archaeology & Anthropology

The Iron Age in Eastern Europe was a time of profound change and growth. The culture groups within the region found themselves flourishing both politically and economically, but were also confronted with great trials and tribulations. Social organization based on regional hierarchies were becoming more common and regional seats of power sprouted up throughout the Carpathian Basin. Social organization, being a key factor in understanding past societies internal structures, can be seen archaeologically through the study of settlement patterns. This thesis will demonstrate how the Iron Age society in the region surrounding Pecica, Romania intentionally positioned themselves on the landscape due to some form of social, political, or economic structure that ultimately connected the larger centers with the smaller surrounding settlements. Through the use of GIS mapping software, we are able to conceptualize the different locations, sizes and types of settlements within a region by looking at the distribution of artifacts along mapped GPS points, which were obtained through archaeological field surveys in 2016-2017. By studying the distribution of settlements with different sizes and functions, we can compare the patterns found against known settlement systems models to identify possible hierarchical systems amongst these groups.

U.116 Exploring the Medieval Village in Ballintober, Ireland

Valeria Watson
Mentor: David Anderson, Archaeology & Anthropology

There is a deserted medieval village that exists in relation to a 14th century castle in Ballintober, County Roscommon, Ireland. Lack of knowledge and varying ownership of the related castle leaves the origin and use of the village unknown. By conducting gradiometry, expanding the known area of the medieval village, and comparing it to other Irish and English medieval villages in Ireland, we can understand its origin, use, and how it related to the castle. By understanding who built the medieval village in Ballintober, I believe we can shed light on how influential the Anglo-Normans were in the rural Irishmens' lives during the 13th century.

U.117 Measuring the Possible Effects of Prior Trade Facilitators on Oneota Lithic Resource Procurement

Zachary Allain
Mentor: Constance Arzigian, Archaeology & Anthropology

Projectile points offer a unique insight into the day to day influences and exchange networks of past peoples and cultures. Points represent the culture that made them through intentionally selected stylistic elements that are often unique to a culture and time period, as well as the cultures they interacted with via inter-regional networks of raw material exchange. Materials used to construct a projectile point can not only be sourced to a general region, but often to a specific quarry site used by past peoples. With this in mind, projectile points can help to further explain both the extent and frequency of interaction between the Oneota and outside cultures. Furthermore, they can be used to better understand the exchange networks in place following a decline in Middle Mississippian influence in North America, and through this can better our understanding of the Oneota's own relationships with other cultures.

U.118 The Impact of DUI Mandatory Minimums on Labor Market Outcomes

Zachary Cowell
Mentor: Mary Hamman, Economics

The purpose of this project is to examine the relationship between DUI mandatory minimums and labor market outcomes. Mandatory minimum laws define minimum jail time and fines for certain convictions. Currently, 38 states use mandatory minimum laws for first time DUI offenders as a way to influence individuals to not drink and drive. The length of jail time varies from state to state and how many DUIs a person has. Previous research suggests that mandatory minimum sentences for DUI are ineffective at influencing individuals to not drink and drive. In addition, incarcerations have been found to reduce both wages and employment, suggesting that mandatory minimum jail time may cause unintended consequences for convicted individuals in the labor market while not achieving their desired goal. Findings are based on analysis of the National Longitudinal Survey of Youth 1997, and state mandatory minimum law information was hand collected. Preliminary results are based solely on regional locations of individuals but suggest that mandatory minimums have a negative effect on wages.

U.119 Effects of Temperature and Flow Rate on Adhesion of Human and Thirteen-Lined Ground Squirrel Platelets to Simulated Blood Vessel Walls

Zachary Mancl, Tanner Tenpas, Elizabeth Kaser, and Sam Gowan
Mentor: Scott Cooper, Biology

Hibernating mammals drop their body temperature and heart rate dramatically during torpor, causing changes in blood composition, flow rate, and temperature. However, limited knowledge exists regarding the specific effects, and to what extent, each of these factors have on the function of blood cells involved in clotting called platelets. To observe adhesion and aggregation of platelets, blood extracted from humans and non-hibernating and hibernating thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*) was analyzed via microfluidic flow assays. Blood samples were refrigerated at 4°C or stored at room temperature to analyze the effects of storage temperature on platelet adhesion. To observe platelet adhesion, microfluidic devices were placed on glass slides lined with collagen and platelets marked with fluorescent dye were allowed to flow over the collagen at flow rates of 0.7µl/min and 3.5µl/min and at temperatures of 5°C, 15°C, 25°C, and 35°C. Microscopy was then implemented to quantify platelet adhesion. Decreases in temperature and flow had different effects on adhesion of ground squirrel and human platelets. Implications of a more extensive understanding of how temperature and flow rate influence adhesion and aggregation include improved methods for treating vascular diseases and refinements of surgical techniques governing blood clotting. Human blood is unable to be refrigerated, thus, limiting its shelf life (5-7 days). A greater comprehension of how cold storage impacts the function of platelets in hibernating mammals can give insight into methods for cold storage of human blood.

UNDERGRADUATE ORAL PRESENTATION ABSTRACTS

UR.1 Rainbow Sums

Colin Giles
Co-authors: Hunter Rehm, Christian Stohlman, and Nathan Warnberg
Mentor: Nathan Warnberg, Mathematics & Statistics

Schur numbers, denoted S(x), are named after the Russian mathematician Issai Schur. Since their invention in 1916, only four of them have ever been computed, namely S(1) = 1, S(2) = 4, S(3) = 13, and S(4) = 44. Due to the seeming intractability of computing more Schur numbers, we decided to create and investigate anti-Schur numbers, denoted aS(x). To understand what aS(x) is, imagine the counting numbers [1,2,3,...,x]. If three of these counting numbers satisfy the equation a + b = c then we say they form a sum. For example, {3,5,8} is a sum since 3+5 = 8. Now, we color each counting number in our set. Here is an example using four colors (r for red, b for blue, g for green and p for purple) and the set of counting numbers [1,2,3...,10]: (1,r), (2,g), (3,g), (4,b), (5,b), (6,p), (7,r), (8,g), (9,p), (10, r), where (5,b) means 5 is colored blue. Looking at the sums in our set we see that {2,5,7} is a sum such that each number is a different color, we call this a rainbow sum. Now we can define aS(x) as the smallest number of colors needed to color [1,2,...,x] such that a rainbow sum is guaranteed to exist. An equivalent question is 'What is the most number of colors we can use to color [1,2,...,x] and avoid rainbow sums?' The main result depends on the natural log function and is aS(x) = ln(x)/ln(2) + 2. To prove this we use binary representations of the counting numbers, binary arithmetic, and logic to bound aS(x) both above and below.

UR.2 Let's Talk About Sex

Kelli Hirt, Michael Ericksen, and Mickey Rice
Co-authors: Leona Neziri and Claire Williams
Mentor: Anders Cedergren, Health Education & Health Promotion

"Let's Talk About Sex" is a health education program developed to address the stigmas associated with discussing sexual health on college campuses, including the use of STI testing resources at the Student Health Center (SHC) on the UWL campus. This is achieved by providing participants with information and tools to safely and confidently recognize and discuss sexual health with their partner(s). In the spring of 2017, a needs assessment was conducted through coursework. Both primary and secondary data revealed improvement opportunities in the areas of sexual health information, strategies to communicate effectively with a sexual partner, and the steps to receiving an STI test on campus. To address these, a fifty-minute, theory based intervention was created. It included both lectured information and interactive pieces. A pilot program implemented for a fall 2017 class proved the intervention as successful. The posttest data showed the intervention achieved the program objectives focused on increasing students' self-efficacy for facilitating discussions on sexual health, understanding STI symptoms, and knowing the steps of STI testing at the SHC. Modifying "Let's Talk About Sex" based on pilot test findings and adapting it to better suit a broader student population, researchers aim to test whether effects found in the pilot program hold true to a larger and more diverse participant base. For this up-scaling, four 200-level health education classes will receive the program in the spring of 2018. 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, and the UWL IRB is finalizing the study protocol review. 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.3 Norm-Euclidean Ideal Classes in Galois Cubic Fields

Kelly Emmrich
Mentors: Kevin McGown, Department of Mathematics & Statistics, California State University - Chico, and Tushar Das, Mathematics & Statistics

Lenstra introduced the notion of a norm-Euclidean ideal class as a generalization of norm-Euclideanity of a number field. He classified all quadratic number fields possessing a norm-Euclidean ideal class. We investigate the Galois cubic case. We show that up to discriminant 10^12 at most two such number fields possess a nontrivial norm-Euclidean ideal class, and we conjecture no more exist. In an attempt to settle our conjecture, we prove explicit bounds on the first few non-residues of cubic characters under the generalized Riemann hypothesis.

UR.4 Restorative Justice at Lincoln Middle School in La Crosse, Wisconsin: An Anthropological Evaluation

Jaelyn Roland
Mentor: Christine Hippert, Archaeology & Anthropology

How is the YWCA's Restorative Justice program in La Crosse, Wisconsin's Lincoln Middle School fostering culture change? What do circle keepers (peer mediators), parents, teachers, and administrators think about the program? Circle keepers are students trained in restorative justice practices who facilitate the "justice circles," along with a trained staff member, and "keep" the ideals of restorative justice present in the circles. This study uses participant observation, semi-structured interviews, and focus groups to do an anthropological evaluation of the YWCA's Restorative Justice program. The YWCA's Restorative Justice program was launched in response to a 2014 study sponsored by the La Crosse County Department of Human Services that found juveniles of color are approximately nine times more likely to be arrested than their white counterparts, with most arrests occurring at schools during school hours (La Crosse County Juvenile Justice Arrest and Disproportionate Minority Contact Task Force 2014). The YWCA's Restorative Justice program in La Crosse uses justice circles, meetings led by circle keepers that address the root of a problem, to reconcile respectful relationships between students and restore peace to the school community. By nurturing the ideals of reconciliation, restoration, and respect in school culture, Lincoln Middle School has begun to address the issue of oppression of minority groups in schools, seen in but not limited to the disproportionate rates of discipline for students of color. The results of this study show that the YWCA's Restorative Justice program initiated a change of culture at Lincoln Middle School to one that is more inclusive and is an example of how restorative justice practices can be used to reform school cultures in small-Midwestern towns. The YWCA's Restorative Justice program has been a critical part of changing the culture of Lincoln Middle School to become more inclusive, a change that everyone benefits from.

UR.5 Effect of Hibernation on the Smooth Muscle Layers of the Gastrointestinal Tract in Thirteen-Lined Ground Squirrels

Kathryn Thompson
Mentor: Sumei Liu, Biology

The wall of the gastrointestinal (GI) tract contains two distinct layers of smooth muscle: the longitudinal muscle layer and circular muscle layer. These two layers of smooth muscles make up the muscularis externa. The circular and longitudinal muscle layers are responsible for waves of contraction and relaxation which propel food particles through the GI tract. During hibernation, gastrointestinal motility slows down. This study aims to investigate changes in the thickness of smooth muscle layers that may contribute to the lowered level of gastrointestinal motility. Summer active, winter torpor, and interbout arousal thirteen-lined ground squirrels were used in the study. The animals were euthanized by CO2 inhalation. A segment (about 2-cm long) of colon was removed, fixed in 4% paraformaldehyde, embedded in Optimum Cutting Temperature (OCT) medium, and stored in -80 degrees C until cryosectioning. Hemotoxylin and eosin stain was used to visualize different layers of the colon wall. The stained tissue will be checked under a Nikon microscope and images will be taken using the NIS-Elements software. The thickness of the circular and longitudinal muscle layers will be measured using the NIS-Elements software and compared between summer active, winter torpor, and interbout arousal groups. We predict that the circular and longitudinal muscle layers are thinner during winter torpor, which may contribute to the weakness of gastrointestinal contraction.

