Table of Contents

May 6, 2022
The Bluffs and 3rd Floor Student Union

8:50 a.m. - 1:00 p.m.

SCHEDULE OF ORAL PRESENTATIONS – page 1

	Union 3110	Union 3120
8:50 to 9:15		
9:20 to 9:45	**O.U.3** **Andrew Otto (U)** ***Physics*** Mass Equivalence via a Virtual Quantized Fulling-Davies-Unruh Effect	**O.U.4** **Paige Jansen (U)** ***Sociology & Criminal Justice*** Reciprocal Disclosures of Sexual Assault in Digital Spaces
9:55 to 10:20	**O.U.7** **Emily Friederick (U)** ***Physics*** Zitterbewegung Electromagnetic Deuteron Model	
10:25 to 10:50	**O.U.10** **Hannah Bechtel (U)** ***Physics*** Orbiting Mirror Analysis: A Case Study	**O.U.11** **Hope Carter (U)** ***Economics*** Effects of Anti-Planned Parenthood Policy on Poverty and Welfare Program Participation
11:00 to 11:25	**O.U.13** **Brandon Micech (U)** ***Finance*** Security Selection Model for the Gordon Spellman Fund	
11:30 to 11:55	**O.U.14** **Raffy Traas (U)** ***Physics*** Searching for Extraterrestrial Civilizations in Galaxies Far Far Away	
12:05 to 12:30	**O.G.15** **Francesca Scala (G)** ***Microbiology*** Genetic Bottleneck Effects on Influenza A Replication	

SCHEDULE OF ORAL PRESENTATIONS – page 2

	Union 3130	Union 3314
8:50 to 9:15	**O.F.1** **Recep Pekdemir (F)** ***Accountancy*** Business Sophomore Students' Perceptions of Accounting Profession; Evidence for Any Change in Two Decades	**O.G.2** **Kristina Rands (G)** ***Biology: Aquatic Science*** What Controls the Co-occurrence Patterns of Driftless Trout?
9:20 to 9:45	**O.U.5** **Carley Arrowood (U)** ***Archaeology*** Recreation of Oneota Ceramic Manufacturing and Firing Techniques through Experimental Archaeology	**O.G.6** **Gabrielle Strittmater (G)** ***Physical Education Teaching*** Perceptions of Resilience: An Exploration into the Impact of Perceived and Actual Risk
9:55 to 10:20	**O.U.8** **Noah Grover (U)** ***Microbiology*** Characterization of Antibiotic-Resistant *Stenotrophomonas maltophilia* Isolates from Wild Painted Turtles	**O.U.9** **Brad Morris (G)** ***Biology: Aquatic Science*** Spatial and Temporal Variability of Aquatic Insect Emergence in Pool 8 of the Upper Mississippi River
10:25 to 10:50		**O.G.12** **Kyrsha Balderas (G) and Gabby White (G)** ***Student Affairs Administration*** Land Acknowledgments Are Insufficient
11:00 to 11:25		
11:30 to 11:55		
12:05 to 12:30		

UNDERGRADUATE STUDENT ABSTRACTS

UNDERGRADUATE POSTER PRESENTATION ABSTRACTS

Poster Session A
8:50 am – 9:45 am

A.U.1 Give Me Rap1b or Give Me Death: Modified Rap1b Could Provide Megakaryocytes with Protection from Programmed Cell Death

Audrey Mattmiller and Brooklyn Swenson
Co-authors: Erin Stueber, Marissa Duggan, and Kaylie Marzofka
Mentor: Jaclyn Wisinski, Biology

Platelets are small cell fragments that can form clots to prevent blood loss when blood vessels are damaged. Megakaryocytes found in the bone marrow are responsible for producing platelets. The signaling pathways in megakaryocytes are tightly regulated, therefore the factors that influence megakaryocyte survival have a direct impact on the number of platelets produced. Rap1b is a signaling protein found in megakaryocytes and platelets that is thought to mediate survival in other cell types potentially by protecting them from apoptosis. Rap1b can localize to the inside of the plasma membrane or, when it is phosphorylated, Rap1b translocates to the cytosol. The objective of this project is to determine if the phosphorylation of Rap1b influences survival and susceptibility to apoptosis in the megakaryocyte cell line, DAMI. We used the MTS proliferation assay to determine cell survival with DAMI cells overexpressing green fluorescent protein (GFP)-tagged Rap1b or its phosphorylation mutants. Susceptibility to apoptosis was determined by monitoring caspase activity, using Fluorochrome Inhibitor of Caspases (FLICA) and flow cytometry. The results of these experiments demonstrate if Rap1b and its phosphorylation status are important for megakaryocyte survival and apoptosis.

A.U.2 Microplastics Contribution to Decreased Cellular Efficiency

Ben Kossman
Mentor: Anton Sanderfoot, Biology

" Microplastics are in our everyday lives in which we consume and touch; humans eat and breathe at least 74,000 particles of microplastics a year, approximately half of a pound (Cox et al. 2019). *Chlamydomonas reinhardtii* (Chlamy) is a single-celled alga that would be a useful model organism when attempting to understand microplastic's effects on respiration, the production of carbon dioxide from oxygen, as microplastics in the environment typically start at the bottom of the food web and make their way up to tertiary and quaternary predators like humans. Slowly increasing microplastic concentrations in the presence of growing cells is expected to decrease the cells' ability to grow and divide efficiently. Measuring the respiration of the cells in the presence of microplastics could further indicate the cells inability to grow with microplastics.

A.U.3 Assessing the Suitability of YY-males as a Control Method across Life Histories

Grace Andriacchi
Co-author: Richard Erickson, Ph.D. (USGS-Upper Midwest Environmental Sciences Center)
Mentor: Richard Erickson, Ph.D., USGS-Upper Midwest Environmental Sciences Center

Natural resource managers require tools to control invasive species. Stocking YY-males allows managers to control populations by biasing the sex ratio until a population collapses. In combination with other population suppression methods, stocking YY-males could be used to develop effective Integrated Pest Management. However, life history characteristics vary across species and could influence the feasibility of YY-males as an effective population control tool, e.g., demographic factors could directly affect the ability to skew sex ratios within a given population. We compared five representative aquatic invasive species found in the United States for control with YY-males through closed-population simulations: red swamp crayfish (*Procambarus clarkii*), zebra mussel (*Dreissena polymorpha*), lake trout (*Salvelinus namaycush*), silver carp (*Hypopthalmichtys molitrix*), and Nile tilapia (*Oreochromis niloticus*). We found that red swamp crayfish and zebra mussel would be the easiest to control through stocking with YY-males. Lake trout could also be controlled but require either long stocking periods or high stocking numbers due to the long lifespan of the species. Silver carp require similar stocking numbers as Nile tilapia, but stocking Nile tilapia may more acceptable because they are a smaller fish. These findings demonstrate that species that are short-lived and smaller may be more susceptible to control by stocking YY-males.

A.U.4 There's No Crying in Baseball: Correlates of Competitive Anxiety and Personality in Athletes

Katie Banie
Mentor: Ryan McKelley, Psychology

Awareness and understanding of the mental atmosphere athletes experience prior to and during competition is imperative to achieving maximum performance. Research indicates that factors such as gender, personality, individual versus team competition, and type of anxiety experiences might all have a relationship with athletic performance. The purpose of this study was to explore contributors to performance anxiety in Division III collegiate athletes at the University of Wisconsin-La Crosse. Male and female undergraduate student-athletes ranging from 18 to 23 years old completed a survey measuring demographic variables, personality traits, total lifetime experience in their respective athletic activity, and an assessment of competitive anxiety. Expected trends concluded from previous research analyses include personality traits such as neuroticism and conscientiousness being a positive correlate with levels of performance anxiety in athletes, individual sport athletes displaying higher levels of cognitive anxiety than team sport athletes, and that more experienced athletes in their respective sport will have lower overall anxiety scores. An additional hypothesis includes higher performance anxiety in female athletes than in male athletes. Results may improve our understanding of the variables influencing student-athletes' performance anxiety, therefore being able to better support college athletes through targeted interventions aimed at reducing performance anxiety.

A.U.5 Maintaining a Sustainable Business in Today's Industrialized Food Culture

Madi Bing
Mentor: Elizabeth Peacock, Archaeology & Anthropology

Environmentalism and sustainability are very important concepts, especially in today's social, political and environmental climate. Some restaurants and businesses today are taking these values into account, but this can be difficult to balance with the higher prices that so often come with sustainable products and actions. This research examines how a business in today's industrialized food culture conceptualizes sustainability. Interviews and participant observation were conducted at the La Crosse Distillery co., La Crosse WI, to understand how they balance their values and profit. An inside look at the conversations held on sustainable sourcing, values, farmer relationships and workplace environment brings an understanding of the difficult choices that must be made when prioritizing sustainability.

A.U.6 The Experiences of Queer Women in Relation to Sex Education and Reproductive Care

Olivia Bull
Mentor: Elizabeth Peacock, Archaeology & Anthropology

I have researched queer, an individual who is not heterosexual, women in La-Crosse, WI, and their experiences in how they access and experience Reproductive and Sexual Health services. In the United States, there is a lack of health care and education for poor individuals, women, and people of color. It can therefore be inferred that queer women have to deal with preexisting structural issues as well as discrimination and heteronormativity, the ideology that promotes heterosexuality as the normal and preferred sexual orientation, within their own care and education. To uncover their unique experiences I have conducted seven interviews with queer women as well as literature reviews on writings discussing reproductive education. It is important understand how queer women navigate life within their queer identity, where they seek education, support, and heath care in order to give light to how to create a medical and educational community that supports and normalizes different sexual and gender identities.

A.U.7 Identifying the Causes of Sudden Changes in Mirror Satellite Endstate

Benjamin Callies, Jardon Schlieckau, and Hayley Schultz
Co-author: Shauna Sallmen
Mentor: Shauna Sallmen, Physics

Throughout human history satellites have been used for telecommunications, telescopes, and manned purposes. Observing satellites is a potential method for scientists to search for intelligent forms of life on exoplanets. Satellites in the form of mirrors could be used by intelligent populations to illuminate and perhaps even terraform exoplanets that have one side continually facing the star. These satellites are greatly affected by radiation pressure (RP) which is a force caused by photons emitted by a star. With the use of a simulated 1 square km planar mirror of 1,000 kg mass orbiting an Earth sized planet, we have investigated RP that always affects the mirror (Always) and RP that only affects the mirror when it is on

the dark side of the planet (Night). The simulated planets are at the inner edge of their star's habitable zone, therefore making it possible for such celestial objects to both contain liquid water and be tidally locked. We also modify variables such as star type and both mirror orbit orientations, and sizes. For each simulation we determine whether the mirror's orbit ends in a collision with the planet, escapes from the planet's gravitational influence, or survives; all referred to as the mirror's end state. We will present an analysis of selected initially circular orbits to explore the parameter values where the mirror's survival time and/or end state changes dramatically.

A.U.8 The Angry Basking and Over Stacking of Freshwater Turtles

Camoya Evans
Mentor: Roger Haro, Biology

The proposed research is to help understand the ways that human activity on the Mississippi River has shifted the behavior of freshwater turtles. This research is focused on the presence of deadwood in the river, and the ways that turtles interact with the deadwood. The proposed question is whether turtles are more aggressive with one another over the few logs present in the Mississippi River in human-dominated areas.

A.U.10 Results of Single and Binary Exposures to Neonicotinoids in *Pimephales promelas* Embryos

Myah Fraundorf
Co-authors: Anya Jeninga, Sara Duffy, Elisabeth Harrahy, Ph.D. (UW-Whitewater) and Tisha King-Heiden
Mentor: Tisha King-Heiden, Biology

The insecticides known as neonicotinoids are popular nationwide for their ability to target the nicotinic acetylcholine receptors in invertebrates, making them less toxic to vertebrates than other insecticides. However, recent studies suggest that neonicotinoids have negative impacts on exposed vertebrates. Neonicotinoids are pseudopersistent in the environment, often found in surface water, due to frequent applications and high water solubility. In the Central Sands region of Wisconsin, the neonicotinoids imidacloprid and thiamethoxam have been found at levels greater than ecological thresholds, raising concern for non-target aquatic organisms. Here we present our preliminary work regarding the effects of embryonic exposures to one or two neonicotinoids, thiamethoxam and imidacloprid, simultaneously on the native species *Pimephales promelas*, commonly known as Fathead minnows. In ongoing work, the embryos were exposed to either imidacloprid alone or a mixture of imidacloprid and thiamethoxam in a 1:1 ratio (0, 0.02, 0.2, 2, 20, 200 µg/L) via waterborne exposure with 100% daily renewal for three days. Effects of the embryonic exposure on survival and embryonic motor activity were compared between imidacloprid and mixtures, as well as to embryos previously exposed to thiamethoxam alone to determine the presence or absence of any increased toxicity, also known as additive effects. Initial findings of this work suggest that the toxicity in mixtures may be greater than thiamethoxam.

A.U.12 The Future of Social Security

Anya Harrington
Mentor: Barbara Bennie, Mathematics & Statistics

Since the enactment of The Social Security act in 1935, social security has become a huge pillar of the American work force and retired population. The Social Security Act was designed to support retired workers over the age of 65 by continuing to provide them an income post-retirement. This program is largely funded on a pay-as-you-go basis. This implies that today's workforce is paying Social Security taxes that directly fund the current retired population, or beneficiaries. This being said, the solvency, or the ability to pay scheduled benefits to the current beneficiaries on time, is currently in question. This ability of the program to hand out scheduled benefits is directly reliant on the program's availability of assets in the respective trust funds. Current researchers predict the combined assets of Old Age, Survivors, and Disability Insurance and Disability Insurance Trust Funds will reach exhaustion in 2037. In this study we aim to make slight hypothetical manipulations to the Social Security program, in particular the tax rate imposed on the current working population and monthly benefit amount paid to beneficiaries, to lengthen the life of the program. From there, we can estimate the future solvency of the program given these changes and compare it to a variety of existing models.

A.U.13 Study of Decomposition of Curcumin Analogs Using Spectroscopy

Miryah Henriksen
Mentor: Valeria Stepanova, Chemistry & Biochemistry

The natural product curcumin (CUR) is isolated from plants as a mixture of three compounds closely related and known as curcuminoids. CUR had demonstrated a wide spectrum of biological properties and is considered non-toxic, even if consumed in large quantities. Despite such positive properties, CUR has not found pharmaceutical applications due to several drawbacks. One of them is hydrophobicity of CUR. The molecule contains two aromatic rings which substantially limits solubility of CUR in water. As a result, solutions of CUR for biological studies are often prepared by heating water suspensions to achieve supersaturated conditions. However, stability of CUR and its analogs under physiological conditions and in presence of light sensitivity. 1H Nuclear magnetic resonance (NMR) spectroscopy is a powerful technique that allows identification of individual hydrogen atoms in an organic molecule. With clever design 1H NMR can provide information on how molecules change during the reaction. In this study we used 1H NMR technique and a set of variable temperature experiments to monitor behavior of several curcuminoids previously synthesized in our laboratory. The study has a potential impact on the application of such compounds for bioactivity studies in the future. In addition, the study provides information on keto-enol tautomerization process of curcuminoids.

A.U.14 Ethnic Identity Development of Monolingual English-speaking Latina/o/x College Students?

Yecenia Hernandez
Mentor: Adele Lozano, Student Affairs Administration

Given the increase in monolingual English-speaking Latina/o/x college students, coupled with the current cultural and political climate in which the general Latinx population faces negative stereotypes, it is crucial to develop a more nuanced understanding of Latina/o/x college students. The purpose of this pilot study is to examine the ethnic identity development of Latinx/a/o college students for whom English is their first language and the only language in which they are fluent. Understanding this process will allow college personnel to engage in more nuanced and culturally sustaining ways of supporting the identity development of this growing student population.

A.U.15 Period Poverty among College-Attending Non-Cis Menstruators

Jenna Kantrovich
Mentor: Elizabeth Peacock, Archaeology & Anthropology

Menstruation is a stigmatized experience, often overlooked or intentionally disregarded as a personal issue rather than a societal one. There is an increased awareness that a significant population of people in the United States struggle with period poverty, particularly vulnerable populations. Period poverty can be defined the social, economic, political and cultural barriers to menstrual products and education. Along with the stigma of menstruation, there is further social stigma when a person is unable to meet their menstrual needs on their own and require assistance. Menstruation has long been coded as a cis-woman's experience, denying the experiences of trans, non-binary, agender, intersex and queer menstruators. A cis person's gender identity aligns with their assigned sex at birth, anyone who does not identify with this can be grouped into the non-cis population. In this research, non-cis menstruators were interviewed to investigate their experiences with menstruation and the barriers they face to meeting their menstrual needs. The findings give greater insight into how non-cis menstruators are impacted by their periods and how responses to period poverty can be altered to better serve all menstruators.

A.U.16 Investigating the Mechanism by which CL-5, a Potential New Anthelmintic, Causes Oxidative Stress in *C. elegans*

Jeanna Kedrowski
Co-author: Jennifer Miskowski
Mentor: Jennifer Miskowski, Biology

Parasitic worms (helminths) infect people and animals, and anthelmintics are drugs used to combat these infections. The development of drug resistance to the few available anthelmintics is well-documented and poses a significant health risk. Developing novel anthelmintics is essential to treating anthelmintic resistant parasites. The compound CL-5 derived from the plant *Comptonia peregrina*, sweet fern, was found to possess anthelmintic properties by scientists at UWL, and early evidence suggested function via a novel mechanism. CL-5 has been the focus of anthelminthic research in the Miskowski

lab using the non-parasitic model organism, *Caenorhabditis elegans*. CL-5 has been shown to cause initial paralysis, then death, in adult worms exposed to the drug, and progeny of exposed adults demonstrate developmental delays. The Miskowski lab seeks to determine the mechanism CL-5 uses as a novel anthelmintic. Evidence suggests worms treated with CL-5 have elevated oxidative stress. The two major stress response mechanisms used in *C. elegans* are both evolutionarily conserved in higher organisms, including humans. One pathway relies on changes in gene expression mediated by the transcription factor DAF-16/FOXO, and our lab has implicated DAF-16 in the CL-5 response. However, a second pathway mediated by the SKN-1/Nrf transcription factor can also be elicited in some stress conditions. Current work seeks to determine if SKN-1 also functions in the response of *C. elegans* to CL-5.

A.U.17 Load-Velocity Profile and the Utility of Individual Linear Regression Models to Predict Relative Load in the Deadlift

Chinguun Khurelbaatar, Francisco Zavala, and Jordan Schuler
Co-authors: Ward Dobbs and Glenn Wright
Mentors: Ward Dobbs and Glenn Wright, Exercise & Sport Science

Purpose: The purpose of this study was to compare individual regression models versus group established models to predict relative load of the conventional deadlift from barbell velocity. Methods: Eight resistance-trained individuals participated in this study. Participants were asked to establish a one repetition maximum (1RM) on conventional deadlift. On a separate day, participants returned and performed three repetitions at 50, two repetitions at 60, and one repetition at 70, 80, 90, and 100% of 1RM. A linear-transducer was used to obtain the repetition of the highest mean concentric velocity (Vm) and peak velocity (Vp) per set. Group and individual linear regression equations were created to predict relative 1RM from velocity profiles. Bland-Altman analyses were used to determine the level of agreement (LOA) between the observed relative load and the predicted relative load from group and individual regression equations. Results: The LOA from the group model was -0.01 ± 13.1% for Vm and 0.0 ± 12.8% for Vp, while individual models were -0.11 ± 5.6% and 0.0 ± 4.8% for Vm and Vp respectively. Discussion: Our results suggest individual regression models may be more precise than group models and there is no meaningful difference between estimates derived from Vm and Vp.

A.U.18 "If We Want to Build Resiliency, We Need to Build People Up": A Qualitative Approach to Exploring Identity Gaps Among Essential Workers

Timothy Kissel
Mentor: Michael Tollefson, Communication Studies

The following research investigated how essential workers communicate organizational identification with their co-workers and supervisors during the COVID-19 pandemic. This study used the communication theory of identity to explore the various interactions, which served as bonding or separation points for essential workers with both co-workers and supervisors. Twelve qualitative, semi-structured interviews were conducted with college students who worked essential worker job(s) and were analyzed through thematic analysis. College students managed a variety of identities that interpenetrate with one another in the workplace. The results showed that even through social distancing and masking, casual conversations were vital in the organizational identification process. Workers who achieved a greater sense of belonging extended their relationship outside of work, which increased organizational identification. Separation points that occurred between co-workers and supervisors created the personal-relational and personal-communal identity gaps. As essential workers responded to various changes within the organization throughout the COVID-19 pandemic, identity gaps emerged that decreased organizational identification.

A.U.19 Predicting Enrollments in Math and Statistics Entry Level Classes

Stephen Koch
Mentor: Barbara Bennie, Mathematics & Statistics

This paper explores how future enrollments of entry-level university courses can be predicted. In past years, inaccurate estimates of enrollments have caused inefficient allocation of professors to courses. This project was completed with the intent of use in the Math and Statistics department in years to come as updated student data could be accumulated and used as a basis for making predictions. Enrollment data of entry level math and statistics from 2005 to 2020 was collected and used for this research. Time series models take trends from past years and extend them to future years. To evaluate the credibility of time series forecasts that we generated two different accuracy metrics were computed. Classes for enrollment can be predicted well using the constructed models include MTH 150, MTH 151, MTH 175, and STAT 145.

These models should be able to be implemented in future years as well as reproduced for use in other departments. Upon examination of the total enrollment in entry level math and statistics classes, there is a growing number of students and over the following two years the number of students is predicted to increase. Using the statistical software R, visualizations were created to understand enrollment trends and time series models were constructed to make the forecasts.

A.U.20 Adventure Internship: Characterizing St. John's Climate and Marine Life for a U.S. Virgin Islands Sailing Guide

Alyssa Laffin, Genessa Carney, and Logan Mechler
Mentor: Colin Belby, Geography & Earth Science

The island of St. John in the U.S. Virgin Islands is popular for sailing, yet there is not a current sailing guide available for visitors interested in learning about the area's environmental resources. The goal for this internship was to collect data for a sailing guide on St. John with information about snorkeling locations and their marine life, as well as the best times to visit based on the region's climate. Data collection occurred during a sailing trip between January 13-21, 2022, with follow-up research conducted at UWL. A catamaran was home to researchers while in St. John, allowing for marine data collection within Maho Bay, Watermelon Bay, Salt Pond Bay, Lameshur Bay, and Coral Bay. Underwater photographs captured with GoPro cameras were used to identify the common marine life in each bay. A total of 89 marine species were observed and categorized as coral, larger marine life, reef fish, and invertebrates. Many species were found in multiple bays, but depending on the particular environment within each bay, various unique species were noted.