UR.6 Exploring Stereotypical Expectations of Masculinity and Their Relationship to Stigmatization of Schizophrenia Using Stereotype Content Model

Haley Ingersoll
Mentor: Dawn Norris, Sociology

Mental illness affects millions of people worldwide (WHO 2010). Mental illness stigma often causes people to feel ashamed and incompetent, acting as a barrier to help-seeking behavior. Previous research indicates that stereotypically masculine mental disorders in specific elicit more stigma. Research with the Stereotype Content Model looks at warmth, competence, and their ability to predict social outcomes for a particular group. Those with mental illnesses are seen as low warmth and low competence, eliciting feelings of contempt from others (Fiske et al. 2002; Boysen 2016). Those who are stereotypically low warmth but high competence elicit envy. With that in consideration, men who are not mentally ill likely fall under this category. Further research with Stereotype Content Model posits that perceived warmth increases perceptions of competence (Boysen 2016). This begs the question, do expectations of masculinity inhibit contact for men with mental illnesses, thereby reinforcing stigma? For men, does stigma primarily stem from low

competence rather than from low warmth? To answer these questions, the present study will use a quantitative survey to explore the relationships between mental illness stigma among men, willingness to interact with mentally ill men, and modern ideas of masculinity. Using data from a convenience sample of undergraduate students at UWL, this study will attempt to explain the impact of the expectation of low warmth in inhibiting positive interaction with mentally ill men, and will explore competence's role in perception of men's mental health disorders.

UR.7 Homeless Identities and Their Influence on Service Utilization

Sara Nagengast
Mentor: Dawn Norris, Sociology

The topic of this qualitative project will surround the question, "how homeless people's identities relate to the services that they will or will not utilize", including the perspective service provision organizations have on the subject. I intend to interview eight people that are considered to be a part of the homeless population, and two individuals that work with organizations that are in place to help that population. Since there is a multitude of services out there to be studied, I will focus my attention on those that provide assistance with food, shelter, counseling, and social worker service, such as at the Salvation Army soup kitchen, where I volunteer each week on Thursdays for an hour to an hour and a half. During in-depth interviews, I will be asking open questions encouraging participants to share stories about identity, utilization of services, and views on services the Salvation Army offers. I will audio-record each interview then proceed to transcribe and code for themes.

UR.8 The Gills Rock Petragraphs - Origins

Abraham Packard
Mentor: Amy Nicodemus, Archaeology & Anthropology

Located on the Northern Door Peninsula of Eastern Wisconsin, a panel of Native American rock paintings records the presence of at least two distinct Ojibway groups and a representative of the Midé Medicine Society. Though faint, these writings tell their stories with the aid of digital enhancement (DStretch, GIMP) and author illustration.
Dubbed the Gills Rock Petragraphs for the town in which their existence is remembered in oral tradition, only a few pieces remain of what appears to have been an extensive panel. Luckily, a Mississauga Eagle and a Northern-Lakes style Caribou remains, along with a midewigaanaak, or birch-bark scroll, of the aforementioned shamanic medicine society. Considering similar works at Agawa Rock and the history of the region, it appears likely that the paintings date from the 17th century, possibly even as a relic of the Ojibway-Iroquois war.

UR.9 Pregnancy in Prison: A Doula's Perspective

Maya Schulte
Mentor: Lisa Kruse and Nicholas Bakken, Sociology

Pregnancy among incarcerated women is an understudied topic and the existing literature on this topic reflects limited awareness by the general public. Women are the fastest growing group among incarcerated persons in the United States (Sutherland, 2013), and pregnancy while in prison is becoming a growing issue as 76% of these women are of childbearing age (Shlafer et al., 2013). Many prisons across the country lack the necessary physical, mental, and medical support needed to carry out a successful pregnancy (Shlafer et al, 2013; Sutherland, 2013; Ferszt and Clarke, 2012; Siefert and Pimlott, 2001). Minnesota recently became the first state to guarantee inmate's access to birth coaches, also known as a doula (MN Doula Project, 2016). The purpose of this study is to assess the perspectives and experiences of the doulas that work directly with this vulnerable population of women. I will be conducting face-to-face, in depth interviews with doulas that work for the Minnesota Prison Doula Project. This exploratory study will help to build a foundation for understanding the unique experiences of pregnancy for incarcerated women from the perspective of the doulas. It is essential that we continuing to develop an understanding of these experiences and perceptions so that correctional facilities are more capable of providing adequate care for incarcerated women.

UR.10 Modeling Chronic Vascular Responses Following a Major Arterial Occlusion

Jordan Pellett
Co-author: Emma Brewer
Mentors: Julia Arciero and Jared Barber, Department of Mathematical Sciences, Indiana University – Purdue University Indianapolis

Peripheral arterial disease is a serious health concern characterized by a full or partial occlusion of a major artery in the systemic vasculature. Following an occlusion, blood supply to peripheral tissues is significantly reduced, causing patients to experience severe pain and reduced mobility. This study uses mathematical modeling to investigate the role of different vascular segments in restoring blood flow following a major occlusion. Vascular adaptations to collateral arteries and the microcirculation distal to the occlusion have been observed to occur on both acute and chronic time scales. Here two chronic vascular responses, arteriogenesis (increased diameter of existing vessels) and angiogenesis (new vessel formation), are investigated in a single vessel and a complex network. By coupling these chronic responses to acute responses, the model provides a framework for understanding the time frame and significance of vascular responses that help restore flow. Preliminary results suggest the number of collaterals increases following an occlusion while fewer vessels distal to the occlusion are required for optimal flow restoration. Ultimately, the model can be used to identify the most important vessels to target for future therapies.

UR.11 Martha Bullert: An Extraordinary 20th Century Single Woman

Rebecca Lenski
Mentor: Patricia Stovey, History

Martha Bullert was a fearless WWII veteran, prisoner of war, missionary, and the list goes on. Most notably, Martha Bullert was a professor at the University of Wisconsin-La Crosse (La Crosse Teacher's College) right after WWII. As an adult, Bullert created a life for herself utilizing education and teaching, which took her abroad and allowed her a level of personal freedom. Bullert never married and therefore, was able to change the direction of her life as she saw fit. The Martha Bullert Collection was originally brought to UWL by her family in 1996, soon after her death. Since that time it has sat unstudied. The purpose of my research is to demonstrate the societal criticisms Martha Bullert had to face throughout her life in the early to mid 20th century because she was a single woman. Single women in the mid 20th century were heavily criticized for not marrying because, as stated by a magazine poll, “they had failed to achieve even the most basic task of establishing a household” (Israel, Betsy). Martha Bullert faced these criticisms and more which even affected her internment during WWII. Single women during war time were seen as dispensable and it was expected of them to drop their lives to serve their country, whether on the home front or abroad. Despite Martha Bullert's incredible life of opportunity and personal freedom, because she was a single woman, it also introduced her to harsh criticism and unfair expectations.

UR.12 Determining Patterns of Interaction between Native Americans and the Spanish, Mexican, and United States Governments throughout History

Steve Bonin
Mentor: Víctor M. Macías-González, History

This project builds off of a previous course term paper. That term paper focused on how different Indian groups were able to resist Spanish colonial pressures or accept them in order to acculturate into Spanish society in Mexico. I determined in that essay that Indian groups, including the Xiximes, Acaxees, Conchos, Tepehuan, Tarahumara and Comanche were able to resist the Spanish and maintain their ethnic identities by living mobile lifestyles on the frontier of colonial New Spain. Meanwhile, sedentary Indian groups located in the interior of Mexico were forced to acculturate into Spanish society. After being enveloped by colonizers, these Indians blended their ethnic identities with those of other groups like Spanish and Africans in Mexico. This project investigates how the governments of Mexico and the United States dealt with Indians compared to the Spanish. My term paper revealed which Spanish activities resulted in either acculturation or resistance among Mexican Indians from 1521-1870. This project determines how Indians were treated by the Mexican and American governments after the Spanish decolonized New Spain and left Mexico. I plan to reveal similarities and differences between the methods of interaction implemented by the Spanish, Mexicans, and Americans as well as the underlying reasons for using those policies. This project will focus on the Apache, Kickapoo and Comanche Indian groups. I plan to analyze roughly six books about Indians in the American Southwest. I also will determine where primary source documents on these Indian groups are held by investigating the Bureau of Indian Affairs website. I expect differences to exist between the reasons each government implemented their policies.

However, I also expect that the policies each government implemented will follow a general theme of domination and exploitation of the Indians. Ultimately, this project will determine how the treatment of Indians in the American Southwest changed over time, for what reasons, and how Indians responded to these pressures over time.

UR.13 History on the Go

Rebekah Bain
Mentor: Ariel Beaujot, History

Undergraduate research project History on the Go introduces the bus-riding public in La Crosse to the history of the mode of transportation they utilize. This project includes the history of street cars, stagecoaches, trains, and buses in the La Crosse area, based upon information found at the Murphy Library Special Collections at the University of Wisconsin-La Crosse. Signs with historical trivia questions were placed on the inside marquee of the buses with a QR code that leads to the answer as well as a five question survey, allowing participants to provide their input on the condition of the public bus system. The data generated will be provided to the La Crosse Municipal Transit Utility (MTU) for its quality improvement. Participants are encouraged to take the survey because they have the potential to receive a free month bus pass. The outcome of the project is three-fold: those who take the bus potentially learn more about their transportation system, the Municipal Transit Utility is more thoroughly aware how best to serve the transportation needs of the public, and public historians learn the value of similar projects. History on the Go furthers the Wisconsin Idea by solving problems in the transportation system and promoting history education in a non-traditional setting.

UR.14 Culture and Female Entrepreneurship: A New Look Into Economic Development across Nations

Taylor Franklin
Mentor: Nabamita Dutta and Mary Hamman, Economics

Female entrepreneurship is considered an integral aspect of economic development. It can boost or enhance economic development through its impacts on welfare, poverty alleviation, and employment. Exactly how different cultural traits affect female entrepreneurship across countries is largely unexplored, however. Using extensive cross-country survey data, this paper investigates how different cultural traits assessing women’s independence, their relationship with work and family, their relationship with the society, and how they are perceived within societies affect female entrepreneurial rates. The World Value survey data enables us to take a detailed look and construct various cultural trait measures. Regression analysis is employed to empirically assess the nature of the relationship between the variables.

UNDERGRADUATE EXHIBIT PRESENTATION ABSTRACTS

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

E.1 Through the Eyes of UWL

Brittany Tashner
Mentor: Kate Hawkes, Art

“Through the Eyes of UWL” is a film that shows the many diverse perspectives that the University of Wisconsin-La Crosse (UWL) has to offer. I asked UWL students and faculty to film their unique experiences and daily activities. For example, participants wore a video camera while they practiced gymnastics, created ceramic vessels, or stood on stage during a dress rehearsal. This project allows us to see and experience the wide range of perspectives and activities that UWL has to offer.

E.2 Gruesome Playground Injuries: Love Hurts

Caitlyn Nettesheim
Co-author: Rachel Krause
Mentor: M. Beth Cherne, Theatre Arts

This summer, the UWL Theatre Department student run theatre company, Happy Rain Company, will be producing the play Gruesome Playground Injuries by Rajiv Joseph. This dark comedy is about two friends, Doug and Kayleen, trying to win each other's love while they struggle with mental illness, eating disorders, child abuse, sexual abuse, and emotional abuse. Our goal in producing this play is to answer and teach playwright Rajiv Joseph's question and driving reason for why he wrote the play: Why do we hurt ourselves to gain someone else's love? Through researching, analyzing, conceptualizing, designing, casting, rehearsing, and performing this play, we will explore the specific production process required for this show and the challenges presented in its dark humor, socially difficult subjects, and nonlinear plot. At the end of our rehearsals, we will be holding two performances of our production as well as a post-show discussion to hold an open discourse between Psychology and Women and Gender Studies professionals, the company, and the audience. The intent of this discussion will be to continue the dialogue that began in the performance and to spark a conversation in the La Crosse community that outlasts our production on the issues in the show that impact many young adults in America.

E.3 Stop and Thinx

David Wronkowski, Sydney Homan, and Louis Kastenbauer
Mentor: Nese Nasif, Marketing

Why the women's underwear company, Thinx, had issues advertising on New York subways while focusing on the benefits of women's underwear during their mensuration, rather than many of the other women's underwear ads that use nearly naked (much more revealing) women in their ad. Ultimately, we will research how and why these ads are seen as different, or unwelcomed by the public when the female anatomy is talked about in a unique manner.

E.6 Marketing to College Millennials for Pearl Street Brewery

Alyssa Amann, Cameron Scheuren, and Rebecca Josefsson
Mentor: Nese Nasif, Marketing

Targeting niche markets within a geographical region has been an ongoing hurdle in the marketing world we currently live in. Working with our local client, Pearl Street Brewery, they have an audience of two universities and a tech school within the La Crosse region with the age demographic of 21-25-year-olds who typically have been interested in "bang for your buck" food and beverage deals. However, this young adult demographic has increasingly been interested in causes that initiate them into the bigger picture of society, making them feel as if they are part of a change and their voice is being heard. Pearl Street Brewery historically has marketed to all craft brewery drinkers as a whole, but now there is much more potential in this demographic who share similar morals such as supporting relevant causes, rooting for the "small guy," and letting their voice be heard. Through the various causes, inevitable social media marketing, and

evolving strategies in modern marketing, our promotional opportunity to assist Pearl Street Brewery has sky-high potential. Providing relevant, data-driven market research will allow us to produce strategic direction and guidance for applicable marketing, advertising, and promotional opportunities to their company.