A.U.21 Characterizing the Lipid-Binding Properties of a Salmonella Copper Resistance Protein

Josie Lammers
Mentor: John May, Chemistry & Biochemistry

Salmonella enterica is a common cause of infection and foodborne illness. Previous research done by the May research group at UWL has shown that the DcrB protein functions to provide copper resistance to Salmonella. This is significant because the immune system can use high concentrations of copper to defend against pathogens, but the presence of DcrB may allow bacteria to survive this defensive mechanism. Research on a protein with a similar structure to DcrB, called LpqN, has revealed that it is able to bind lipids, suggesting that DcrB could bind lipids as well. Therefore, we hypothesize that DcrB binds lipids. Since DcrB is located on the membrane of these bacteria, determining if and how DcrB can bind lipids will aid in the understanding of how it stabilizes the membrane. To test the hypothesis that DcrB binds lipids, we exposed the protein to many different lipids and determined the melting temperature (Tm) using thermal fluorescence assays to assess whether it bound to the protein. We also tested the lipid binding ability of DcrB by attempting to form crystals of the protein in the presence of various lipids. We have identified lipids that change the Tm of DcrB and obtained crystals of DcrB grown in the presence of lipids. Ongoing work is focused on analyzing the diffraction patterns of the crystals obtained to gain insight into the structure of any protein-lipid complexes that DcrB forms.

A.U.22 Understanding the Structural Requirements for Hemolytic Protein Function

Lilyanna Massman
Co-author: Daniel Grilley
Mentor: Daniel Grilley, Chemistry & Biochemistry

The goal of this research is to better understand the structure of a toxic hemolytic protein released by a bacterium capable of causing urinary tract infections. Less than 20% of the structure of this protein, termed HpmA, is known and none of the hemolytic domain structure is known. Based on our research and the known structures of other proteins with similar functions, we hypothesized that HpmA is a modular protein which forms a circular, pore-forming structure. To test this hypothesis, we developed two potential models for how HpmA maintains its functionality even after we have removed portions of the protein. The applicability of these models to different shortened HpmA constructs and the implications for HpmA biological structure and function are discussed.

A.U.23 The Face of a Pandemic: How Facial Coverings Influence Facial Recognition, Expression Recognition, and Ratings of Attractiveness

Andrina Savor and Alison Stangler
Mentor: Alexander O'Brien, Psychology

In response to the COVID-19 Pandemic, worldwide mask use has become common. Face masks may significantly impact facial expression recognition, individual recognition, and perceptions of attractiveness. These experiments are being conducted to add to the literature on how non-verbal communication is affected by facial coverings and investigate the impact of face coverings on facial perception. The first of two experiments investigated whether the ability to recognize facial expressions was significantly impacted by the presence of a face mask. The hypothesis was that individuals would be less confident and less accurate at identifying the seven universally accepted facial expressions with and without a face mask. Results suggest that expression recognition accuracy and confidence are significantly reduced by the presence of a mask. Experiment 2 examined the ability to recognize individual faces, and the perceived facial attractiveness of masked faces. It is hypothesized that recognition accuracy will decrease when asked to recognize individuals initially seen masked, and masked individuals will receive a higher perceived attractiveness rating than those who are unmasked. The findings will provide a better understanding of the degree to which widespread masking has led to disruptions in non-verbal communication, interpersonal relationships, and implicit biases related to the halo effect.

A.U.24 The Effects of Metals on ORF48 Protein from a Cancer-Associated Virus

Rachel Senft
Co-author: Kelly Gorres
Mentor: Kelly Gorres, Chemistry & Biochemistry

Murine Herpesvirus 68 (MHV68) and Epstein-Barr Virus (EBV) are members of the gamma subfamily of herpesviruses that are associated with cancer. The protein of interest, ORF48, is conserved among all gamma herpesviruses. The function of ORF48 is unknown. To learn more ORF48 in MHV68, metals have been added to the protein. Metals have potential bind to ORF48. Metal binding could increase the stability of the protein. The effects of the metals can be determined by measuring the temperature at which the protein denatures at, otherwise known as the melting temperature. A higher melting temperature would suggest that the protein has formed a bond with a metal ion. The metals of interest include zinc, magnesium, copper, and cobalt. These metals were chosen because they are commonly found in biological systems. ORF 48 contains a high percentage of cysteine residues. Cysteines are known to bind various metal ions including zinc, to form zinc-cysteine complexes. Determining if ORF48 binds metals will help determine the structure and a potentially function of ORF48 in MHV68. If the function and structure of ORF48 can be determined in MHV68 then it will provide information about other cancer-causing gamma herpesviruses such as EBV.

A.U.25 Proteomics Activity in Platelets of 13-Lined Ground Squirrels

Rylee Stewart, Boden Saikie, Mia Hanson, Will Brown, and Sara Albert
Co-author: Scott Cooper
Mentor: Scott Cooper, Biology

Ictidomys tridecemlineatus, commonly known as the 13-lined ground squirrel, hibernates during the winter months. While in torpor, their body temperature drops to 4-8°C and their heart rate decreases to 3-5 beats per minute. Due to the physiological changes endured in torpor, blood cells termed platelets avoid blood clotting through different mechanisms including altered protein expression. To observe protein expression in platelets, blood samples were drawn from squirrels in torpor, and then again in their active state. Additionally, human blood was analyzed for comparison of differing protein expressions. Both the squirrel and human samples were stored at either room temperature (mimicking active state) or four degrees Celsius (mimicking torpor). Platelet proteins were separated using a western blot to measure three different proteins in comparison to actin as a control. The proteins of interest include, APOA1, albumin, and thrombin. These proteins were of interest due to previously detected increases in the platelet proteome of squirrels in torpor. The results of the western blot analysis will be analyzed for any significant differences.

A.U.26 Iron Supplementation and Status and Hepcidin Response in College Athletes

Ethan Thompson
Co-authors: Lydia Schult, Steni Sackiriyas, Sara Scala, and Margaret Maher
Mentors: Margaret Maher, Biology, and Steni Sackiriyas, Health Professions

Iron carries oxygen in blood and is regulated by the hormone hepcidin. It is known athletes need optimal iron for performance, and may be at risk for deficiency. We sought to determine prevalence, reasons for and monitoring of iron supplementation, as well as relationships among iron status parameters and hepcidin. Of 550 UWL Division III NCAA athletes from 14 teams, 96 (46 females, 50 males) from 8 teams, ages 18-22 years responded to an online survey. Participant iron supplementation included 11 past, 11 present, 15 past and present (38% of respondents). Track athletes (4 females, 7 males) who consented to further participation, completed an additional survey, anthropometrics, and scheduled blood collection appointments. Complete blood count (CBC), iron status panel, and serum hepcidin (baseline and after a training run) were assessed. Of the 11 track athletes, 7 (63%) had at least one iron status value suggesting deficiency. Sedentary students (96, same age and BMI ranges) may also be surveyed and 11 invited for further blood analyses as we await arrival and completion of hepcidin assays. Results of this study may be of interest to athletes, parents, coaches, and healthcare professionals to inform athletes about recommendations for iron supplementation.

A.U.27 Using Vmax Express to Solubilize KSHV ORF48

Owen Thompson
Mentor: Kelly Gorres, Chemistry & Biochemistry

KSHV ORF48 is a protein that is present in Kaposi's sarcoma-associated herpes virus. This virus is under research due to its potential to cause cancer. Many proteins, such as this one, are insoluble in water. Studying proteins is much easier if the protein is able to be solubilized in water. Many researchers utilize a strain of *E. coli* to express their protein, unfortunately, efforts to solubilize KSHV ORF48 using *E. coli* have been unsuccessful. Due to this, I have been utilizing Vmax Express, a different type of bacteria that is able to express different proteins. They have a faster doubling time than *E. coli* and are said to express protein better and in a more soluble form. I have been working to optimize Vmax Express's growth and expression of KSHV ORF48 using the mouse version of KSHV ORF48, MHV68 ORF48, as there has been more success in solubilizing the MHV68 protein. The hope is that the protein will be expressed in a form that can be solubilized.

A.U.28 Improving Nature Connection, Mood States, and Life Satisfaction through Nature and Forest Therapy

Cora Vogt
Co-authors: Mallory Hillman, Kati Thompson, Tai Shan-Zen, Jenna Marose, and Namyun Kil
Mentor: Namyun Kil, Recreation Management & Therapeutic Recreation

With an increasing burden of mental health and a growing disconnection with nature, nature and forest therapy (NFT) has emerged as an effective therapeutic intervention that slowly and mindfully immerses individuals in nature. Previous studies have revealed a growing need to further examine the beneficial health and well-being outcomes of this intervention for individuals with various health challenges (esp., mental, cognitive, behavioral). This study investigated changes in nature connection, mood states, and life satisfaction before and after a NFT intervention on a natural trail in Hixon Forest Park, La Crosse, WI. Participants (N = 17) included two groups: (1) children (n = 6) with mental, cognitive and/or behavioral and/or cognitive challenges and their staff (n = 3) with stress and emotional burnout and (2) adults (n = 8) who work in a high stress profession. Two groups engaged in a separate nature immersion in October 2021. Data analyses revealed a significant increase in nature connection and vigor as well as a substantial decrease in confusion, anger, depression, anxiety, and fatigue. Overall, results demonstrate the effectiveness of NFT on the health and well-being of individuals and suggest that health care sectors provide NFT to their clients.

A.U.29 Let's Eat: Perfectionism, Social Media and Problematic Eating Behaviors

Rachel Way and Emily Veroeven
Mentor: Bianca Basten, Psychology

Perfectionism is a personality trait that can be associated with maladaptive eating behaviors. Research has also shown that social networking sites allow individuals to engage in upward and downward social comparisons and prolonged exposure can affect state self-esteem and relative self-evaluations. The purpose of this study was to investigate the

connections between perfectionism, maladaptive eating behaviors, and social media use, particularly given the increase of social media use since the beginning of the COVID-19 pandemic. 300 undergraduate students from the University of Wisconsin- La Crosse, completed a variety of questionnaires, including the Eating Attitudes Test, Positive and Negative Perfectionism Scale, and Perfectionistic Self Presentation Scale, and answered questions about their social media use (which platforms, frequency, etc.) and its impact. Results indicated that negative perfectionism (more so than positive perfectionism) is correlated with both maladaptive eating behaviors and social media use. Better understanding the role social media plays in eating behaviors and perfectionistic ideals can shed light on how individuals, specifically college students, use social media to shape who they think they need to be and hopefully, how these beliefs can be addressed by mental health professionals or other programming.

A.U.30 Shine on you Crazy Exoplanet: A Preliminary Analysis of Survival Trends for Initially Circular Mirror Orbits

Jamin Wilson
Mentor: Shauna Sallmen, Physics

A tidally locked exoplanet, which is a planet that orbits its star in the same amount of time as it takes to rotate fully, would have a dark side. A civilization might wish to illuminate a planet's dark side through the use of large, lightweight mirrors in orbit around the planet to redirect starlight onto the planet's dark side. This comes with its own host of problems, primarily that due to the large size and the lightweight nature of the mirrors, they would become subject to radiation pressure, which is the pressure exerted on matter by electromagnetic radiation, in this case light from the star. Presently, not much is known about the extent of the effects of radiation pressure on the orbital stability of large, lightweight satellites, such as these mirrors, around a planet. My team's research uses computer simulations to model the orbit of one of these mirrors in a variety of situations. The goal is to be able to predict what initial orbit conditions for these mirrors will be stable for exoplanets around various stars. Different simulations include exoplanets that are potentially habitable and tidally locked but with varying mirror distance from the planet, type of star, mirror orbit orientation around the planet, and the extent to which radiation pressure is exerted on the mirror. I will present a preliminary analysis of how these factors affect the survivability of the initially circular orbits.