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

E.4 Adaptable Expressive Arts

Baley Murphy
Mentor: Jennifer Terpstra, Art

In my research, I explored unique adaptable painting styles through the usage of acrylic paint incorporated with cake decorating tools, paint skins, and bubbles. The results concluded that bubbles were overall the most universal of all three techniques and could be applied with standard wands, bubble guns, and depending on the abilities of the participant, holding the wand while they blew the bubbles or vice versa. The paint skin technique was the most time consuming. If you hand multiple days with a participant, this would be a useful technique. The paint skins act like stickers and are easy to attach to various substrates. The cake icing tools were the most challenging. Depending on the intended outcome, you had to change the consistency of the paint thickness through the medium-to-paint ratios, adjusting when needed. The thicker paint shrinks when it dries, causing unexpected white areas. However, this can be easily fixed by painting over the white areas with acrylic paint directly. This technique is able to create 3-D effects and textures that could be desirable to the participant. Overall, all three techniques are fun, creative, and manageable. They allow for forward thinking when it comes to painting and pushes the limits of the medium to its full potential.

E.5 The Corsets Make the Costume

Emmett Sharp
Mentor: Joseph Anderson, Theatre Arts

Over the Winter 2018 break, I travelled to London, England to study the methods and styles of the understructures of women's clothing from one of the most fascinating periods in fashion history: the Victorian Era. The understructures I studied included the corset and the garments used to support the skirts of women's dresses. Throughout this distinct period in fashion, the foundation garments used to create the silhouettes of these gowns changed with the looks of the time, giving costume designers ample options when designing historical shows. I focused my research on the "Bustle Era" of Victorian Fashion that lasted from approximately 1860 to 1890. As a part of my research, I studied period samples of these garments kept in museums, as well as closely inspected the construction methods by handling select samples at the Victoria & Albert Museum. Through this research, I hope to better understand the historical construction techniques to find ways of modernizing them for contemporary Theatre. By changing how we replicate these foundation garments, we can better portray these periods accurately without compromising efficiency of construction as well as actor use. Through this research, I feel that I have grasped key aspects of historical accuracy in both design elements and costume construction for future historical productions.

GRADUATE STUDENT ABSTRACTS

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

G.1 Patellofemoral Joint Stress during Single Leg Hopping Exercises

Abbigail Ristow and Matt Besch
Mentor: Thomas Kernozek, Health Professions

Patellofemoral pain syndrome is a very common injury related to athletic activities. Pain is often experienced during single leg hopping tasks, which can be used in the physical therapy clinic to observe the patient's ability to dynamically control the knee, as well as in the rehabilitation of patients who have patellofemoral pain syndrome. Patellofemoral joint stress values during single leg hopping exercises at different hopping rates has not been investigated. The purpose of this study was to observe if there is a difference between patellofemoral joint stress during single leg hopping exercises when performed at a slower cadence versus a faster cadence. 25 college-aged females were recruited to perform multiple trials of single leg hopping exercises at a cadence of 50 jumps per minute and 100 jumps per minute. Participants wore 47 reflective markers and trials were analyzed using a 15 camera 3-dimensional motion analysis and a force platform. Five trials were performed at each cadence. Preliminary data analysis indicates a difference between the two rates for maximal patellofemoral force ($p = 0.048$), but no difference for maximal quad force or patellofemoral joint stress.

G.2 Differences in Extracellular Matrix Protein Gene expression of Human Chondrocytes in Response to Sole and Combined Treatments Using Autologous Adipose-Derived Stem Cells and Homologous Platelet-Rich Plasma Administered in Transwell Culture Systems

Alec Sime
Co-author: Peg Maher
Mentor: Peg Maher and Anne Galbraith, Biology

Platelet-rich plasma (PRP), which is essentially plasma with concentrated platelets, has been shown to be used as a useful therapy for connective tissue repair in circumstances such as cosmetic treatments and sports injuries. Adipose-derived stem cells (ADSCs) are mesenchymal stem cells isolated from adipose tissue that have potential to differentiate into many connective tissue cell lines. Due to ADSCs' large number of growth factors, high potentiality, adequate yield, and generally large reservoirs of tissue easily retrievable from the patient, treatments using ADSCs have been developed and shown to be effective for repairing connective tissue damage. ADSC and PRP dual treatments have shown promise in animal models of articular cartilage repair, more so than either treatment alone. This study aims to further elucidate the mechanism by which the ADSCs are contributing to cartilage repair in the dual treatment approach by monitoring the expression of genes responsible for extracellular matrix (ECM) protein production in human chondrocytes supplied with autologous ADSCs and homologous PRP dual therapy. Human chondrocytes are developed from ADSCs isolated from donated human adipose tissue and cultured in a Transwell culture system with chondrogenic media. Then ADSC, PRP, ADSC and PRP, or a control treatment is applied to the chondrocytes via the Transwell system with ECM gene expression being monitored periodically via RT-qPCR. Varying degrees of genes expressed, that result in ECM proteins such as collagens, between treatments could provide evidence for, or against, current views on ADSC involvement in the dual treatment approach to articular cartilage repair.

G.3 Variations in Brachial Plexus Formation and Potential Clinical Implications for Physical Therapists

Carley Seibel, Shannon Campbell, Tori Kieler, April Okruszynski, Melanie Oostdyk, and Megan Willger
Mentor: Thomas Greiner, Health Professions

Introduction: The brachial plexus is a network of nerves that supplies the upper extremity with both motor and sensory innervation. Its standard organization is an important component in the anatomical education of healthcare professionals. This study investigated deviations of the plexus from the standard textbook organizational pattern. These deviations may complicate neuromuscular diagnoses and therapies. Methods: The plexus of twelve adult cadavers, twenty-four sides, were examined. Observations through dissection focused on identifying variations from the typical textbook pattern. Results: We found that none of the twenty-four brachial plexus demonstrated a textbook pattern. Variants found included duplicated lateral roots to the median nerve, the absence of a musculocutaneous nerve, the

joining of ulnar and radial nerve through a communicating branch, and a variety of patterns of trunk formation. Discussion: Many of the identified variants may not have immediate influence for a physical therapist, but may be significant for other professions. Several variants, however, would have a large impact on physical therapy examination findings. The variations noted in all brachial plexus observations reinforces the importance of understanding the brachial plexus rather than memorizing the most common presentation.

G.4 ACL Injury Risk during a Cutting Task with Anticipated versus Unanticipated Stimuli Task

Chelsea Olson, Christopher Suilmann, Kaycie Simon, and Brett Boettcher
Mentor: Drew Rutherford, Health Professions

Introduction: Injury to the anterior cruciate ligament (ACL) is one of the most common musculoskeletal injuries to the athletic population in the United States, with an incidence of 100,000 cases per year. Lateral cutting and deceleration activities such as running, jumping, and changing direction may stress the ACL and cause damage. Current evidence hypothesizes that motor planning of an activity plays a significant role in the ability to control excessive kinematic and kinetic stresses to the knees. Injuries to the ACL are up to 8 to 9 times more likely to happen in females, indicating an increased need for injury prevention research and interventions for young, athletic females. Purpose: To determine how healthy, college-aged females alter ground reaction forces and joint mechanics for an unplanned versus anticipated jump landing task in response to various directional visual stimuli. Methods: Twenty-four college-aged, active females participated in the current study and were marked with a 47-reflective marker set. Joint kinematics were captured with 15 infrared cameras (Motion Analysis Corp). Force plates were used to measure ground reaction forces during each trial. Participants completed baseline, anticipated, and unanticipated jump landing and cutting trials from a 50 cm box. A switch mat was used during the unanticipated trials to trigger the presentation of a visual stimulus that indicated which direction the participant needed to cut upon landing. Results: Mean peak ground reaction forces were significantly higher during unanticipated conditions compared to anticipated ($p < 0.05$). Conclusion: Motor planning plays a significant role in influencing the ability to dissipate ground reaction forces during a jump landing and cutting task in college-aged females. Unanticipated task goals, such as those experienced in a game environment, may significantly impair these individuals' ability to control motion and prevent ACL injuries during dynamic sport activity.

G.5 Postmortem Dietary Analysis of Coyote (*Canis latrans*), Red Fox (*Vulpes vulpes*), and Gray Fox (*Urocyon cinereoargenteus*)

Christina Burkhart
Mentors: Eric Snively and Gregory Sandland, Biology

Coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and gray fox (*Urocyon cinereoargenteus*) are the canid species that dwell within the La Crosse area. The objective of this project was to perform gastrointestinal analyses on locally harvested specimens to measure dietary overlap and gauge potential dietary competition. Gastrointestinal samples of the three species were retrieved from the Weibke fur trading company during the 2014 and 2015 furbearer harvest seasons. The canids' stomachs and intestines were flushed through sieves and contents identified as mammal, vegetation, bird, insect, or fish. Bones, flesh, and fur of mammals were the most abundant with positive macro identification of deer, rodent, pig, and rabbit. The second most common material was vegetation including incidental debris, prey stomach contents, discarded waste, and berries. The amounts consumed corresponded with body size between the canids with coyotes consuming the most followed by red fox, then gray fox. Interestingly, within the three species the females consumed more than the males. As expected, the coyote and red fox had more overlap with each other than with the gray fox. These analyses are likely skewed by the winter season and lack of vegetation available for consumption. These results are being corroborated with genetic analyses of the same canids' gut contents.

G.6 Thinking outside the Block: External Focus Shortens Reaction Times in Collegiate Sprinters

Garrett Miles
Co-author: Attila Kovacs
Mentor: Attila Kovacs, Exercise & Sport Science

The time taken to react to a starting gunshot can have a dramatic effect on the outcome of a short-distance running race. While, focusing attention on an external cue has been shown to enhance skill acquisition and performance (Wulf, 2013), track and field coaches tend to provide instructions to their athletes that promote an internal focus of attention (Porter et al., 2010). Nevertheless, the effects of different attentional foci on reaction times remain unclear. Therefore, the purpose

of this study was to investigate the influence of instructions promoting external versus internal focus on reaction time during a track block start. Ten collegiate track sprinters (ages 18-23) completed three separate testing sessions 2 days apart. Reaction times were assessed as the participants were instructed to propel themselves out of the starting blocks as fast as possible under three different conditions: i) external focus (EF) where subjects focused on pushing the blocks away; ii) internal focus (IF) where subjects focused on extending the knees; and, iii) no focus instruction (NF). Muscle activity was recorded from the vastus lateralis and medial gastrocnemius muscles. Subjects exhibited significantly shorter reactions times during the EF condition (Mean =0.209s, SD=0.027s) compared with the IF condition (Mean=0.230s, SD=0.024s). Muscle activity also indicated a shorter pre-motor reaction time under the EF condition. Our findings indicate that adopting an external focus improves reaction time during block starts. This improvement likely originates from a reduction in movement preparation time. These findings have the potential to contribute to the development of new coaching techniques when the aim is to improve the reaction time of athletes.

G.7 Effect of Immediate Visual Feedback during Drop Landings on Impact and Joint Positions in Young Healthy Female Athletes

Jessica Onsager and Jeremie Schiedermayer
Co-authors: Thomas Kernozek, Drew Rutherford, and Becky Heinert
Mentor: Thomas Kernozek and Drew Rutherford, Health Professions

Introduction: Anterior cruciate ligament (ACL) injuries are common in the United States with an estimated 250,000 injuries occurring annually [1]. These injuries often occur due to high vertical ground reaction forces (vGRF) and increased knee valgus angles during jumping activities. Females are 2 to 6 times more likely to experience an ACL injury than males, therefore preventative training interventions to decrease vGRF and minimize knee valgus angles may be effective in this young, female population [2]. The purpose of this study was to determine if feedback is effective in improving landing performance in young, female athletes. Methods: Seventy-three middle and high school-aged females (Age: 14.9 ± 1.8 years, Height: 165 ± 8.1 cm, Mass: 58.9 ± 10.6 kg) participated in a single twenty minute session of testing. Each performed a total of 30 drop landings from a height of 50 cm. Kinetic data was collected using custom high impact force platforms. Kinematic data was collected by a high speed web camera sampled at 100 Hz. Participants performed 6 baseline landing trials, 12 training trials, 6 posttest trials and 6 transfer trials. Visual feedback was provided as a numeric representation in multiples of body weight on a projector in front of the participant with replay video feedback during the training trials. Verbal feedback was also given during the video analysis of each jump landing during training trials. Results: Repeated measures ANOVA among baseline, training 1, training 2 and post trials showed significance in vGRF $F=85.55$ ($p<.001$). Paired samples t-test also showed significance in ankle/knee ratios between pre and post trials $t=3.02$ ($p=.003$) with ratio means in pre trials=1.40 ± 1.21, post trials= 1.11 ± .23. Conclusion: The results suggest that jump landing biofeedback may reduce vGRF and knee valgus during a landing in middle and high school-aged females.