Poster Session B
9:55 am-10:50 am

B.U.1 Identifying the Method of Action for *Salmonella enterica* Copper Resistance gene, *dcrB*

Kyle Gebhardt
Mentor: John May, Chemistry & Biochemistry

Within the bacteria *Salmonella enterica*, research has identified a protein coding gene called *dcrB.* This gene has proven to provide *Salmonella* with a resistance to copper, allowing it to survive in toxic copper containing environments that would otherwise kill it. However, the way that DcrB works to provide *Salmonella* with copper resistance is still unknown. This research sought to identify the *dcrB* method of action using techniques called mutagenesis and gel electrophoresis. Using mutagenesis, spots of interest in *dcrB* were altered to determine if *Salmonella* could still survive in toxic copper environments without them, providing insight on the necessity of those locations for proper *dcrB* function. With gel electrophoresis, differences in strands of sugars, called lipopolysaccharide (LPS), which attach to the *Salmonella* cell exterior, were tested to identify if *dcrB* altered the strand structure. The results of these studies indicate that the sites of interest were not important in altering *dcrB* function, but LPS is altered as a result of *Salmonella* being grown in copper, indicating that LPS composition is important for copper resistance and may play an important role in proper DcrB function.

B.U.2 The Development of Quantitative PCR Assay for the Detection of the Invasive Faucet Snail (*Bithynia tentaculata*) in Water Sample

Arini Arsana
Mentors: Kelly Gorres, Chemistry & Biochemistry, and Gregory Sandland, Biology

Faucet snails can be found throughout the Mississippi River along the La Crosse area and are considered invasive to the Great Lakes region. They compete with the native snails for food/habitat and disrupt other organism mortality rates. This study aims to quantify and develop quantitative polymerase chain reaction (qPCR) for the detection of invasive species

such as faucet snail (*Bithynia tentaculata*) in water samples. The experimental method was first developed by obtaining snail tissue and extracting its DNA as a standard. Then, primers and probes specific for the detection of snail species were designed before running the sample with a qPCR machine. The qPCR assay results will detect species specific to the primers and probe designed to detect snail DNA. Afterward, environmental water samples will be collected from the Mississippi River to extract and detect invasive snail DNA. Developing qPCR assay with the use of water samples could advance the monitorization of faucet snails. It is especially crucial to be able to monitor and detect faucet snails in water samples since its invasive characteristics could disrupt the Great Lakes ecosystems as a whole.

B.U.3 Using Air-Water Temperature Relationships to Predict Locations in Spring Coulee Creek That Are Susceptible to Trout Habitat Loss Due to Increasing Air Temperatures

Skyler Theisen
Co-author: Ali Chalberg
Mentor: Eric Strauss, Biology

Stream and air temperature relationships are important as they can be used to identify between a coldwater stream which has a significant groundwater input versus a warm water stream which is characterized by surface water runoff input. This relationship can also be used to identify coldwater streams which are prone to an increase in temperature due to global warming. Waters that are vulnerable to increasing stream temperatures will affect the survival rate of organisms. For example, trout that are only able to live in cooler waters that have a significant groundwater input may be significantly affected. Specifically, Brook trout (*Salvelinus fontinalis*) survive within a narrow range of temperature. The highest temperature Brook trout are able to withstand is 20 ℃ before the water becomes unsuitable for them to live in (Krider et al., 2013). Spring Coulee Creek is a coldwater stream that is located near La Crosse, WI; it is known to be a suitable habitat for Brook trout to live. The limestone topography located in the Driftless area provides many streams with a large input of cold water that creates a suitable habitat for Brook trout. The purpose of this experiment is to determine the air temperature vs. water temperature relationship at different locations in Spring Coulee Creek by utilizing regression analysis to obtain the slope and y-intercept of the relationship.

B.U.4 The Role of Rap1b in the Cell Cycle

Caleb Andrews
Co-author: Heather Lecomte
Mentor: Jaclyn Wisinski, Biology

While it is known that Rap1b is a protein that acts on the process of the cell cycle it is unknown as to where it fits in. Rap1b is like other proteins and can be phosphorylated, but it is unclear if phosphorylation activates or deactivates the protein. A cell line with regular Rap1b and one without any Rap1b can be used to find how the cell cycle is affected in the absence of the protein. The objectives of these experiments were to find what the role of the protein is in the cell cycle and how its phosphorylation state affects it. Through experimentation it was found that cells that were unable to make Rap1b had decreased DNA replication. This likely means that Rap1b is a proto-oncogene that helps the cell move through the G1/S checkpoint of the cell cycle.

B.U.5 A Zooarchaeological Analysis of Inequality at the Bronze Age Sites of Rabe Anka Siget, Serbia and Pecica-Şanţul Mare, Romania

Signe Aspengren
Mentors: Amy Nicodemus and Constance Arzigian, Archaeology & Anthropology

The Maros culture group lived in Eastern Europe during the Bronze Age (ca. 2700-1500 BC). In addition to the development of bronze technologies and trans-continental trade networks, this period is characterized by increased social stratification and inequality. The Maros lived in settlements of various sizes. Many of these settlements were smaller villages or hamlets which connected via trade and social networks to larger regional centers which exhibited evidence of elites. Within these larger regional centers there was much variation in their sizes. This may indicate differences in economic and production roles as well as different amounts of inequality among elites. However, the relationship between the size of a larger center and the levels of inequality has not been studied in depth. This research will use faunal assemblages from a large primary center, Pecica-Şanţul Mare, and secondary center, Rabe Anka Siget, to examine how inequality may differ between the two settlements based on their food usage. This will be done by looking at the respective frequencies of high-quality animal species and elements at each site. It is expected that as the size of a settlement increases,

inequality and social stratification will as well. Therefore, the animal bone assemblage from primary center Pecica-Şanţul Mare will have a greater occurrence of high-status foods being exploited than secondary center Rabe Anka Siget.

B.U.6 Analysis of Carbonization Patterns to Determine Use of Oneota Ceramics at the Onalaska Village Site (47LC288)

Clayton Bruckner
Mentors: Constance Arzigian and Heather Walder, Archaeology & Anthropology

The Onalaska Village archaeological site in Onalaska, Wisconsin, is an Oneota settlement that was excavated in the summer season of 2012 to investigate an area effected by a highway construction project. The Oneota people were an agricultural society that resided in the La Crosse area from the 14th to the 17th century. The ceramic containers from one of the Oneota settlement sites were analyzed to compare them to previously established research patterns. To determine how ceramic vessels from the Onalaska Village site were used relationships between physical characteristics, like: height, rim diameter, and rim angle were recorded. The carbonization patterns that result from use that were present on sections of the vessel, including location, texture and coloration were also recorded. Preliminary results indicate that there is no observed correlation between vessel rim diameter and patterns of carbonization, from which I infer that the use or function of the vessels was not related to vessel size. This shows that vessel size likely was not a determining factor for the method of food preparation or cooking practices in use at this Oneota site during the period of Oneota occupation.

B.U.8 How Do Point Mutations in the *fimB* Gene Promoters Affect the Ability of the OmpR Protein to Regulate *fimB* Transcription in Uropathogenic *Escherichia coli*

Emma Grapentine
Co-author: William Schwan
Mentor: William Schwan, Microbiology

Uropathogenic *Escherichia coli* cause 90% of urinary tract infections. Type 1 piliated *E. coli* cells stick to human bladder cells. The FimB protein is important for expression of the type 1 pili by positioning an invertible DNA element that houses the structural gene transcriptional promoter. Human urine is a low pH/high osmolarity environment that leads to lower type 1 pilus expression. Under high osmolarity and acidic conditions, a protein called OmpR regulates transcription of the *fimB* gene in *E. coli* cells. To further understand OmpR control of *fimB* transcription, a collection of *fimB* promoter mutants with a single DNA base substitution was screened for the effect on *fimB* transcription in *E. coli* cells grown in different environments. A polymerase chain reaction technique was used to quantitate *fimB* transcription among the *fimB* mutants compared to an unmutated *fimB* strain. Mutations to two regions of the *fimB* promoter, the P1 TSS box and P2 TATA box, resulted in changes in *fimB* transcription when grown in neutral conditions, signifying these are important regions for OmpR binding. Results from this research will help us to develop a better understanding of how the OmpR protein controls type 1 pili expression within uropathogenic *E. coli,* which could lead to a drug to treat human urinary tract infections someday.

B.U.9 Effect of Running Speed on Foot Strike Angle

Anastasia Grochowski, Gabrielle Gunderson, and Thomas Landt
Co-author: Thomas Kernozek
Mentor: Thomas Kernozek. Health Professions

Foot strike patterns are thought to be important to musculoskeletal injury. The purpose of this study was to examine how foot strike angle (FSA) changes as running speed increases. We measured the foot strike angle of 30 individuals (14 male, 16 females) at 6 different speeds (3.0, 3.5, 4.0, 4.5, 5.0, and 5.5 meters per second). All participants self-reported that they were rearfoot strikers. Reflective markers placed on the body were tracked with 12 cameras as participants ran on an instrumented treadmill. We measured the Strike Index (SI) based on markers applied to the shoe based on Altman and Davis (2012). Participants ran for a 40-second duration at each speed, and 5 steps were analyzed during a 15-second interval. These angles were then analyzed using repeated measures analysis of variance. Alpha was set to .05. Post-hoc tests were performed between each speed. As running speed increased, FSA increased ($p < .05$). The largest differences in FSA were found amongst the lower speeds, with the largest difference being 16% between 2.0 and 2.5 meters/second. At higher speeds, the percentage differences became less, however all FSAs were classified as a rearfoot strike. This may have implications for running related injury.

B.U.10 Assessment of Final Exam Data from Organic Chemistry Students: Impact of Varied Pedagogy Approaches

Connor Haindfield and Heather Schenck
Co-authors: William Cerbin and Douglas Baumann
Mentor: Heather Schenck, Chemistry & Biochemistry

One of the "big new ideas" in organic chemistry is the study of organic reaction mechanisms. This topic examines how a chemical reaction occurs: the sequence of events by which chemical bonds break and form. Students must learn to depict electron movements with curved arrows, and they must remember common patterns of electron movement. The curved arrow formalism is very challenging for many students, earning organic chemistry a top-3 slot in many lists of "hardest college courses". This weed-out aspect is especially relevant in first-semester organic chemistry, where the sum of drops, Ds and Fs commonly reaches 30, 40, or even 50% of enrolled students, depending on the instructor. A multi-year study that began in 2012 in CHM303 (first semester organic chemistry) tested new ways of instructing students in the use of curved arrows. Formative (ungraded) assessments analyzed previously showed significant improvement in groups of students who saw modified pedagogy for organic mechanisms when they took CHM303 with a single instructor. This research is examining the final exams for those same students, as well as final exams for all students who took CHM303 with that instructor in the two semesters preceding the study. The analysis of final exam data reinforced the premise that students who saw the modified pedagogy showed greater mastery in the usage of curved arrows, even if they were unable to get the correct answer for the question.

B.U.11 An Analysis of Faunal Remains from The Archaeological Site of Rabe (Anka Siget) to Understand the Social Organization of the Bronze Age Maros

Maisie Lenards
Mentors: Amy Nicodemus and David Anderson, Archaeology & Anthropology

The Maros are one of many cultures that lived in Eastern Europe during the Bronze Age and were present in the region for roughly a millennium (2700 -1500 BC). The archaeological site of Rabe (Anka Siget) is an Early to Middle Bronze Age site in Northern Serbia. Excavations and surveys conducted at this site reveal two distinct mounds. Analysis of artifacts found within residential areas on these mounds points toward the possibility that individuals of higher status occupied the western mound. Whether there are status differences between these two mounds has yet to be confirmed. Analysis of faunal remains provides an additional line of evidence to understanding social organization at Rabe. The goal of this project is to determine if there are differences in diet at Rabe and if so, how do they differ and what does this reveal about social differentiation. Faunal remains from the 2018 excavation at Rabe will be analyzed to determine differences in taxon and skeletal element composition. People of higher status will have differential access to higher quality foods. It can be determined which mound was occupied by higher status individuals by measuring the proportion of the total assemblage made up of high quality animals and cuts of meat. If the western mound was occupied by members of a higher status, then there should be a larger proportion of high value and high utility animals when compared to the eastern mound.

B.U.12 Rainbow Numbers of Non-Abelian Groups

Ethan Manhart
Co-author: Nathan Warnberg
Mentor: Nathan Warnberg, Mathematics & Statistics

Consider the set {1, 2, 3, 4, 5, 6, 7, 8} and the equation $x + y = z$. Note that there are several solutions to $x + y = z$ within our restricted set of integers. For example, {2, 5, 7} is a solution since $2 + 5 = 7$. Now, imagine we color the elements of our set with the colors red, blue, green, and orange resulting in the set {1, 2, 3, 4, 5, 6, 7, 8}. In this situation, {2, 5, 7} is a rainbow solution since all elements are different colors. The set {1, 2, 3} is not-rainbow solution, however, as two of the elements are the same color. Our research question is: Given a set of elements and a binary operation, what is the fewest number of colors needed to guarantee a rainbow solution in mathematical objects called non-Abelian groups?

B.U.13 Optimization of Bacteriocin Production in *Carnobacterium* LV66

Kaylan Marshall
Mentor: Bonnie Bratina, Microbiology

Bacteria are required to compete for resources just like any other organism. One method some bacteria employ is the production of compounds that kill or inhibit the growth of neighboring bacteria. When produced in large quantities, these

compounds, such as bacteriocins, can be exploited for human benefit and used in food products to prevent the colonization of organisms that cause foodborne illness. *Carnobacterium* LV66 is a bacterium that produces a bacteriocin capable of inhibiting the growth of *Listeria monocytogenes*, a known foodborne pathogen. Unfortunately, the amount of bacteriocin produced is very small. To determine if a growth factor increases bacteriocin production, LV66 is grown in different conditions and its inhibitory effects against *L. monocytogenes* are measured. Increased inhibition was observed when LV66 was cultured in the presence of autoclaved *L. monocytogenes* cells. This growth condition may simulate the competitive natural environment in which bacteriocins evolved to provide a growth advantage, therefore contributing to an increase in bacteriocin production. Further testing is required to determine if this response can be elicited when LV66 is cultured in the presence of other organisms, especially those approved for use in food products. The goal of the project is to optimize bacteriocin production to a level at which it may be cost-effective for industry and applied to commercial food products.

B.U.14 Seeking Social Support: How Women with Postpartum Depression Navigate Cultural Stigmas That Influence How They Disclose Their Struggles

Morgan Nordbeck
Mentor: Linda Dickmeyer, Communication Studies

This research explores how women with postpartum depression (PPD) seek social support while navigating cultural and interpersonal discourses. The aim of this research is to identify what motivates women to disclose their struggles with postpartum depression and discover the ways in which they receive (or do not receive) social support. Social media and cultural expectations placed upon women contribute to beliefs that they will have a natural motherly instinct, that parenting will be easy, and that they will have an instant love for their child. Qualitative analysis took place through semi-structured interviews with women who have experienced PPD in the last five years. When women with PPD had expectations that didn't meet their reality, this motivated them to disclose their struggles to close others so that they weren't seen as "crazy." Most instances of disclosure yielded an outpouring of support, but the idea of what helpful support looks like is unique to each individual. Although this data analysis is preliminary, the project will be fully complete at the beginning of May 2022.

B.U.15 Effect of Gut Microbes on Circadian Rhythms Expressing Human Tau-gene

Ashton Osterhaus and Dylan Tousey
Mentor: Alder Yu, Biology

The naturally occurring cycle generating 24 hour behavioral, mental, and physical systems in an organism is the circadian rhythm. Circadian rhythms can interact with the gut microbiome, which are microorganisms that maintain immune and metabolic homeostasis by secreting molecules that nourish and signal to the host. We found the absence of gut microbiota to not affect the circadian rhythms of flies. This does not answer whether gut microbiota affect abnormal circadian rhythms caused by Alzheimer's Disease. Sundowning is the worsening of neuropsychiatric symptoms (NPS) in the late afternoon. Fruit flies containing a human amyloid-beta gene, which replicates circadian rhythms typical of Alzheimer rhythms, were used to research if the absence of gut microbiota impacts circadian rhythms in organisms expressing the human tau-gene. We will observe the activity rhythms using an activity monitoring system connected to an online data analysis program. The microbiota will then be removed from the AD flies and their activity monitored using the same online system. The data analysis of the AD flies without microbiota will be compared to the data analysis of AD flies with microbiota and with wildtype flies. We expect to find changes to the gut microbiota will impact the organism's circadian rhythm.

B.U.16 Period Gene Expression within Non-24-hour Schedules

Aubrey Schoneboom
Co-author: Alder Yu, Biology
Mentor: Alder Yu, Biology

Shift work disorder has been identified within individuals that continually work 24-hour shifts and have sleep patterns inconsistent with a traditional job. The disorder has been linked to diseases such as breast cancer and cardiovascular disease. The circadian clock regulates patterns of sleep and wake within individuals in response to their environment. This clock restarts every 24 hours and is the length of the cycles is governed by the period gene. Normal period expression shows low levels of mRNA at dawn and high levels at dusk. An overall increase of period gene expression shortens the circadian clock, and a decrease lengthens the clock cycle. Our lab models shift work with non-standard light/dark cycles to measure period expression within Drosophila melanogaster. We hypothesize that the simulated shift work cycles will

modify the rhythm of period expression. We are using qRT-PCR to assess alterations in period expression in response to shift work light:dark schedule. Quantitative real-time polymerase chain reaction is the quantification of mRNA expression within a cell at a specific time. We expect to see shortened phases and an overall increase in amplitude of period expression. The quantifiable expression of per could then be used as a biomarker for shift work disorder.

B.U.17 Relationship between Repetitions in Reserve and Relative Intensity during a Conventional Deadlift

Francisco Zavala, Chinguun Khurelbaatar, and Jordan Schuler
Mentors: Ward Dobbs and Glenn Wright, Exercise & Sport Science

PURPOSE: The purpose of this study was to assess the intra-individual association between repetitions in reserve (RIR) and conventional deadlift in resistance trained individuals. METHODS: Thirteen resistance-trained college aged men and women volunteered to participate in the study. Participants were asked to establish a one repetition maximum (1RM) on conventional deadlift during the initial session. Following each successful set, RIR was recorded after asking the participant to report the additional number of repetitions they felt they could complete. Forty-eight hours later, participants returned for a second session where RIR was again recorded after 1 repetition performed at 70, 80, 90, and 100% of their 1RM.The intra-individual association between RIR and relative 1RM was calculated and presented as (r ± 95%CI). RESULTS: The intra-individual association for RIR and relative load displayed excellent reliability, at -.92, (-.95, -.88). The individual's subjective RIR accounted for approximately 84% of the variation in relative 1RM. DISCUSSION: When working with individuals who consistently utilize the conventional deadlift within their training regime, RIR may be a useful tool for prescribing loads between 70-100% 1RM. Thus, RIR may help the practitioner gauging relative intensity within a training session.

B.U.18 Determining the Timing of the Ambrosia Rise in a Lake Sediment Core from Southeastern Wisconsin

Erin Seliger and Cole Remack
Mentor: Joan Bunbury, Geography & Earth Science

Increased spread of Ambrosia artemisia within North America is associated with European colonialism as land was settled and forested land was cleared for agriculture. This allowed for the colonization of Ambrosia, a plant that becomes established on disturbed ground, particularly plowed areas. The presence of this plant leads to inflated Ambrosia pollen deposition in lake sediments. Using a lake sediment core from Mud Lake in southeastern Wisconsin, Ambrosia pollen is being identified and the amount of Ambrosia and other pollen types recorded. This proportion of Ambrosia to "other" pollen will illustrate the timing of excess Ambrosia deposition. This Ambrosia rise can be used as an age-equivalent marker in the core chronology since the year of settlement in this area of Wisconsin is known. A chronology using radiometric methods and the timing of the Ambrosia rise will be presented.

B.U.19 Investigation of Antibody Response to *Raoultella ornithinolytica* in Rheumatoid Arthritis Patients versus Normal Healthy Donors

Evan Steiger and Allison Pugel
Mentor: Bernadette Taylor, Microbiology

The bacterial genus of Raoultella have been linked to Rheumatoid Arthritis (RA). These bacteria have been found in the tissue and fluid near joints affected by RA; they have been suspected of triggering an immune response in the body that may be a trigger for autoreactive antibodies causing RA. The aim of this research project is to detect a difference between blood serum antibody levels of patients who are affected by RA, and patients who are not affected by RA. Culturing (being able to grow) the Raoultella bacteria is the first step in learning about this genus. These cultured bacteria will be used to create a highly sensitive and specific ELISA (enzyme-linked immunosorbent assay) to determine whether patients have been exposed to Raoultella. Determining exposure could show evidence of Raoultella's involvement in worsening, or triggering the onset, of RA.

B.U.20 Analysis of the Secondary Structure and Structural Stability of Murine Gammaherpesvirus 68 ORF48 Using CD Spectroscopy

Brandon Worachek
Mentor: Kelly Gorres, Chemistry & Biochemistry

Murine Gammaherpesvirus 68 (MHV68) is very similar to Epstein-Barr Virus (EBV), a human gammaherpesvirus that infects around 90% of adults. ORF48, a protein found in MHV68 that is conserved amongst other gammaherpesviruses, is of particular interest due to its role in viral replication, yet its function remains unknown. Understanding the function of MHV68 ORF48 is necessary for the potential development of a therapeutic target for EBV. Circular dichroism (CD) spectroscopy is used to determine the structural stability of ORF48 protein under various chemical conditions. Additionally, CD spectroscopy is also used to identify the protein's secondary structure. These results will contribute to the overall understanding of the structure of ORF48 protein and provide initial insight on the function of the protein as well.

Poster Session C
11:00 am-11:55 am

C.U.1 Role of CRF1 and CRF2 Receptors in Stress-induced Increase of Intestinal Permeability

Caroline Sargent
Co-author: Sumei Liu
Mentor: Sumei Liu, Biology

Stress affects a wide variety of body function one of which is the intestinal epithelial barrier. The epithelial layer in the small and large intestine has been proven to have increased permeability during stress, which may contribute to the development of irritable bowel syndrome and other intestinal issues. Corticotropin releasing factor (CRF), a peptide hormone, has been related to the etiology and symptom severity of irritable bowel syndrome. CRF binds to two different receptors that may increase intestinal permeability. The CRF peptide family includes CRF and CRF-related peptides urocortins (UCN) I-III. CRF binds to both CRF1 and CRF2 receptors which are located on mast cells and other cell types in the intestine. The different roles of the CRF1 and CRF2 receptors in stress-induced increase of intestinal epithelial permeability are still debated among researchers. For this study restraint was used on the mice to induce the stress response in the body. Then, the CRF1 and CRF2 receptors were blocked using selective CRF1 and CRF2 antagonists, which were administered through intraperitoneal injection. This allowed us to observe the effectiveness of the antagonists in preventing stress and CRF-induced increases of intestinal permeability. The results of this study could help to delineate the roles of CRF1 and CRF2 receptors in mediating stress-induced increases of intestinal permeability.

C.U.2 Synthesis of Hemi-Curcuminoids for Asymmetric Curcuminoid Synthesis

Kyle Faivre
Mentor: Valeria Stepanova, Chemistry & Biochemistry

Curcumin has emerged as a small molecule of importance due to its many biologically and medicinally relevant properties. Due to curcumin’s overall poor solubility in water and stability in solution, there is a large interest in chemical modifications that target these setbacks. Curcuminoids with different arm pieces, known as asymmetric curcuminoids, are a relatively unexplored area of curcumin modification due to the current complexities and cost of synthesis with few commercially available examples. These curcuminoids have shown enhanced bioactivity and stability past those present in curcumin. Our proposal focuses on developing a synthesis of these curcuminoids that stems from the generation of half or hemi-curcuminoids. Using a procedure previously developed by our group for symmetric curcuminoid synthesis I hope to develop a greener and simpler synthesis to potentially decrease the price of these compounds.