G.8 Mindfulness as an Intervention: Openings and Obstacles for Implementation

Joseph Converse
Co-author: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

The use of mindfulness-based interventions (MBI) is one method schools are utilizing to improve students' mental health. However, there has not been sufficient research on the social validity (the acceptability of and satisfaction with an intervention) of MBI. Therefore, this study aims to investigate the social validity of mindfulness-based interventions in relation to teacher understanding of mental health and other teacher characteristics. Results provide important considerations for school psychologists looking to implement mental health interventions.

G.9 Effect of Omega-3 Fatty Acid Supplementation, Exercise, and Combined Effects on Lipid Levels

Kaila Potting and Haley Trom
Mentor: Dennis Fater, Health Professions

Introduction: Due to the high prevalence of atherosclerosis, finding an effective preventive method is crucial. Omega-3 fatty acids have been shown to be cardioprotective and combat hyperlipidemia, a risk factor for the development of atherosclerosis. In addition, exercise has been found to play a significant role in lowering lipid levels. Therefore, the aim of this literature review was to determine if there are combined effects greater than supplementation and exercise

alone. Methods: A total of 7 articles were found fitting our search terms. Outcome measures assessed were triglycerides, total cholesterol, high-density lipids (HDL), low-density lipids (LDL), body mass index (BMI)/body composition, and VO2Max. Results: A reduction in triglycerides ($p < 0.0001$-0.05), total cholesterol ($p < 0.0003$-0.01), BMI/body composition ($p < 0.0001$-0.05), and VO2Max ($p < 0.0001$-0.01) were found. An increase in HDL ($p < 0.0001$-0.03) levels was also found. Conclusion: Based on these studies, there was a combined effect (exercise + omega-3 supplementation) greater than that of omega-3 fatty acid supplementation or exercise alone in reducing factors that contribute to hyperlipidemia. There was a limited number of studies examining the combined effects of omega-3 supplementation and exercise, therefore further research is needed.

G.10 Internalizing and Externalizing Problems: Examining Teacher Experience, Advocacy and Knowledge

Kalli Boland
Co-author: Robert Dixon
Mentor: Robert Dixon, Psychology

Although most mental health needs among youth go untreated, they are most likely to be addressed at school. However, teachers may lack the knowledge required to accommodate these needs. This study examines how teachers' level of experience and level of mental health advocacy relate to their knowledge of internalizing and externalizing disorders. Results give school psychologists insight into which type of mental health symptoms teachers are knowledgeable about, providing implications for professional development.

G.11 Caring for the Caregiver: Perceived Support Impacting Teacher Burnout

Kelsey Kohlbeck
Co-author: Robert Dixon
Mentor: Robert Dixon, Psychology

Many schools are having difficulty retaining new teachers potentially due to feelings of burnout. With the importance of education, it is crucial to understand how to best support teachers. This study investigates the impact of perceived support from administration and other colleagues on the three dimensions of burnout: Emotional Exhaustion, Depersonalization, and reduced feelings of Personal Accomplishment. Results provide important implications regarding factors that may diminish burnout in teachers and how to better support teachers.

G.12 Trust as a Protective Factor against Teacher Burnout in Schools

Kendal Ursin
Mentor: Betty DeBoer, Psychology

Burnout symptoms affect nearly one-fifth of teachers each week, impacting their health, engagement, and commitment. Fortunately, relationships and support have been shown to reduce teacher burnout. This study specifically looks at how trust, characterized by benevolence, reliability, competence, honesty, and openness, between teachers and their principals, colleagues, and students can impact burnout. Practitioners will learn how to promote these trusting relationships and decrease teacher burnout within their schools.

G.13 Does Blood Flow Restriction Therapy Reduce Quadriceps Atrophy following ACL-R?

Lauren Lipker, Caitlyn Persinger, and Bradley Michalko
Co-author: Christopher Durall
Mentor: Christopher Durall, Health Professions

Clinical Scenario: Quadriceps atrophy and weakness are common after anterior cruciate ligament (ACL) reconstruction (ACL-R). Efforts to reduce atrophy and increase strength after ACL-R involve moderate-to-high intensity resistance exercise. However, some investigators have experimented using blood flow restriction (BFR) with low-resistance exercise to reduce muscle atrophy to the same extent as high-resistance exercise. This review was conducted to ascertain the extent to which current evidence supports the use of BFR to reduce quadriceps atrophy following ACL-R. Clinical Question: Does BFR reduce quadriceps atrophy after ACL-R? Summary of Key Findings: The literature was searched for level I randomized control trial (RCT) studies that directly compared BFR to non-BFR treatments in ACL-R patients. Three articles returned from the literature search met the inclusion criteria. Clinical Bottom Line: High-quality evidence suggests BFR while immobilized following ACL-R may help reduce quadriceps atrophy. High-quality

evidence also suggests that adding BFR to post-operative exercise for several months may increase quadriceps CSA to a greater extent than exercise alone. The efficacy of using BFR with exercise for shorter durations has not been established. Additional data are needed to establish if the benefits of BFR on quadriceps atrophy after ACL-R outweigh the inherent costs. Strength of Recommendation: Level 1 evidence from two RCTs supports using BFR alone or with exercise to reduce quadriceps atrophy following ACL-R. However, level 1 evidence from another RCT did not find a benefit to adding 13 days of BFR to post-operative exercise.

G.14 Improving Adult-Student Relationships: Ongoing Teacher and Parent Book Studies

Lindsey Artymiuk
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

Professional development (PD) programs are necessary to best meet the needs of students in the school and home environments. This study will examine the effect that ongoing PD with teachers and parents in the form of book studies on Ross Greene's Collaborative and Proactive Solutions (CPS) approach has on perceived adult-student relationships. Results will help school psychologists understand the impact of this type of PD and allow them to develop similar trainings within their schools.

G.15 Patellofemoral Joint Stress during Front and Back Squat

Matthew Besch
Co-author: Abbigail Ristow
Mentor: Thomas Kernozek, Health Professions

Patellofemoral pain syndrome is a common and frequent diagnosis for the knee when looking at individuals participating in physical activity. Many researchers speculate that knee injury and pain occur with abnormalities in squatting mechanics, but the research lacks investigation of any relationship between patellofemoral pain along with depth of squat and where the external force, whether anteriorly or posteriorly, is placed when exercising. The purpose of this study was to identify if there is a difference between patellofemoral joint stress or force during a four-step protocol; front squat at the depth of 80% of leg length, front squat at depth of 60% of leg length, back squat at depth of 80% of leg length, and back squat at depth of 60% of leg length. 25 college-aged females were recruited and participated in the squatting protocol. Participants wore 47 reflective markers and were analyzed using a 15-camera 3D motion analysis and force plate platform. One trial of each condition was performed by each participant. Data analysis is in the preliminary stages, but predictions are being made that there will be a difference between patellofemoral joint stresses between the front and back squatting conditions, as well as between 60% and 80% squatting depth conditions.

G.16 Effects of Added Weight on Patellofemoral Joint Stress during Running

Molley Kujawa and Aleyna Goerlitz
Mentor: Thomas Kernozek, Health Professions

Patellofemoral pain is one of the most common injuries in runners, and may be a precursor to osteoarthritic joint pain. One of the predisposing factors for PFPS includes increased patellofemoral joint forces which may be the result of greater body weight. Patellofemoral joint stress during running has not yet been quantified with different amounts of added weight. Our purpose was to compare patellofemoral stress during with different amounts of added weight. Twenty-six healthy college-aged female runners completed five running trials at zero, 4.5 kilograms, and 9.0 kilograms added weight, for a total of fifteen trials. Kinetic and kinematic data were used in combination with a static optimization technique to estimate individual muscle forces. These data were inserted into a patellofemoral joint model which was used to estimate patellofemoral joint stress and other variables during running trials. Results showed increased peak quadriceps force, peak patellofemoral joint load, and peak patellofemoral joint stress with 4.5 kilograms (2.1%, 2.1%, and 2.4%) and 9.0 kilograms (9.1%, 8.0%, and 11.8%).These results will help clinicians and patients better understand the effects that added body weight has on patellofemoral joint forces, and therefore PFPS.

G.17 Building Competency in Traumatized Students: Effects of Outdoor Adventure Education

Morgan Schilz
Co-author: Betty DeBoer
Mentor: Betty DeBoer, Psychology

Outdoor adventure education (OAE) programs have positively impacted competencies of youth; however, little research has been done regarding the impact of OAE on youth exposed to trauma. This study examines the impact of OAE programs on traumatized students' competency as operationalized by reported self-efficacy. The outcomes will help practitioners become more attuned to the effects of trauma on competency and better able to provide meaningful input regarding mental health programming for traumatized youth.

G.18 School Climate: The Role of Mental Wellness and Student Engagement

Rachel Pfarr
Co-author: Robert J. Dixon
Mentor: Robert J. Dixon, Psychology

The Every Student Succeeds Act (ESSA) recognizes the importance of and promotes the growth of a positive school climate. This study investigates the connections between students' mental wellness, affective engagement, cognitive engagement, and perception of school climate. With this knowledge, school psychologists will be better able to understand how student-level factors contribute to students' perceptions of school climate, which may allow them to develop strategies to promote and support a positive school climate.

G.19 Intratester Reliability of the Dopplex ABIlity: An Automatic Ankle-Brachial Index Measuring Instrument

Samuel Schwartz, Jeffrey Quednow, Kati Gittens, Rachael Menos, Ryan Holewinski, and Kristin Kotzer
Mentor: John Greany, Health Professions

Introduction: Ankle-Brachial Index (ABI) is the ratio of systolic blood pressure (SBP) in the ankle to the arm and is used to diagnosis peripheral artery disease (PAD). The Huntleigh Dopplex ABIlity uses a two chamber cuff system to measure SBP by volume plethysmography versus traditional doppler ultrasound. Purpose: The purpose of this study was to determine the intrarater reliability of ABI values obtained from the Dopplex ABIlity device for young and at-risk populations (over age of 50 or with risk factors). Subjects: Participants consisted of a convenience sample of 19 young subjects (11 females, 8 males) age 22.8 ± 0.9 and 13 at-risk subjects (7 females, 6 males) age 60.4 ± 10.9. Six Doctor of Physical Therapy students obtained the ABI readings. Methods: Subjects rested in supine for 10 minutes prior to data collection. Four Dopplex ABIlity pressure cuffs were placed on bilateral feet and arms, followed by one additional minute before ABI data were collected. Subjects rested five minutes before repeating the protocol. Reliability (within-day) data were reported as ICCs (2,1) and differences in SBP values from paired T-tests (SPSS). Results: Reliability (ICCs) of ABI data demonstrated moderate to good within-day reliability for R/L extremity and for each group (0.65-0.83). The ICC for all subjects (n=32) was 0.77, at-risk subjects (n=13) 0.80, and for young subjects (n=19) 0.72. A paired T-test analysis showed no differences ($p > 0.05$) between SBP values for all comparisons (upper and lower extremities) obtained between trials. Conclusion: The study confirms that the Dopplex ABIlity is a reliable instrument. Human and technology errors should be considered when applying this to patients. Clinical Significance: The Dopplex ABIlity may be considered a reliable method for screening individuals with or without risk factors for PAD.

G.20 The Role of Omega-3 Supplementation in Control of Rheumatoid Arthritis

Sarah Stern and Kayla Knez
Mentor: Dennis Fater, Health Professions

Introduction: Rheumatoid arthritis (RA) is an autoimmune, inflammatory disease primarily affecting the synovium of the body's joints. The disease's progression causes joint swelling, tenderness, and warmth, as well as joint deformity and dysfunction. Many RA sufferers seek treatment from physical therapists to slow progression of the disease through exercise, modalities, and lifestyle adaptation. Counseling by a dietician may also be helpful for the patient in maintaining independence and slowing progress of the disease. A dietitian's role in care may include recommending anti-inflammatory nutrients to patients such as Omega-3 fatty acids. Purpose: To determine the effects of Omega-3 supplementation on the symptoms present in patients with RA. Methods: A literature review was conducted using

EBSCOhost and PubMed using the search terms "omega-3 or epa or dha" and "rheumatoid arthritis". Outcome measures also included in the search were "swollen joint count (SJC) or disease activity scale (DAS) or morning stiffness or visual analog scale (VAS) or NSAIDs". 12 articles were acquired and statistical significance for each outcome measure was reported. Results: Statistically significant reductions in SJC, DAS, and VAS outcome measures were observed with Omega-3 supplementation for RA patients, whereas reductions in morning stiffness and NSAIDS outcome measures showed mixed results. Conclusion and Implications: The results of the literature review suggest Omega-3 supplementation for patients with RA symptoms may be beneficial due to its anti-inflammatory effects as shown through multiple outcome measures. Physical therapists can apply this knowledge when treating patients with RA by referring their patients to a dietician for a further, multifaceted approach to care.

G.21 Mental Health Screening and Academic Outcomes in Middle School

Shelby Fitzgerald
Co-author: Jocelyn Horn Newton
Mentor: Jocelyn Horn Newton, Psychology

Mental health disorders are the most common health issues faced by our nation's school-aged children, which is why it is imperative that schools strive for quality prevention and intervention efforts. The purpose of this study is to examine the degree to which mental health screenings predict academic outcomes in middle school students. Results can help school psychologists better inform their practice regarding the use of mental health screenings as a preventative, school-wide measure.

G.22 What Is the Optimal Method for Measuring Ankle Dorsiflexion in Weight-bearing after Ankle/Lower Leg Injury or Surgery?

Tiffany Gehl, Bryan Alm, and Kelly Hunter
Co-author: Christopher Durall
Mentor: Christopher Durall, Health Professions

Clinical Scenario: Adequate ankle dorsiflexion range of motion (DF-ROM) is critical for the successful performance of many daily activities. Accordingly, DF-ROM is commonly measured to help determine recovery progress following ankle injuries. Assessing DF-ROM in weight-bearing (WB) has been promoted as a preferable alternative to non-weight-bearing methods. Focused Clinical Question: What is the optimal method for measuring ankle dorsiflexion in weight-bearing (WB) after ankle/lower leg injury or surgery? Summary of Key Findings: Five descriptive-measures studies were found that examined the reliability of weight bearing DF-ROM assessment using a variety of devices. All studies found the measurement techniques to be highly reliable (ICC > 0.94). Clinical Bottom Line: Based on ease, cost, and efficiency, a bubble inclinometer is recommended for measuring WB DF-ROM in a lunge position after ankle/lower leg injury or surgery. Strength of Recommendation: The descriptive-measures design used in all of the reviewed studies is not included in current quality of evidence rating scales. Nonetheless, based on commonly accepted indicators of robust study methodology, the reviewed studies all appear to be reasonably high quality with high ICC values.

G.23 Effects of Pulsed Electromagnetic Frequency Therapy on Knee Osteoarthritis: Literature Review

Tyler Thorsen
Co-authors: Kyle Brown and Dennis Fater
Mentor: Dennis Fater, Health Professions

Introduction: Pulsed Electromagnetic Frequency (PEMF) therapy has been gaining popularity in recent years. Those who promote the use of PEMF make many claims about its benefits such as reducing pain and improving function in knee osteoarthritis patients. It is very important for these claims to be tested and verified as effective treatments when applied to patients. Purpose: To examine the effects of PEMF therapy on participants with knee osteoarthritis. Methods: A literature review found 8 articles published from 2005-2015. The articles were found using PubMed and MEDLINE search engines. Outcome measures included visual analogue scale for knee pain and functional measures such as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) or the knee society score. P-values were calculated to determine if PEMF therapy had an effect. Results: Evidence in the studies varied greatly for the VAS pain rating (p-values= < 0.001-0.906), as well as function (p-values= < 0.001-0.985). Discussion: Current research on PEMF therapy indicates that PEMF may have some benefits in treating patients with knee osteoarthritis, but in the future

studies have to be more uniform to look at specific PEMF devices that have the same signal characteristics and treatment regimen. Research with more consistent methods could provide better guidance for usage in a clinical setting. Conclusion/clinical relevance: At this time, research data do not support use of PEMF therapy for treatment of patients with knee osteoarthritis. More consistency in the parameters of PEMF waveforms and applications utilized in studies may better identify specific devices and treatment regimens that are effective.

G.24 The Effect of Exercise Timing on Motor Learning and Retention of a Drop Vertical Jump Landing Strategy in Females

Valerie Prusak, Nichole Cruse, Heather Grelle, and Carly Schams
Mentor: Patrick Grabowski, Health Professions

Introduction: Aerobic exercise enhances both cognitive and motor learning. With regard to intensity, moderate exercise is superior to both high and low. The optimal timing of aerobic exercise relative to skill training has yet to be determined. Purpose: To determine if moderate intensity exercise performed immediately before or after a drop vertical jump (DVJ) training session affects learning and retention of that motor skill. Methods: Forty healthy females, ages 18-25, performed one practice DVJ followed by two recorded baseline trials. The skill acquisition phase included an additional 30 trials with fading visual feedback. The goal of this session was to increase peak hip flexion angle (PHFA) during deep knee flexion. Prior to (pre) or immediately following (post) the DVJ acquisition phase, participants biked at a moderate intensity (55-65% heart rate reserve) for 20 minutes. Individuals returned seven days later for a retention session, consisting of two recorded DVJs. Results: Both the pre and post exercise groups demonstrated increased PHFA following the acquisition phase ($m=29.5$, $SD=22$, $p<0.01$), and there were no differences between groups in the amount of improvement that occurred ($p=0.31$). At retention, PHFA differed between groups ($p=0.02$), with the pre group regressing an average of 4.3° (SD=7.0°) back towards baseline, and the post group performing an average of 0.3° (SD=5.3°) better than at the end of acquisition. The number of participants who retained what they learned after acquisition was significantly different between pre (50%) and post (80%) groups ($X2=3.95$, $p=0.05$). Discussion: Moderate intensity exercise performed after acquisition of a motor skill results in superior retention. This indicates that aerobic exercise may improve learning by facilitating consolidation more than by preparing the brain to learn. Conclusion: Physical therapists should consider implementing aerobic exercise after learning a motor task in order to facilitate retention of that task.

G.25 The Motor Learning of a Thrust Mobilization Technique for Physical Therapy Student

Valerie Prusak, Bridget Gilbertson, Kelsa Rubeck, and Kody Vaassen
Co-authors: Patrick Grabowski
Mentor: Patrick Grabowski, Health Professions

Introduction: High-velocity low-amplitude thrust mobilization (HVLATM) is a common skill used by physical therapists to treat musculoskeletal and other conditions. Observations of physical therapy students (PTS) suggest a stable technique is established quickly due to the simple nature of the psychomotor skill; however, literature that quantitatively measures motor learning of clinically meaningful HVLATM parameters is lacking. Purpose: To quantify the change in motor performance of PTS in the administration of a HVLATM during their first semester of thrust manipulation exposure. Method: Thirty-nine healthy first year PTS participated in this study. Each subject viewed a short video providing minimal education and demonstration regarding a HVLATM. Subjects proceeded to perform 10 HVLATM on a therapeutic foam mat placed on a force plate. Peak force (PF), peak rate of force production (PRFP), and time to peak force (TTPF) were collected and analyzed for each subject. Post data was collected after students received formal instruction, practice, and assessment of HVLATM,; a period of approximately one month. Results: There was a significant decrease in TTPF (38% difference, $p<0.01$, $d=1.3$) and increase in PRFP (17% difference, $p=0.05$, $d=0.5$) between sessions. Coefficients of variation decreased by 50% for TTPF and for 20% for PRFP. A total of 35 participants reduced their TTPF, while 24 students increased their PRFP. There was no significant change in PF. Discussion: After formal education and one month of practice, PTS displayed significant quantitative improvements in rate of force production and time required to reach PF. Despite the lack of change in amount of force, participants became quicker and more consistent in delivering the HVLATM. Clinical Relevance: The results of this study verify changes in important force parameters of a HVLATM following formal instruction and practice. Future research could compare data to master clinicians and track progress of PTS further through their education.

G.26 Home Literacy Environment: Predicting Emergent Literacy Skills in Low-Income Students

Michaela Keller
Co-authors: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

Early exposure to literacy experiences in the home setting contribute to the success of future readers. This study will advance Bracken & Fischel's work by investigating the relationship between the home literacy environment and emergent literacy skills of low-income, Head Start students. School psychologists will learn the important considerations for encouraging and understanding family engagement in the development of children's literacy skills.

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

G.27 Effects of Oil Contamination on Microbial Community and Function in the La Crosse River Marsh

Anna Hilger
Mentor: Bonnie Bratina, Microbiology

Recently, construction of a second railroad track through the La Crosse River Marsh (LCRM) was approved. This additional track increases the possibility of oil car derailments and contamination in the LCRM. Oil contamination may have detrimental impacts on the structure and function of indigenous microbial communities. Microorganisms are vital to aquatic systems because they are responsible for maintaining anaerobic food chains, releasing oxygen, recycling carbon, and storing carbon. These benefits are established through the processes of methanogenesis, primary production, and secondary production. Methanogenesis is inhibited by phenanthrene and sulfate, and concentrations of these compounds would likely increase after a crude oil spill. Primary productivity has increased as a response to oil spills because of a decrease in predation due to predator's sensitivity to oil. Secondary production has been shown to decrease in instances of oil spills, possibly due to the decrease in accessibility of phosphorus, a nutrient needed for growth. The processes of a microbial community depend on the community composition. The microbial community response to an oil spill may be dependent on the structural make-up and concentration of the oil. Much of the previous work focusing on microbial response to oil contamination has been done in saltwater and soil habitats, while not much has been studied in freshwater habitats, like the LCRM. This study aims to fill this gap by simulating an oil spill in mesocosms to determine the effect oil has on the methanogenesis, primary productivity, secondary productivity, and community composition of the indigenous LCRM microbial communities.

G.28 Monitoring Physical Demands of an Off-season Training Program and Spring Football Practice in Division III College Players

Ashley Kildow
Co-authors: Glenn Wright & Ryan Reh
Mentor: Glenn Wright and Salvador Jaime, Exercise and Sports Science

In the absence of monitoring training loads, some off-season programs fail to optimize performance or may enable overtraining, resulting in performance decrements. The ability to use monitoring through the offseason is helpful for coaches to determine the appropriate training scheme during Division III collegiate off-season training. PURPOSE: The aim of this investigation was to monitor the physical demands of American football players during off-season training and to investigate differences in training responses between linemen and skill position players. METHODS: Twenty-three subjects (11 linemen, 12 skill position) from the University's football team were recruited from an Exercise Science 100 conditioning class to participate in a 15-week off-season training program. Phase I consisted of concurrent strength and speed/endurance training (3-4 days/week) for 7 weeks. Phase II consisted of strength training and spring football practice (3-4 days/week) for 4 weeks. Strength and speed training continued for 3 weeks following spring practices. Countermovement jump, 5 repetition maximum (RM) bench press and back squat, 505 change of direction (COD), repeated sprint anaerobic test (RSAT), and body weight were all measured prior, mid-way through, and following the study. RESULTS: No significant interaction was detected between linemen and skilled position players for all performance variables ($p > .05$). RSAT % decrement, RSAT best time, and 505 COD times significantly improved ($p < .05$). No significant differences were detected in CMJ, body weight, and 5RM performance for squat or bench press ($p > .05$). CONCLUSION: Results indicate that linemen and skilled position players did not respond significantly different to the present training program. Change of direction skill, speed, and anaerobic capacity all improved with the present training program. However, adjustments may be needed to induce greater strength adaptations.