C.U.3 The Effects of Nitrate Exposure on *Chlamydomonas reinhardtii*

Annie Panico
Mentor: Anton Sanderfoot, Biology

The presence of nitrates (NO3-) in drinking water has long since initiated discussion on the possible side-effects experienced by those who consume this contaminated water. Because nitrates allow for the formation of nitrite (NO2-)

and toxic nitrosamines (NOC) that have been shown to cause cancer in mammals, researchers believe that humans are not absent from this risk. A topic less explored that has led to a contradiction within the science community is if nitrates themselves increase the risk of cancer in humans. Using the single-celled green alga *Chlamydomonas reinhardtii* as a model organism, I would like to know if drinking water that contains excess nitrate leads to cancer. Though not experiencing cancer to the degree that is evident in humans, a comparative situation in algae is unregulated cell division. I will expose *C. reinhardtii* to NO3- levels found in drinking water and observe their synchronous cell cycle to look for alterations in this synchrony. I predict that variation will indicate cancer-like growth, in which the physical effects of nitrates on *C. reinhardtii* may be recorded. Additionally, I will expose *C. reinhardtii* to nitrates present in environmental samples from bodies of water in the La Crosse area to determine if NO3- in the water stimulates a similar response. Through experimentally determining the observable effects of nitrates on *C. reinhardtii*, individuals may be able to test the safety of their drinking water by using *C. reinhardtii* as a model.

C.U.4 Collaborative Archaeological Analysis of Early 20th Century Tourism in Red Cliff, Wisconsin

Lauren Brewer
Mentor: Heather Walder, Archaeology & Anthropology

This project is an archaeological analysis of early 20th-century tourism in Red Cliff, Wisconsin conducted in collaboration with the Red Cliff Band of Lake Superior Chippewa Tribal Historic Preservation Office and community. The research goal is to investigate how the Apostle Islands Indian Pageant of 1924 and 1925 used space on the site during this early tourism even in Northern Wisconsin. This will be done by assessing soil color and texture combined with artifact locations and ages to understand the spatial patterns and activity areas along the Lake Superior shoreline and within a "natural amphitheater" used for the event, which included Ojibwe performers. Further analysis of this data, complemented with archival records, will provide a better picture of where people sat, ate, and participated in the pageant. Overall, this project investigates the roles of the local Indigenous community in early tourism and its overall impact on the history of Red Cliff, which is of interest to modern tribal members.

C.U.5 The Articulation of Indigenous Knowledge among Descendants of the Bribri in Talamanca, Costa Rica

Anna Buchberger
Mentors: Christine Hippert and Elizabeth Peacock, Archaeology & Anthropology

Following a history of colonialism and laws marginalizing indigenous peoples, the Bribri people of Talamanca, Costa Rica have faced many challenges in retaining their linguistical and cultural diversity. In investigating how people of Bribri descent articulate their indigenous knowledge in their everyday lives, this research draws off of three months of living in Bribri communities, undergoing participant observation, and conducting approximately 15 unstructured and structured interviews. With the arrival of Christianity and the influence of Western culture, the phenomenon of syncretism has developed throughout the Bribri community. Revalorization of culture has emerged through recent efforts of revitalization. This research finds that indigenous knowledge, consisting of oral traditions, customs, and beliefs is continually manifested in contemporary, everyday life in ways that uphold a "sacred balance" between the physical and spiritual world with the incorporation of health, special diets, medicinal plants, horticulture, and animals. This research demonstrates the importance of preserving indigenous languages for all the knowledge they contain going beyond Western sciences in regard to the relationship held between humans and the natural world.

C.U.6 Study of an Impact of an Outreach Program on Growth of Chemistry Vocabulary and Ability to Develop Scientific Explanations in K-12 Students

Kennedy Bussan and Valeria Stepanova
Mentor: Valeria Stepanova, Chemistry & Biochemistry

Chemistry is often referred to as the "central science." Chemical reactions are at the heart of numerous processes that govern human life from biological processes to the development of everyday materials. Nevertheless, children have little exposure to chemistry during the science curriculum and opportunities to experience the hands-on activities are scarce. Access to students with low socioeconomic status and marginalized backgrounds to guided science experiences is even further limited. As a result, it is difficult for children to see the role of chemistry in the world. This translates to limited chemistry vocabulary and could result in a limited ability to develop scientific explanations for observable phenomena. The long-term impact could translate to the lack of knowledge and interest in adult citizens towards pressing scientific problems, such as global warming, sustainable production of chemicals and pharmaceuticals, issues of clean water, and many more. In this study, we hypothesize that the regular introduction of hands-on activities that are connected to

everyday phenomena will increase interest in learning about chemistry and promote the development of a scientific vocabulary in young children. Students will observe scientific demonstrations and conduct hands-on activities. Students will be introduced to the scientific method and discussions will be promoted in small groups. The impact of the program will be measured using student work samples and staff interviews.

C.U.7 Constructing Identities of Impoverished Communities through Poverty Alleviation Organization Messaging

Hannah DeKeyser
Mentor: Beth Boser, Communication Studies

Poverty alleviation organizations (PAO) partake in the construction of organizational identity through messaging to stakeholders (Gamson, 1989). Within this construction, PAO have the ability to influence stakeholders' perceptions of people experiencing poverty, impoverished communities, and poverty as a whole, through the use of symbolic communication (Hall et al., 2013). This privileged position of authorship grants the dissection of PAO messaging necessary in order to mitigate harmful consequences that can occur from false, problematic, and/or misconstructed narratives (Fürsich, 2010). This research highlights how PAO partake in the construction of organizational identity and further, how as a byproduct of PAO communicating organizational identity, they (PAO) create identities about impoverished communities. This study uses textual analysis as a method to analyze three PAO websites; The Borgen Project, World Relief, and Oxfam. Texts and images are analyzed to reveal the methods the organizations use to communicate identity to stakeholders, such as mission statements and testimonials of the organization's experience in alleviating, combating, and/or eradicating poverty. From the findings, themes and interpretations are discussed to answer what organizational identities PAO are creating through their messaging, and what identities are being created on behalf of individuals experiencing poverty as a byproduct of PAO messaging.

C.U.8 The Effect of Sodium Butyrate Analogs on Lytic Cycle Activation of Epstein-Barr Virus

Brice Durocher
Co-author: Kelly Gorres
Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein Barr Virus (EBV) causes infectious mononucleosis and was one of the first human viruses linked to a variety of cancers. 75% of 18-22-year-olds develop an infectious state of EBV post-infection (Dunmire et al.). This virus spreads quickly through lecture halls, house parties, and all the other aspects of the college experience. EBV encodes for a series of genes responsible for a switch activating its lytic state from its latent state. Targeting this switch is important for preventing spread by keeping the virus from reactivating. Sodium butyrate (NaB) activates the switch. We have observed that short-chain fatty acids, propionate, and valerate, also induce, but not as potently. However, branched medium-chain fatty acids such as valproate and valpromide inhibit Burkitt lymphoma cells. To determine the effects of hydroxylated and branched butyrate analogs on the latent/lytic switch of EBV, beta-hydroxy-beta-methyl butyrate (HMB), a leucine metabolite, was tested on Burkitt Lymphoma cell lines infected with EBV. Low millimolar concentrations of HMB showed no toxicity but induced morphological changes at higher concentrations. The effects of HMB on EBVwas measured both accompanied by NaB and without. Relative to a negative control, it was observed that HMB decreased the baseline levels of lytic EBV in the B-lymphoma cells. Discovering regulators of EBV will aim to prevent the spread and development of clinical solutions for EBV-related diseases.

C.U.9 Significance of *brpS* gene point mutations on biofilm formation in *Staphylococcus aureus*

Sarah Fleegal
Co-authors: Allison Zank and William Schwan
Mentor: William Schwan, Microbiology

Staphylococcus aureus causes hundreds of thousands of cases of skin/soft tissue, heart valve, and bloodstream infections each year in the United States. Many of these infections result in biofilm formation by the bacteria that makes treatment and resolution of the infection difficult. Previous work has identified two genes that may be tied to biofilm formation in *S. aureus* labeled *brpR* (biofilm regulator protein regulator) and *brpS* (biofilm regulator protein sensor). Mutations in either of these genes caused the *S. aureus* cells to create more biofilm than the unmutated parent strain. To better understand the important amino acids tied to the function of the BrpS protein, single point mutations were made in the *brpS* gene on a plasmid. Each plasmid with a single *brpS* point mutation was transformed into a *brpS* mutant strain and tested for their ability to form biofilms in the wells of a microtiter plate compared to the unmutated *S. aureus* Newman and Newman *brpS* strains using a crystal violet dye staining procedure. All the *brpS* mutant strains complemented with a

plasmid containing a point mutation in the *brpS* gene exhibited a significantly higher biofilm forming ability compared to the unmutated S. aureus Newman and Newman *brpS* strains. This indicates that the point mutations in the *brpS* gene were critical for the affected functionality of the BrpS protein and the ability to regulate biofilm formation in *S. aureus*.

C.U.10 Multiracial Misrecognition and Identity Formation of Young Adults in Our Nation's Predominantly White Intuitions

Emma Forrest
Mentor: Elizabeth Peacock, Archaeology & Anthropology

The experience of multiracial and multiethnic people in our society can only be partially understood through their marked social categorization as "Other." Through the perpetuation of folk theories of race, basic institutions demand that multiracial individuals assimilate to the dominant social norms. These cultural ideals favor identities that are easily understood through the white lens and are detrimental to those who elude the monoracial reduction of their intersectional lives. This research suggests that the experience of navigating multiracial and multiethnic identities contributes to social and situational struggles for these informants. More importantly, these struggles have inspired a creative and unique form of self-expression for these individuals and collective sense of community among others who share this diverse identity. These results demonstrate a need to reevaluate how we perpetuate categorical racial identification at both an interpersonal and institutional level to allow individuals to self-identify in ways that are meaningful to them.

C.U.11 *Streptobacillus moniliformis* (Rat-Bite Fever) in Thirteen-lined Ground Squirrel (*Ictidomys tridecemlineatus*)

Grace Gehrke
Co-authors: Cord Brundage, Amy Cooper, and Scott Cooper
Mentor: Cord Brundage, Biology

The bacteria *Streptobacillus moniliformis* has been identified in rodents and other species as a zoonotic risk (potential to be transmitted to people). Infections of *S. moniliformis* in humans result in local and systemic inflammation and gastrointestinal upset commonly called "Rat-bite fever". Thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*; TGS) can be found in semi-populated areas and are used regularly for biomedical research. This study presents the first documented cases of *S. moniliformis* in TGS. In November 2020, three TGS research animal at UW-La Crosse tested positive for *S. moniliformis* during a routine PCR blood health screening test. Consequently, all TGS were tested (n = 17) and a 6 total positive were identified. No correlation was identified based on animal age, origin or cage location. No positive cases were identified in subsequent reported testing at other facilities. It remains to be seen if *S. moniliformis* can be identified in wild TGS or if the outbreak at UW-La Crosse was an isolated incident. Additional testing is needed to determine the risk factor of Rat-bite fever for humans working with TGS.

C.U.12 Loneliness and Health-Behaviors in an Undergraduate Sample across Pandemic Semesters

Alyxandra Holvick and Ellen Rozek
Mentor: Ellen Rozek, Psychology

The COVID-19 pandemic changed the typical "college experience" in many ways. In this project, we are seeking to understand the how the pandemic has impacted their health and social experiences. Loneliness is a negative perception on one's own social network. Samples of undergraduates responded to a survey during the fall of 2020 and the fall of 2021 to assess their loneliness, health, and social experiences. There were a number of single item measures of loneliness, for example, "Are you lonely?" In 2020, 47.4% of participants stated that they were lonely; in 2021, 47.2% of participants stated that they were lonely suggesting that rates of loneliness may have stayed the same. There were statistically significant declines in pandemic-related health behaviors and an increase in the number of people reporting that they were not in good health. Although, college students may not have been lonelier, the responses indicate a negative impact on overall health.