G.29 Effect of the Antimicrobial Drug SK-03-92 on *Saccharomyces cerevisiae* Copper Related Genes Expression

Emilie Anderson
Mentor: Anne Galbraith, Biology

Faculty and students at UWL have developed and patented an antimicrobial, SK-03-92, that was derived from a stilbene produced by *Comptonia peregrina* (sweet fern). Work at UWL has shown that this compound is effective against a

variety of gram-positive bacteria, but is not toxic in a mouse model or *C. elegans*. However, the precise mechanism of action of SK-03-92 has yet to be determined. We have been taking advantage of the genetics of *Saccharomyces cerevisiae* to provide a greater understanding of how the compound works. Select yeast mutants were treated and examined by a simple plating assay to determine if the killing effects of the drug differed in these mutants relative to wild-type cells. A large-scale RNAseq analysis was also performed on treated versus untreated cultures of *Saccharomyces cerevisiae* to determine a subset of genes that are dysregulated by cells in response to SK-03-92 treatment. Several genes involved in copper homeostasis showed significant dysregulation in treated yeast. In addition, yeast strains with mutations in genes involved in copper homeostasis were affected by SK-03-92 treatment differently than wild-type yeast strains. Copper is an essential trace element, required for the function of many essential enzymes, but copper is also extremely toxic to cells when it is not properly sequestered. Results of my work on the involvement of copper and copper-regulating genes in the killing effect of SK-03-92 in yeast will be presented.

G.30 Evaluation of Copper Alloy Surfaces for Inactivation of a Human Norovirus Surrogate

Jordan Recker
Co-author: Xinhui Li
Mentor: Xinhui Li, Microbiology

Human noroviruses (HuNoVs) are the leading causative agent for foodborne illnesses. Copper and copper alloys have been shown to inactivate many pathogens, including HuNoVs. Inactivation studies of HuNoVs usually rely on surrogates and molecular based assays, such as RT-qPCR because there is no convenient cell culture system available for HuNoVs. However, it is still unclear how accurate it is to quantify the inactivation efficacy of copper surfaces on virus particles by RT-qPCR. The objective of this study was to evaluate the efficacy of copper (100% Cu) and brass (70% Cu) surfaces for inactivation of the Tulane virus (TV), a commonly used surrogate for HuNoV. TV was treated on copper and brass surfaces for a variety of times. Stainless steel (0% Cu) was also used for comparison. The virus was then retrieved at certain time points and inactivation was quantified by both plaque assay and porcine gastric mucin-conjugated magnetic beads binding assay followed by RT-qPCR (PGM-MB/PCR). Results indicated that copper and brass could rapidly inactivate TV within a 10-15 minute treatment. However, the PGM/PCR assay underestimated the efficacy of copper and brass for TV inactivation. In addition, faster and higher inactivation was observed when TV was suspended in phosphate buffered saline, compared to when it was suspended in cell culture medium. The results from this study suggest that copper and brass could be used as a precautionary measure to limit HuNoV spread and infection in close quarter environments, such as schools, restaurants, and care facilities.

G.31 How an Antarctic Bacterium Could Help Keep Your Groceries Fresh: Optimizing a Bacteriocin Produced by Carnobacterium LV62:W1

Laura Wright
Mentor: Bonnie Bratina, Microbiology

Bacteriocins are antimicrobial proteins produced by many species of bacteria. Those produced by the group known as Lactic Acid Bacteria (LAB) are of particular interest because they are considered safe for use in food and could be easily integrated into food production processes. Several strains of Carnobacterium (a LAB) discovered in Lake Vanda, Antarctica were brought back to UWL, and further testing revealed signs of bacteriocin production that could be utilized against food pathogens and spoilers like Listeria monocytogenes. This project aims to optimize the production of a bacteriocin, termed "carnocin", generated by Carnobacterium LV62:W1 and further characterize its structure. Due to the wide range of factors that can contribute to carnocin production, Design of Experiment (DOE) software will be utilized to streamline testing and conserve resources.

G.32 Human Parainfluenza Virus 3 Matrix Protein Nuclear Localization and Nuclear Export Signals Impact on Nuclear Transit

Micaela Haas
Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus 3 (HPIV3) typically causes a cold in healthy individuals. However, in young children, elderly, or immunocompromised individuals a lower respiratory tract infection is usually seen. Currently there is no vaccine for HPIV3. Understanding the lifecycle of HPIV3 may be useful for developing a vaccine in the future. The matrix protein is thought to control assembly, budding, and nuclear transit. Little is known about how the matrix protein controls nuclear travel or budding. Viruses within the *Paramyxoviridae* family are thought to translocate through the

nucleus. It has been seen with Nipah and Sendai viruses that this process is controlled by nuclear localization and nuclear export signals, and nuclear travel is needed for budding. To investigate the process by which HPIV3 transits through the nucleus and to see if translocation is controlled by nuclear localization and nuclear export signals the wild-type matrix protein and mutants were expressed in 293T cells and immunofluorescent localization assays were conducted. The matrix protein was seen to transit through the nucleus, and translocation through the nucleus was influenced by the nuclear localization and nuclear export signals. The K258A mutant limited entry of the matrix protein into the nucleus, and the K258R and L106/107A mutations restricted the release of the matrix protein from the nucleus. These results suggest that nuclear transit could be controlled by the nuclear localization and nuclear export signals. Future research is needed to see how mutations in the nuclear localization and nuclear export signals and thus inefficient nuclear transit affects budding.

G.33 Labeling Levels of EBP and CCR in Occupational Therapists

Renae Tjelta
Mentors: Angela Benfield, Health Professions, and Mark Johnston, Professor Emeritus, University of Wisconsin-Milwaukee

Objective: To determine descriptors (levels of expertise) for the different strata of performance on the subscales of the Measure of Evidence-Informed Professional Thinking (EIPT), Critical Clinical Reasoning Habits (CCR) and Evidence-Based Practice Habits (EBP) in occupational therapists. Participants: 11 experts who teach and/or publish on clinical reasoning and/or evidence-based practice. Methodology: Rasch analysis of data used to develop a measure of EIPT identified 11 distinct strata, or levels of performance, on the CCR scale and 8 strata on the EBP Habits scale. An internet and literature review was completed to identify expert participants, to whom a 12-question Qualtrics survey was sent. Respondents were asked to review two 16-item scales, Evidence-based Practice Habits (EBP) and Critical Clinical Reasoning (CCR), with the interquartile level responses bolded. Participants were asked to label what level of competency the bolded performance represents and were invited to provide comments. Results: Twenty-three respondents entered the survey and agreed to participate. Eleven respondents provided responses for some or all of the questions. Six of the respondents indicated that the CCR scale interquartile level reflects basic competency, while 6 selected competence. Six respondents indicated that the EBP scale interquartile level reflects novice or basic competency, and 4 indicated competency or high competency. Conclusion: Four levels of competency on the two subscales of the EIPT measure have been identified. The person measure scores can now be clinically interpreted, allowing identification of those in need of support, basic competency, competency, and high competency. Person measure scores for the different levels of competency vary slightly between the scales. Person measures greater than interquartile levels indicate higher competency, while lower person measures indicate areas requiring support. These strata labels provide a point of reference for therapists utilizing this questionnaire for professional development and will facilitate discussion about specific areas of improvement.

G.34 Who Are Attached Forest Therapy Campers?: Implications for Recreational Therapy Interventions

Samantha Petitte and Alexa Brenner
Co-author: Namyun Kil
Mentor: Namyun Kil, Recreation Management & Therapeutic Recreation

The purpose of this study was to examine the characteristics of individuals who engage in forest therapy through the context of place attachment. On-site exit interviews with campers who engaged in forest therapy in established public national and state forests in South Korea were conducted during late July to mid-September 2014. Forest therapy (i.e., forest bathing encompassing slow walking paths, practicing mindfulness meditation, deep immersion in nature, utilizing all human sensory systems) has long been utilized as a strengths-based approach to enhance positive benefits. Individuals engage in forest therapy (FT) programs in natural settings where they develop emotional bonds with nature. Previous place attachment (PA) studies have identified outdoor recreationists' characteristics and experiential benefits. Such information about FT participants does not exist. This study seeks to examine the characteristics of individuals who participate in FT programs and provide information about FT recreationists' demographic/trip characteristics, reasons for visiting forest camping areas, and healthy lifestyle behaviors. Recreational therapists can use this information in clinical practice in designing recreational therapy interventions for clients (e.g., ADHD, social anxiety disorder, autism, depression, PTSD) to engage in FT programs (with family and friends), which could improve physical, mental, and social well-being.

G.35 Two Proteins Tied to Sortase A Gene Regulation Contribute to the Formation of Biofilm by *S. aureus*

Allison Zank
Mentor: William Schwan, Microbiology

Twenty percent of the general population are persistent carriers of *Staphylococcus aureus* and 60% are intermittent carriers. The evolution from *S. aureus* carriage to infection is dependent on bacterial surface protein display, which can lead to chronic or life-threatening conditions such as bacteremia, infective endocarditis, and meningitis. The sortase A (SrtA) enzyme, which covalently anchors surface proteins to the cell wall of Gram-positive bacteria, contributes to *S. aureus* infectivity and virulence. However, all of the regulators of the srtA gene have not been identified. We hypothesize that dissociation of a response regulator protein from an antagonizing conjugate sensor kinase protein upregulates SrtA expression in response to a signaling event. To explore this hypothesis, we have constructed plasmids with the full length response regulator, or sensor kinase, gene cloned into them to complement mutations in either gene in the *S. aureus* Newman strain. Through the use of biofilm assays, we have demonstrated that complementation of the sensor kinase mutation results in either biofilm formation returning to wild type levels or being significantly lower depending on the concentration of the sensor kinase within the bacterial cells. Our results show that the two proteins tied to sortase A gene regulation contribute to the formation of biofilm by *S. aureus*.

G.36 Tracing the Naturalization of Golden Oysters in the United States

Andrea Bruce
Co-author: Todd Osmundson
Mentors: Todd Osmundson and Tom Volk, Biology

Non-native golden oyster mushrooms (*Pleurotus citrinopileatus*) began appearing in North American woodlands approximately 5 years ago. Golden oysters are indigenous to eastern Russia, northern China, and Japan, but appear to have become naturalized in the United States rapidly. The large fruitings observed by mushroom collectors suggest that indigenous decomposers are being outcompeted and displaced, presenting a potential threat to fungal biodiversity. I aim to infer how *P. citrinopileatus* populations have become naturalized, using population genomic data to infer migration pathways and relatedness between wild and cultivated strains. I will test two competing hypotheses for the spread of this organism: 1) multiple introductions have occurred (i.e., that each naturalized individual is most closely related to a commercial strain); or, 2) a single escape of a commercial strain occurred, followed by spread of wild populations. I will also attempt to determine whether naturalization via spores (i.e., involving recombination and more likely due to accidental escape of spores) or clonal spread (i.e., more likely due to intentional introduction) is better supported by genetic evidence. Genome sequencing of 31 wild specimens from 6 American states, as well as 7 cultivated strains, is currently underway. I will construct a single-nucleotide polymorphism (SNP) dataset to build a minimum spanning haplotype network to infer the most likely pathway of naturalization and spread.

G.37 Neuromuscular and Subjective Responses to a Nontraditional Practice Schedule for Collegiate American Football

Haley Hedgecock
Co-authors: Glenn Wright, Jamie Salvador, and Scott Doberstein
Mentor: Glenn Wright, Exercise and Sport Science

It is well recognized that athletes need to train at a high-intensity to illicit improvements. The balance among training, competition, and recovery is a key aspect for competitive athletes and an imbalance overtime could have negative outcomes. Neuromuscular fatigue is the inability to maintain muscular strength or power and an accumulation can lead an athlete to a maladaptive stage such as overtraining. New advancements in technology have made it easier for coaches to monitor the stresses (mechanical and physiological) that athletes undergo during practice. Traditionally, weekly competition for collegiate football occurs each Saturday, with passive rest or light training on Sunday and Monday. Practices take place from Tuesday through Friday, with intensity and duration peaking on Tuesday and tapering progressively through the week. The aim of this study is to evaluate a new organization of weekly practice for a collegiate football team by estimating the state of readiness for competition at different time points of the practice week. METHODS: Nineteen University of Wisconsin-La Crosse football players were assessed for signs of fatigue by tracking countermovement jump performance three times per week using a linear positional transducer (relative mean power, peak velocity, eccentric dip) and perceived ratings of player wellness (fatigue, muscle soreness, mood, sleep quality, and stress). Players were also monitored at daily practice five days per week during the first six weeks of the competitive season for external (accelerometer data) and internal (heart rate data) training load using wearable

technology attached to the player under their practice equipment by an elastic chest strap. RESULTS: Results are currently being analyzed and will be presented at the Celebration of Student Research and Creativity.

G.38 Outdoor Adventure Education: The Effects on Self-Regulation in Traumatized Students

Katelyn Flynn
Mentor: Betty DeBoer

Students with Adverse Childhood Experiences are at-risk for cognitive, social, and behavioral impairments. School-based outdoor adventure programs have positively impacted stress level, subjective well-being, and self-regulation in the general population. This study aimed to extend the research by examining the influence of outdoor adventure education on self-regulation in traumatized students enrolled in alternative education. The results of this study will equip school psychologists to make recommendations on mental health programming for traumatized students.

G.39 Family-School Partnerships: What Parents See as Most Important

Kayla Fleck
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

The purpose of this study is to examine which is most important in predicting a parent's overall rating of family-school partnership: specific dimensions of the partnership, the building level of the parent's child (i.e., elementary, middle or high school) or the child's education status (i.e., general education or special education). This study will utilize The Power of Partnership Family Survey and will allow practitioners to apply the parent's perspective when designing family-school partnerships.

G.40 Estimating Organic Carbon Burial in Freshwater Impoundments

Matthew Barbour
Mentor: Eric Strauss, Biology

Global carbon sinks have gained much recent attention within the research community due to ties with current global climate change issues. Freshwater impoundments may be a globally significant organic carbon sink that has been largely overlooked. Previous models used to estimate the amount of organic carbon in these impoundments have mainly relied on simple basin characteristics, such as watershed land area and impoundment surface area. In this study, I will present a novel method for calculating the amounts of sediment organic carbon in freshwater impoundments by developing a multiple-regression model based largely on geospatially derived parameters. Geographic Information Systems (GIS) will be used to develop model parameters from multiple databases for each sampled impoundment. Sediment samples were collected throughout Wisconsin, Minnesota, and Iowa across multiple ecoregions. Sediment was analyzed for organic carbon content and used as the dependent variable in a multiple-regression model. Comparisons between ecoregions were made to examine the proper spatial applications of this novel method. Data and models will be presented and comparisons will be made to existing models.

G.41 Building Group Cohesion in Traumatized Students: Effects of Outdoor Education

Megan Rasmussen
Co-author: Betty DeBoer
Mentor: Betty DeBoer, Psychology

Outdoor adventure education (OAE) has positively impacted group cohesion, a form of peer attachment, in regular education settings. Students with Adverse Childhood Experiences are at risk for negative life outcomes and may face impaired attachments with caregivers and peers. This study will examine the influence of OAE on group cohesion in students with trauma backgrounds within an alternative education setting. Outcomes will equip school psychologists with meaningful input on mental health programming for traumatized students.

G.42 ESCRT Pathway Involvement in the Release of Human Parainfluenza Virus Type 3 Virus Particles

Shanna Mueller
Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus type 3 (HPIV3) is a leading cause of severe lower respiratory tract infections in infants and young children. Currently there are no treatments or vaccines available for HPIV3. Research on how this virus completes its lifecycle may provide vital information that could help in finding potential treatments or vaccines to help combat the roughly 18,000 hospitalizations caused by HPIV3 infections each year. To better understand how HPIV3 mature virus particles are released from host cells, knowledge of how the viral proteins interact with the host proteins is vital. The viral matrix protein is thought to be able to interact with the host cell proteins found within the ESCRT pathway, which is involved in the rearrangement of membranes and vesicle formation. It was found in a structurally similar virus, HIV-1, that when the ESCRT protein, VPS4A/B, was knocked down in cells, the virus was unable to be released from infected cells. These established protocols were followed in order to use siRNA, which binds to mRNA of VPS4A/B, knocking down the levels of VPS4A/B protein in tissue culture cells. These knocked down cells were then either transfected or infected with HPIV3 Matrix protein or HPIV3 whole virus, respectively. These cells were then used to determine if a depletion of VPS4A/B had an influence on the number of virus like particles or virus particles that were produced. These particles were detected via western-blots. The final results will give a more definitive answer on the involvement of the host cellular ESCRT pathway with the release of HPIV3 virus particles.

GRADUATE ORAL PRESENTATION ABSTRACT

GRAD.1 Large Scale Evaluation of Reed Canarygrass Suppression across Four SE Minnesota Floodplain Sites

William Kiser
Co-authors: Meredith Thomsen, Maria Delaundreau, Rebecca Montgomery, Tim Schalgenhaft, and Andy Beebe
Mentor: Meredith Thomsen, Biology

Experiments can provide insights as to whether invasive plant dominance is caused by superior competitive ability or by negative environmental changes facilitating plant invasion. Reed canarygrass (*Phalaris arundinacea*, hereafter RCG) displaces native plants and forms near monocultures in North American wetlands. In the Upper Mississippi River (UMR) system, floodplain forests are negatively impacted by RCG invasion. Converting RCG monocultures back to this forested wetland type is a high priority among UMR stakeholders. We are testing two RCG control techniques and three methods of tree propagation (bare root stock, container stock, and direct seeding) at four sites in SE Minnesota. We are monitoring herbaceous plant responses, litter depth, and tree performance over two growing seasons. Treatments consist of (1) fall applications of glyphosate (Rodeo) and (2) mulching followed by late-fall application of sulfometuron methyl (Oust) herbicide. Treatments were applied in Fall 2016 and trees were planted in Spring 2017. Initial results indicate that both treatment methods significantly reduce RCG performance relative to controls. Although RCG cover and height increased over time, differences remained significant among treatments. Additionally, herbaceous plants increased in species richness and cover relative to controls, although volunteer plant diversity varied among sites. Preliminary results indicate that lack of native propagules may be a factor in RCG invasions. Herbicides will be re-applied in early Spring 2018; data collection in 2018 will verify if early observations continue to hold true. By studying the causes and consequences of RCG invasion, we can assess community dynamics while evaluating the effectiveness of restoration methods.

GRAD.2 Effects of Urocortins on Intestinal Secretion in the Mouse Colon *in Vitro*

Aaron Karo
Co-author: Sumei Liu
Mentor: Sumei Liu, Biology

Background and Aims: Urocortins (Ucn1, Ucn2, and Ucn3) belong to the corticotropin-releasing factor (CRF)-like peptide family and bind to two subtypes of CRF receptors (CRF1 and CRF2) to exert their biological effects. Ucn1 binds to both CRF1 and CRF2 receptors with equal high affinity, whereas Ucn2 and Ucn3 bind exclusively to CRF2. CRF and urocortins are expressed in the gastrointestinal tract. CRF has been implicated in stress-stimulated intestinal ion secretion and diarrhea. However, the effects of urocortins on intestinal ion secretion have remain uninvestigated. The aim of the present study was to investigate the role of urocortins in the regulation of intestinal ion secretion. Methods: Mucosa/submucosa preparations from mouse colon were mounted in Ussing flux chambers for measurement of short-circuit current (Isc) as an indicator of mucosal ion secretion. Results: Application of CRF, Ucn1, Ucn2, and Ucn3 to the submucosal side of the preparation increased baseline Isc in a concentration-dependent manner with an EC50 (in M) of 1.2810-6, 6.0410-7, 2.8910-7, or 2.9810-7, respectively, with the rank order of potency: Ucn2Ucn3 > Ucn1 > CRF. At 1 M, Ucn3 caused a greater rise in Isc (Isc: 47.018.94A/cm2), compared with Ucn2 (17.712.63A/cm2), Ucn1 (7.064.33A/cm2), or CRF (8.924.11A/cm2). The neuronal blocker tetrodotoxin had no effect on Ucn1-evoked Isc. Conclusions: The results suggest that urocortins stimulate colonic ion secretion independent the submucosal plexus of the enteric nervous system. Ucn2 and Ucn3 are more potent than CRF in stimulation of colonic ion secretion and may play a dominant role in stress-induced hyper secretion and diarrhea. Acknowledgement: NIH R15 DK097460-01A1 (SL) and UWL graduate research service and educational leadership grant (AK)..

GRAD.3 Perceptions of Universally Designed Adventure Education

Nick Faulds
Mentors: Matthew Maurer and Zack Beddoes, Exercise & Sport Science

The focus of this qualitative study is to gain insight on the long term benefits of implementing Universal Adventure Education in physical education. Universal Adventure Education is a type of program where students with disabilities participate in different adventure and outdoor pursuits activities with their nondisabled peers. There are three groups of

participants who have shared their perspectives regarding this topic. The participant populations include faculty members who have facilitated and implemented this type of program, parents of students with disabilities who have participated in this program, and former nondisabled high school students who have participated in this type of program. This study has employed 5 different qualitative instruments for data collection, which include semi-structured formal interviews, informal follow up interviews, document analysis, narrative descriptions written by former high school students who participated in a Universal Adventure Education program, and observations of a current Universal Adventure Education program taking place by the principal investigator. The hope of this study is to identify key factors regarding this type of program in order to motivate physical educators to start a Universal Adventure Education program at their school district. Data collection has started and the researcher has been able to identify some very positive benefits towards all parties involved in this type of program.

2017 RECIPIENTS OF UNDERGRADUATE RESEARCH AND CREATIVITY GRANTS

Name	Department	Mentor	Title
Emily Abramowicz	Chemistry & Biochemistry	Ressano Desouza-Machado & Constance Arzigian	Systematic Profiling and Cross-Sectional Lipid Residue Analysis on Oneota Vessels Utilizing Gas Chromatography and Mass Spectroscopy
Alexa Aguirre	Biology	Gretchen Gerrish	Applying Computed Tomography (CT) Imaging to the Description of New Luminescent Ostracod Species
Zachary Allain	Archaeology & Anthropology	Constance Arzigian	Exploring Trends Regarding Oneota Lithic Source Material Usage in the La Crosse Area
Abbie Anderson	Chemistry	Kelly Gorres	Activation of Epstein-Barr Vvirus by a Mood-Stabilizing drug
Abbie Anderson	Chemistry & Biochemistry	Kelly Gores	Inhibition of Epstein-Barr Virus by an Atypical Antipsychotic
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Rebekah Bain	History	Ariel Beaujot	History on the Go
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Nicholas Berg	Chemistry & Biochemistry	John May	The Role of DcrB, a Novel Protein used in Salmonellas Survival in Toxic Metals
Tyler Billman	Biology	Scott Cooper	Von Willebrand Factor as a Mechanism of Platelet Storage in the Bone Marrow of Thirteen-Lined Ground Squirrels
Fiona Boler	Sociology	Carol Miller	Authoritarianism, Nativism and Anti-establishment Beliefs Amongst College Students: A Cross-national Comparison
Carly Boles	Theatre Arts	Beth Cherne	*Titus Andronicus*: a Feminist Approach
Daniel Bradley	Microbiology	Peter Wilker	Impact of Serial Genetic Bottleneck Events on Influenza Viruses Replicative Capacity
Joshua Christensen	Chemistry & Biochemistry	Valeria Stepanova	Investigation of the Mechanism for the Curcumin Synthesis
Jack Cioci	Psychology	Bianca Basten	Beyond Racial Salience: Reminding White Jurors of their Privilege
Madeline Cordle	Psychology	Alessandro Quartoroli	Frequency of College Marijuana Use as a Result of Coping with Stress and Mental Illness
Zachary Cowell	Economics	Mary Hamman	The Impact of DUI Mandatory Minimums on Labor Market Outcomes
Malcolm Driessen	Excercise and Sports Science	Sheldon Wagner	Reducing the Risk of Contact Injuries in Collegiate Football through Vision Enhancing Strobe Goggles
Brandon Emerson	Archaeology & Anthropology	David Anderson	Geophysical Surveys of a Historic Jewish Cemetery in La Crosse, WI
Carly Emmel	Health Education / Health Promotion	Gary Gilmore	Assessing Women's Health Disparities with the Sagbado Neighborhood with SADA in Lomé, Togo