C.U.13 Educating the Public: Virtual Museum Exhibitions and Descendant Communities in The United States

Jasmine Kratt
Mentor: Constance Arzigian, Archaeology & Anthropology

My research is a comparative analysis of virtual museum exhibits centered around artifacts. Artifacts are objects created or modified by humans. Many artifacts have a degree of historical or cultural importance, making it a sensitive task to display them. I hope to understand how the method of displaying and presenting these artifacts differs with each type of museum. The study examines six different museums, two in each of three different museum categories: science museums, art museums, and history museums. This data comes from virtual exhibits and web pages from The Field Museum, The Art Institute of Chicago, The Metropolitan Museum of Art, The National Museum of the American Indian, The Children's Museum of Indianapolis, and the New Mexico History Museum. This comparative analysis aims to show how the curation and exhibition of artifacts is changing within museums. There is a growing awareness of the sensitivity innate to culture history, and my study looks at how this is reflected in museums' exhibits. In addition, my research looks at how their exhibits relate to and involve descendant communities, which are the communities or families descended from or still part of the culture from which the artifacts come.

C.U.14 Identifying Cold Water Streams for Iowa DNR

Grace Kunkel
Mentors: Anna Keefe, Global Cultures & Languages, and Niti Mishra, Geography & Earth Science

The project I am a part of is funded by the Iowa DNR. The research I have done over the semester is to help identify cold water streams for the DNR to help expand their knowledge to help monitor and maintain fish (trout) in these cold water streams. The research is done using UAV (drone) imagery to survey and capture the terrain of the area and then inputting the images into ArcGIS Pro to digitize and identify by eye the cold water streams. I also applied other techniques to help identify cold water streams such as OBIA (object based image analysis) the help classify what is a cold water stream and what isn't. Once analyzing the imagery, maps are created to help communicate with DNR what information they need/are asking for.

C.U.15 Enhanced Corrosion Characteristics of Electrogalvanized Carbon Steel Substrates Using Simplified Plating Chemistry

Ella Mack
Co-authors: Jason Martin, Sujat Sen, and Seth King
Mentors: Sujat Sen, Chemistry & Biochemistry, and Seth King, Physics

Coating a metal such as steel with a thin layer of zinc is a common practice known as Galvanization. This practice can prevent corrosion of the underlying metal, while the zinc sacrifices itself. Corrosion can cost a lot of money and energy to fix and is therefore an important problem of widespread concern. Herein, we report on the study the corrosion resistance of zinc deposited on carbon steel plates. However, unlike conventional direct-current (DC) methods, we use a pulsed current (PC) method to deposit zinc, which has been shown to provide unique benefits not possible with DC methods. Working over this past year, we have collected data that has demonstrated that the PC method provides different patterns or texture of zinc film on steel plates. We have measured the corrosion resistance of these electro-galvanized steel substrates, through accelerated electrochemical testing. Using industry-standard methods such as Linear Polarization Resistance (LPR), Linear sweep voltammetry (LSV) and electro-impedance spectroscopy (EIS) measurements, we report on preliminary findings of corrosion potential, current and corrosion rates expressed in mm per year as a function of crystalline texture of the zinc thin films. Preliminary results from corrosion tests reveal that the corrosion rates vary widely between zinc-coated steel substrates generated at progressively increasing current densities or duty cycle.

C.U.16 Does a QB's Age Influence Their Performance in the NFL?

Brandon Miller
Mentor: Barbara Bennie, Mathematics & Statistics

In the NFL, the only player to touch the ball every offensive play besides the center is the quarterback. Usually, an offense thrives or struggles as a result of the performance of the QB and the offensive playbook is shaped to fit the style of the QB. This makes the decision for who is your team's QB important to the success of your team. But you can either acquire your franchise QB through the draft with a younger player from college or through free agency with an older more

experienced veteran. Each of these options comes with pros and cons but ultimately which one provides the best performance or efficiency for the team's QB play? For this project, I will be analyzing QB statistics such as quarterback expected points added, quarterback rating, and quarterback completion percentage. Each of these measures various aspects of the performance of a QB. I will relate these to the age of a QB to see if it is more valuable for a team to draft a younger QB or sign a veteran through free agency. I will also look at what age a QB's performance typically peaks, and at which age it generally starts to decline. My analysis will use data visualization tools, descriptive statistics, and linear mixed models, primarily using R coding.

C.U.17 Investigating the Role of M Protein Dimerization in HPIV3.

Halle Pavelski
Mentor: Michael Hoffman, Microbiology

Human parainfluenza virus III (HPIV3) can cause lower respiratory tract infections (LRI), such as pneumonia, croup, and bronchiolitis. Globally, LRIs are the leading cause of death in children under five. Many of these deaths are from viral infections (including HPIV3) for which no antivirals or vaccines are available. To develop antivirals, increased knowledge of HPIV3's life cycle is required, specifically the assembly and release of virus particles. The matrix protein (M) of HPIV3 plays a key role in these steps of the life cycle. In infected cells, the M protein forms a dimer and is responsible for gathering all viral proteins and the genome (i.e. assembly) as well as inducing budding of the virus from cells (i.e. release). To understand how M dimerizes and interacts with other viral proteins, site-directed mutagenesis was conducted to create a series of M proteins with Flag sequences inserted into outer amino acid loops of the protein. Specifically, Flag sequences were inserted at residues 77, 166, 217, 226 and 317. The flag-tagged M proteins were previously analyzed for the ability to direct release and assembly with other viral proteins. I will now analyze these flag-tagged M proteins for their ability to dimerize with the wild-type M protein. Developing a co-immunoprecipitation assay in which a Flag-tagged M can be shown to bind to wild-type M will then allow analysis of previously made M protein variants that are suspected of having reduced dimerization ability.

C.U.18 Religion & Repression: An Unlikely Relationship

Mya Salinas
Mentor: Agatha Hultquist, Political Science & Public Administration

In a climate of violence and repression, the role of religion has a complicated yet powerful influence on continued conflicts throughout the world. It is well established that there is a unique dynamic between religious beliefs and the onset of violent conflict. In the present study, there is a focus on the role of how an official religion influences the likelihood that a state will engage in repressive behaviors. Repression has many definitions that can range from coercion/manipulation to full-on political violence and in the most extreme cases human rights abuses. Repressive behavior in the context of this study can be defined through a continuum of limited political violence to full force terror throughout the population. This study argues that a country that recognizes one official state religion has a greater likelihood to engage in repressive behavior within a given year in comparison to a country with multiple official religions or none at all. This study will use both the Political Terror Scale and Religion and State Project to measure the relationship between official state religion and the onset of any form of repression. The results of the study will yield information into the complex relationship between the imposition of one official religion and the probability of repressive behavior by the government.

C.U.19 Understanding Knowledge and Attitudes of Health Literacy in Pre-Professional Undergraduate Students: A Case Study

Hannah Soczka
Mentor: Emily Whitney, Public Health & Community Health Education

The ability to understand, interpret, and make decisions about health and medical information is defined as health literacy. For undergraduate students pursuing careers in health professions, it is integral that health literacy is acknowledged, and health literate practices are taught to provide health equity and improve health outcomes. The purpose of this study is to explore knowledge, attitudes, and understanding of undergraduate pre-professional students going into health fields regarding health literacy. A single instrumental case study design will be implemented along with qualitative data collection techniques including focus groups, document review, and interviews for data collection. Focus groups will be composed of students from Pre-Occupational Therapy, Pre-Physical Therapy, Pre-Medicine, and Pre-Physician's Assistant tracks as well as students majoring in Public Health and Community Health Education. Interviews will be conducted with faculty teaching in the aforementioned programs, and documents including the course catalog will be reviewed. The findings from this study will indicate the extent to which pre-professional health students are aware of

health literacy and whether or not they intend to learn more as they move forward in their careers. Recommendations will also be made regarding the ways in which health literacy might be incorporated into the pre professional curricula.

C.U.20 Gender in Death: The Representation of Gender in Viking Graves

Arin Spierings
Mentors: Amy Nicodemus and Constance Arzigian, Archaeology & Anthropology

How gender was practiced in the Viking Age in Scandinavia has, in recent years, been up to speculation after the genomic sexing of a previously thought male warrior burial. Because of this, it is essential to establish a more thorough understanding of how gender roles were practiced. In this study, this will be accomplished by examining burials from multiple Viking Age sites across a large geographical area to answer two questions; what artifacts or artifact types can represent a specific gender and is gender represented differently in different areas. The comparisons between burials within each site data was collected from revealed that certain artifact types can be used to establish the gender of an individual. Additionally, comparing between sites to investigate whether the same artifacts and artifact types are used to represent the same genders revealed that there is regional variation in how gender is represented, implying that gender roles were much more fluid and diverse than previously held assumptions would imply.

C.U.21 Retweets to Riots: Political Polarization in Online Settings

Elizabeth Titera and Chloe Kepler
Co-author: Kevin Zabel
Mentors: Kevin Zabel and Bianca Basten, Psychology

The purpose of this study was to examine the effects of online (compared to in-person) communication on political attitude polarization. Recent research indicates a sharp political partisan divide and increasing levels of political polarization in America (Deane & Gramlich, 2020). However, little research has experimentally investigated why political attitude polarization is becoming commonplace in American society. Consistent with research on deindividuation (Lee, 2007) and echo chambers (Sasahara et al., 2020), we theorized that the internet may be a contributing factor to this social dilemma. We hypothesized that online (relative to in-person) participants would show a significantly larger increase in political attitude polarization after engaging in a prompted political discussion about four contemporary political issues. Understanding how communication methods influence political opinion polarization may illuminate how online platforms contribute to the development of extremist attitudes and ideologies so that strategies to reduce destructive or deviant behaviors that follow can be effectively implemented.

C.U.22 Loss-on-Ignition Analysis of a Sediment Core from Mud Lake, Wisconsin

Emma Trettin, Sam Baumgartner, and Alex Baker
Mentor: Joan Bunbury, Geography & Earth Science

A lake sediment core was collected in June 2019 from Mud Lake in Jefferson County, Wisconsin to gain a better understanding of the past climatic conditions of the region. Loss-on-ignition (LOI) is a sedimentary analysis that determines the organic, carbonate, and silicate content of a sediment core, and yields data that is useful for investigating past climatic conditions. Greyscale reflectance and magnetic susceptibility provide insight into the physical properties of a lake sediment core and were previously measured on the same core. Our goal is to find relationships between the organic, carbonate, and silicate content, and the magnetic susceptibility, and greyscale reflectance data available for the core. Preliminary results indicate small variations in the organic and carbonate content from the date of core collection to ~AD 1200. Each of these data series alone can provide evidence of past climatic conditions but when analyzed together provide more robust results. The findings of the LOI results, greyscale reflectance, and magnetic susceptibility measurements will be presented as will their relationship to past climate conditions over the past ~1,000 years in the region.