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Patrick Fischenich, Nicholas Glodosky	Psychology	Bart Vanvoorhis	The Effect of Personally Relevant Words on the Attentional Blink
Leah Foltman	Sociology	Dawn Norris	Millennials' Social Class of Origin, Mastery, and Depression Symptoms.
Taylor Franklin	Economics	Nabamita Dutta	Individualism and Female Entrepreneurship: A New Look Into Economic Development Across Nations
Riley Friederichs	Health Professions	Thomas Greiner	An Exploration of Non-Human Primate Foot Anatomy
Jack Geiger	Chemistry & Biochemistry	Adrienne Loh	Lysine Position Affects Binding of Aib-rich Model Antibiotics to Lipid Vesicles
Julian Grosskopf	Chemistry & Biochemistry	Todd Weaver	Site-Selective Alterations within the Hemolysin A Non-polar Core
Sergio Guerrero	Psychology	Alessandro Quartiroli	The Trauma of Latinxs in the iGeneration
Lisa Hady, Brittany Raven	Psychology	Ryan McKelley	Fifty Shades of Rape Culture: Rape Culture Salience on College Campuses
Sadie Halfrich	Sociology	Lisa Kruse	Racial Disparities in Wisconsin: How Freedom Schools Can Close the Gap
Kyleigh Hall	Sociology	Laurie Cooper Stoll	White Perception's of Black Social Movements
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Joshua Jensen	Chemistry & Biochemistry	Curtis Czerwinski	Rate of Haptotropic Rearrangement in Ethyl-Amino-Biphenyl Chromium Tricarbonyl
Micaela Julian	Psychology	Berna Gercek Swing	The Influence of Perceived Parental Psychological Control and Bicultural Identity Integration on the Sense of Belonging of Latino Students In Higher Education
Katelyn Kautzer, MacKenzie Ritchey	Psychology	Casey Tobin	Let's Talk About Sex: Sexual Health Outcomes of American Youth in Abstinence Only versus Comprehensive Sexual Education Programs
Rachel Krause, Caitlyn Nettesheim	Theatre Arts	M. Beth Cherne	Gruesome Playground Injuries: Love Hurts
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Zachary Mancl	Biology	Scott Cooper	Effects of Temperature and Flow Frate on Adhesion of Platelets to Simulated Blood Vessel Walls
Megan Marlowe	Chemistry & Biochemistry	Kelly Gorres	Identifying the Stable N-terminal Fragment of an Epstein-Barr Virus Protein of Unknown Function
Mitchel McCloskey	Biology	Barrett Klein	Exploring the Impact of Sleep Restriction on Learning in Panamanian Fruit Bats
Annie McIntyre	Geography & Earth Science	John Kelly	Forest Cover Change in Tropical Mexico: Comparing Traditional Mayan and Commercial-Agriculture Mennonite Communities
Erynn McNeill	Biology	Meredith Thomsen	How Gray Wolves are Affecting the Spatial Distribution of Smaller Canid Predators in the Black River State Forest
Kristin Miller	Health Education & Health Promotion	Dan Duquette	School Garden Impact on Students' Relationship with Fruits and Vegetables
Christian Montes	Biology	Todd Osmundson	Examining Population Genetic Variability in Two Sister Species of Alpine Mushrooms to Address a Long-Standing Hypothesis in Fungal Genetics
Baley Murphy	Art	Jennifer Terpstra	Adaptive Expressive Arts
Sara Nagengast	Sociology	Dawn Norris	Homeless Identities and Their Influence on Service Utilization
Alyssa Nelson	Educational Studies	Leslie Rogers	Communication Expectations As Described by Parents/Caregivers and the Overall Impact on Communication Satisfaction
Mikka Nyarko	Health Education & Health Promotion	Keely Rees	'Women's Reproductive Health Initiative in Matagalpa, Nicaragua: A Collaboration with Gundersen Health System's Global Partners and the Lily Project'
Mekaela Opsahl	Archaeology & Anthropology	Amy Nicodemus	Comparative Changes in Livestock Morphology between the Copper and Bronze Age at Pecica "Şanţul Mare," Romania.
Mychaela Parker	Exercise and Sport Science	Scott Doberstein	Comparing Foam Rolling and IASTM
Adele Parks	Sociology	Laurie Cooper Stoll	A Sense of Belonging: Analyzing Intersectionality Theory at Predominantly White Institutions
Charlotte Peters	Geography & Earth Science	Joan Bunbury	Continued Analysis of Sediment Cores as a Basis for Understanding Climate Change and Its Effects on the Settlement, Habitation, and Subsequent Abandonment of the Aztalan Site in Southeastern Wisconsin
Filipe Pincheira-Berthelon	Archaeology & Anthropology	Elizabeth Peacock	Multilingualism as a De-Stressing Factor

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Lucy Putnam	Sociology	Carol Miller	Do Computer Scientist's Dream of the Jobless Future?
Hafsa Qazi	Biology	Sumei Liu	The Effect of Stress Peptide Urocortins on the Intestinal Epithelial Barrier Function
Jackson Radenz	Geophraphy & Earth Science	Niti Mishra	Mapping Treeline Ecotone Properties in Nepal Himalaya Using Unmanned Aerial Systems (UAS) Imagery and Field Data
Katelyn Rigotti	Women, Gender, and Sexuality Studies	Jodi Vandenberg-Daves	The Equal Rights Amendment and Its Advocators in the Women of Wisconsin
Phoenix Rogers	Biology	Eric Strauss	The Use of Stream Metabolism to Determine the Effects of Damming Icelandic Rivers
Phoenix Rogers, Molly Warner	Biology	Eric Strauss	The Air-Water Relationship of Driftless Area Streams
Madeline Roth	Recreation Management	Laurlyn Harmon	Getting Messy in Dirt: Effects on Preschool Children's Happiness Levels
Carissa Schlafer	Sociology	Peter Marina	Modern Mexican-American Immigrants: Searching for Humanity in the Era of Color-Blind Racism
Maya Schulte	Sociology	Lisa Kruse	Pregnancy in Prison: A Doula's Perspective
Thomas Schultz	Chemistry & Biochemistry	Daniel Grilley	Stability for Poly-A Tract Sequences of DNA with Varying Types and Concentrations of Cations
Ashley Schwartz	Archaeology / Anthropology	Christine Hippert	Examining Indigenous Knowledge and Community Inclusiveness in the Curriculum of the Pirwa After-school Program for Children in Huancarani, Bolivia
Alexandra Schwarz	Chemistry & Biochemistry	Nick McGrath	A Bioorthogonal Approach to Reacting Diazo Compounds with Coumarin Double Bonds
Emmett Sharp	Theatre Arts	Joe Anderson	The Corsets Make the Costume
Johanna Shepard	Chemistry & Biochemistry	Nicholas McGrath	Mild Reduction of Alkyl-Amides for Potential Use in Biomedical Applications
Tessa Snell	Archaeology & Anthropology	Amy Nicodemus	Settlement Pattern Analysis at the Site of Pecica, Romania and its Importance in Understanding Iron Age Social Organization.
Ross Soens	Chemistry & Biochemistry	John May	Probing Quaternary Structure of a Periplasmic Lipoprotein with a Function in Magnesium Homeostasis in Salmonella
Marissa Soto	Chemistry & Biochemistry	Curtis Czerwinski	Non-Classical Hydrogen Bonding in Halogenated Biphenyl Chromium Tricarbonyl
Rachel Steffen	Biology	Barrett Klein	Curation of Insects
Alexander Steil	Biology	Jennifer Klein	Using CRISPR to investigate Calmodulin oxidation
Gage Stuttgen	Chemistry & Biochemistry	Todd Weaver	Structural and Functional Effects of Altering the Beta-Helix Structure of Hemolysin A
Gage Stuttgen	Chemistry & Biochemistry	Todd Weaver	Sturctural and Functional Effects of Altering the Nonpolar Core of Hemolysin A

Name	Department	Mentor	Title
Claire Sykes	Biology	Markus Mika	Measuring the Effectiveness of Malaise Insect Traps to Estimate Phenology and Habitat Quality of Breeding Flammulated Owls (*Psiloscops flammeolus*)
Michael Szeszol	English	Bryon Kopp	Projective Uses of Literature: Poetry and Psychoanalytic Techniques
Cody Vaneerd	Chemistry & Biochemistry	John May	Testing Efficacy of Small Molecules to Inhibit the Growth of Salmonella
Cody Vaneerd	Chemistry & Biochemistry	John May	Testing Small Molecules to Inhibit Salmonella Resistance to Polymyxin B
Gina Wade	Chemistry & Biochemistry	Daniel Grilley	Determining the Henolytic Regions of Hemolysin A in Proteus mirabilis
Daniel Walgenbach	Biology	Jennifer Klein	Conformational Effects of Methionine Oxidation in Calmodulin Explored with Molecular Dynamics
Valerie Watson	Archaeology & Anthropology	David Anderson	Exploring the Deserted Medieval Village in Ballintober
Amy Weber	Political Science & Public Administration	Regina Goodnow	Democratic Decay in a New Democracy: The case of Hungary
Demi Weisbrod	Global Cultures & Languages	Omar Granados	"The LGBTQ+ experience in Cuba"
Drake West	Biology	Sierra Colavito	1,4-benzoquinone toxicity
Kyle Willoughby	Archaeology & Anthropology	Amy Nicodemus	Analysis of Ritual Activity During the Bronze Age Occupation of Pecica Şanţul Mare, Romania
Sydney Yarbrough	Sociology	Laurie Cooper Stoll	"I'm Not Sexist But...": Female College Students' Experiences of Gender Microaggressions
Courtney Young	Biology	Margaret Maher	Influence of Feminine Hygiene Washes on the Vaginal Entrance Microbiota

2017 RECIPIENTS OF THE GRADUATE RESEARCH, SERVICE, AND EDUCATIONAL LEADERSHIP AWARDS

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Lindsey Artymiuk	School Psychology	Daniel Hyson	Improving Adult-Student Relationships: Ongoing Teacher and Parent Book Studies
Matthew Barbour	Biology	Eric Strauss	Organic Carbon Burial in Freshwater Impoundments
Christina Burkhart	Biology	Eric Snively	Interspecific Competition for Food and Habitat Resources among Coyotes (*Canis latrans*), Red Fox (*Vulpes vulpes*), and Gray Fox (*Urocyon cinereoargenteus*) in La Crosse, Wisconsin
Shelby Fitzgerald	School Psychology	Jocelyn Newton	Mental Health Screening and Academic Outcomes in Middle School
Kayla Fleck	School Psychology	Daniel Hyson	Family-School Partnerships: What Parents See as Most Important
Micaela Haas	Microbiology	Mike Hoffman	Nuclear Localization Signal and Nuclear Export Signal Motifs of the Human Parainfluenza Virus Matrix Protein and Their Involvement in Virus Release
Brandon Harris	Biology	Jennifer Klein	Characterization of Calmodulin Oxidized Mutants in C2C12 Muscle Cells
Lynsi Havens	School Psychology	Robert Dixon	Depression and Coping Stategies: The Effects on Academic Success
Aaron Karo	Physiology	Sumei Liu	Effects of the Neuropeptides Urocortins on Rat Colonic Epithelial Barrier Function
Michaela Keller	School Psychology	Jocelyn Newton	Home Literacy Environment: Predicting Emergent Literacy Skills of Low-Income Students
Ashley Kildow	Exercise & Sport Science	Andrew Jagim	Effects of Exogenous Ketone Supplementation on Fuel Utilization and Ketone Levels during Sub-Maximal Exercise
William Kiser	Biology	Meredith Thomsen	Evaluation of Hebaceous and Tree Seedling Response to Reed Canarygrass Suppression Treatments
Michael Mamerow	Microbiology	Peter Wilker	The Effect of Genetic Bottlenecks on Mutation and Replicative Capacity of the Influenza A Virus
Garrett Miles	Exercise Sport Science	Andrew Jagim	Effects of Repeat Isometric Contractions During Rock Climbing on Markers of Muscle Damage and Exercise Performance

Hannah Mueller	Recreation Management	Daniel Plunkett	Effects of Waiting on Satisfaction in Recreational Experiences
Shanna Mueller	Microbiology	Michael Hoffman	ESCRT Pathway Involvement in the Release of HPIV-3 Virus Particles
Jordan Recker	Microbiology	Xinhui Li	Evaluation of the Efficacies of Copper Alloy Surfaces for Inactivation of Human Noroviruses
Nick Reda	Biology	Gretchen Gerrish	The Search for Species Boundaries: Identifying Regions of Reproductively Isolating Change in Marine Bioluminescent Ostracods (*Pancrustacea*)
Laura Wright	Microbiology	Bonnie Bratina	Production, Optimization, and Characterization of a Bacteriocin Produced by *Carnobacterium* LV62:W1
Allison Zank	Microbiology	Bill Schwan	Characterizing Point Mutations of a Putative Environmental Sensor Protein in *Staphyiococcus areaus* Tied to Biofilm Formation

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ACKNOWLEDGEMENTS

The 2018 Celebration of Student Research and Creativity is sponsored by the
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the Office of Graduate Studies.

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and the Graduate Council.

ABSTRACT BOOK EDITORS

SYDNEY YARBROUGH, Celebration Coordinator
CHANDRA HAWKINS
BRITTNEY GREENO
MELISSA NIELSEN
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