C.U.23 Asymmetric Curcuminoids: Mechanistic Study, Computational Modeling, and Green Synthesis

Claire Trudeau
Mentors: Valeria Stepanova, Chemistry & Biochemistry, and Joseph West, Ph.D., Winona State University

Curcumin is the active ingredient in turmeric that consists of an acetylacetone central liner and two side-arms of benzaldehyde derivatives. Curcumin has demonstrated a broad spectrum of biological activity. Curcumin is known for its anti-cancer, anti-viral, anti-inflammatory, and anti-oxidizing effect. However, curcumin is not a good paramedical candidate because when ingested, it quickly decomposes due to its poor stability. In addition, curcumin has low water

solubility. These factors severely hinder the pharmaceutical use of curcumin itself. The stability of curcumin has been linked to the flexibility of the central core while the solubility is in large depends on the functional groups present at side arms. It was previously suggested that increasing rigidity of the central linker could provide curcuminoids with improved biological stability. In this study we have substituted acetylacetone with rigid 2-acetylcyclohexanone. We conducted our study using a combination of computational modeling and 1H NMR experiments. As a result of our efforts, we developed a versatile green method towards 2-acetylcyclohexanone-based asymmetric curcuminoids. We were able to elucidate the mechanism of their formation and develop a simple two step purification procedure that does not require column chromatography or extensive recrystallization or extractions. Our method provides desired compounds using a one general procedure for a variety of curcuminoids with modified side arms.

C.U.24 Media Bias in Coverage of Civil Wars: Evidence from Kosovo and Rwanda

Hailey Polk
Mentor: Agatha Hultquist, Political Science & Public Administration

Media attention is lopsided in the coverage of civil conflict across the world. Such bias results in uneven action and justice in such conflicts by other nations and international organizations. Previous studies have found that battle deaths, the political regimes countries in conflict, and regional history and proximity of the areas in conflict affect the number of media attention these conflicts receive. In this study, I argue that it is the ethnic composition of these areas in conflict that affect the amount of media attention in U.S. publications. The more the ethnic composition fits the presence of U.S. media publications, the more the conflict will receive media attention. To test this theory, I compare the media coverage of three U.S. media publications of the first three months of the civil wars of Kosovo and Rwanda. Findings show that there is significant uneven media attention: significant overreporting in the case of Kosovo and underreporting in the case of Rwanda.

C.U.25 The Effects of a Carbohydrate + Caffeine Beverage on Game Performance, Blood Glucose and Perceived Effort in Collegiate Soccer Players

Makenna Carpenter and Abby Ambrosius
Co-author: Andrew Jagim, Ph.D. (Mayo Clinic Health System, La Crosse)
Mentor: Andrew Jagim, Ph.D., Mayo Clinic Health System, La Crosse

Carbohydrate availability and hydration status have been shown to influence exercise and sport performance. Caffeine ingestion has also been shown to elicit improvements in performance. Purpose: The purpose of the current study is to examine the effects of a carbohydrate + caffeine beverage on match performance, perceived exertion and blood glucose levels in collegiate women soccer athletes. Methods: Approximately 100 collegiate women soccer athletes will be recruited to participate in the study during a single day of scrimmage play, in which each team will play twice. Players will ingest either a carbohydrate + caffeine beverage or control beverage (flavored water) in a double-blind, randomized control trial design. Beverage ingestion will occur during half-time of each scrimmage. Prior to and after each game, urine specific gravity, body weight, total body water, and blood glucose levels will be assessed. Players will also be equipped with a GPS monitoring system with an integrated accelerometer and heart rate sensor (Polar TeamProTM Polar Electro, Oy, Kempele, Finland). We hypothesize that ingestion of the experimental beverage will result in greater total (and high speed) distance covered, and a higher training load in the second half compared to the control beverage. Additionally, we hypothesize that ratings of perceived exertion will be lower in the second half with a better maintenance of blood glucose levels following ingestion of the experimental beverage compared to the control beverage. Outcomes of the current study will help inform practitioners and coaches on the potential benefits of ingesting a carbohydrate + caffeine beverage on second half performance during match play.

C.F.33 World Languages Behind the Screen: Students' Perceptions of Virtual L2 Teaching and Learning during COVID-19

Mikaela Robarge and Kimberly Morris
Mentor: Kimberly Morris, Global Cultures & Languages

The COVID-19 pandemic has drastically impacted second language (L2) classrooms due to the absence of face-to-face (F2F) target language use and interaction, essential facets of second language acquisition (Long, 1996). With the abrupt shift to online instruction, new technologies have become essential to language teachers and students, oftentimes with little training (Morris, 2021). Because students' perceptions and attitudes of teaching practices can impact L2 development and success (Kern, 1995), it is crucial to examine their experiences during this unprecedented time. Thus, this study

explores how students believe L2 teaching and learning has been impacted due to remote instruction during COVID-19. A survey was distributed among 120 undergraduate students enrolled in L2 classes at UWL during the spring of 2021. Questions inquired about the effectiveness of different modalities and teaching strategies along with student engagement, participation, and workload. Results confirmed the effectiveness of online synchronous instruction and group interactions to foster active engagement among students yet found breakout rooms less effective for L2 interactions. Perceptions regarding workload, effort, and participation were similar to F2F classes, altogether illustrating the perceived value of computer-assisted language learning and its implications in future program design.

C.U.34 Raw Data to Travel Guide: Creating Hiking Trail Maps of St. John, USVI

Dan Fedorenko and Jamie Schoen
Mentor: Colin Belby, Geography & Earth Science

The island of St. John, one of the U.S. Virgin Islands, consists primarily of the Virgin Islands National Park. With a majority of the natural flora being preserved and protected, hiking trails on the island are plentiful, however, many are unmapped. On a research expedition in January of 2022, a number of these trails were mapped for the purposes of being used in a travel guide. Coordinates along the trails, as well as geotagged images, were collected using the GAIA GPS app installed on an Apple iPad mini connected to a Bad Elf GPS receiver. The process of collecting the data, processing it, and polishing it into a clean, professional map is detailed, along with best practices and errors that occurred during data collection.

C.U.35 An Examination of *brpS* Point Mutations and Their Effect on *srtA* and *lrgA* Transcription

Benjamin Stelter
Co-authors: William Schwan, Madison Moore, and Alison Zank
Mentor: William Schwan, Microbiology

In recent years, there has been a 62% increase in *Staphylococcus aureus* infections in the United States that are often tied to the formation of biofilms. Thus, an understanding of what regulates biofilm production in *S. aureus* is important. Previously, we showed that mutations in two genes named *brpR* (biofilm regulator protein regulator) and *brpS* (biofilm regulator protein sensor) cause *S. aureus* to produce more biofilm than the unmutated parent strain. We know little about the proteins that are encoded by both of these genes. For this project, we examined how point mutations in the *brpS* gene affected the ability of BrpS protein to regulate transcription of the sortase A (*srtA*) and anti-holin (*lrgA*) genes that are important for biofilm formation compared to the unmutated parent strain and *brpS* mutant strain without a plasmid inserted. A quantitative reverse transcribed-polymerase chain reaction technique was used to measure transcriptional differences in the *srtA* and *lrgA* genes. Several *brpS* point mutants affected transcription of the *srtA* and *lrgA* genes. This information will help us to understand which parts of the BrpS protein are important for regulating biofilm formation in *S. aureus*.

Poster Session D
12:05 pm-1:00 pm

D.U.1 Determining the Functional Role of the GOX1969 Protein in *Gluconobacter oxydans*

Ky Ariano
Co-author: Meg Zumsteg
Mentor: Paul Schweiger, Microbiology

Acetic acid bacteria are used in many industrial processes (vinegar, vitamin C, antidiabetic drug miglitol production, etc.). These industrially important reactions are mainly done by an arsenal of membrane-bound dehydrogenases that shuttle electrons directly into the respiratory chain. Among these dehydrogenases, GOX1969 in *Gluconobacter oxydans* was predicted to be a PQQ-dependent dehydrogenase of unknown function. However, dehydrogenase activity has not been detected after multiple analyses by a number of labs. Reanalysis of the protein sequence reveals similarities to the BamB protein that functions as a subunit of the **β**-barrel assembly machine (BAM) complex that is responsible for the assembly of **β**-barrels in the outer membrane of gram-negative bacteria. To test if the actual physiological function of GOX1969 is as the BamB subunit of the BAM complex, we introduced the *gox1969* gene into an *Escherichia coli* K12 mutant that lacks BamB. Growth deficiencies in the mutant lacking BamB were restored when *gox1969* was expressed on the plasmid pBamB. This provides the first evidence that GOX1969 is functionally acting as a BamB in *G. oxydans*. Functional

information of uncharacterized genes will provide new insights that will allow a more accurate modeling of metabolism and more rational strain design.

D.U.3 Effect of Increasing Temperature and Presence of Salinity upon *Gammarus pulex* and Its Ability to Decompose Organic Waste Matter

Samuel Flaig and Ashlee Gander
Mentor: Ross Vander Vorste, Biology

Gammarus pulex, a common detrivore (consumer of waste products) holds a significant role in freshwater ecosystems and food chains. This species breaks down waste matter, such as leaves, to later be consumed by smaller microorganisms critical to nutrient cycling in an ecosystem. River ecosystems that *Gammarus pulex* commonly inhabit are frequently under the threat of environmental change, such as increasing water temperature and salinization. Therefore, understanding how *Gammarus pulex* may be affected from changes to their environment can provide information about how these freshwater river ecosystems also change. We examined the ability of *Gammarus pulex* to continue its ecological service in decomposition of waste matter while undergoing various challenges, including the increase of temperature and salinity content in a controlled environment. By exposing the species to varying levels of salinity as well as increased temperature, we monitored the rate of decomposition for these organisms. Data collected provided us with information regarding the rate of decomposition the species was able to perform given their environmental conditions. This data can be used to make predictions regarding how salinity and temperature affect the rate of decomposition in *Gammarus pulex* in natural settings. Conclusions made can help inform how salinity and temperature affect decomposer ecological service rates in rivers.

D.U.4 Genetic Analysis of Wild Caught *Salmo trutta* Gut Microbiome

Emma Ann Oberg
Co-author: Alder Yu
Mentor: Alder Yu, Biology

Our project examines the gut microbiota of wild-caught *Salmo trutta* (common brown trout) caught in different locations to determine if there are trends among the population diversity and abundance of their microbiomes. Existing methods for analyzing population health include examining data such as growth rate and population size; these require a baseline established before the disturbance and are time and labor intensive. Studying the fish microbiome to evaluate fish population and holistic ecosystem health could prove more efficient and reliable than existing methods. Facilitating disturbance response could result in improved fish population and ecosystem health. To determine if there are trends among fish microbiota population diversity/abundance, wild-caught brown trout are dissected DNA purified from a stool sample. The amplified DNA is then sequenced to identify the microbes present in the gut. The analysis will select for specifically microbial genetic material. We expect to see significant differences in gut microbiota abundance and diversity between up-, mid-, and down-stream sample locations.

D.U.5 Electro-synthesis of Manganese Dioxide Nanoparticles for Use in Low-Cost Rechargeable Batteries

Kayla Rondeau
Co-author: Evan Draxler and Sujat Sen
Mentor: Sujat Sen, Chemistry & Biochemistry

Batteries are capable of more than just storing the energy required to power small electronic devices. Today, long-lasting, cheap batteries that can be produced at a large scale are being considered to help power entire cities. Our focus is on synthesizing manganese dioxide (MnO_2) nano-sized particles, for use in rechargeable batteries, because it is cheap and can be mass produced. The chemistry of MnO_2 is complex, as it can exist in many different crystal structures, based on how it is synthesized, and Manganese has multiple oxidation states. Over the summer, we were able to synthesize MnO_2 particles through direct current (DC) electrodeposition methods, a well-known and industrially applicable method. Building on this initial effort with DC methods, we are now using novel pulsed current (PC) methods to see how it affects the synthesis of MnO_2. Using both scanning electron microscopy (SEM) and X-ray diffraction (XRD) we report on the size, morphology, and structure of the product. Cyclic voltammetry and charge-discharge tests are also utilized to determine their electrochemical cycling behavior as battery cathodes. Our goal is to optimize the electrochemical properties of MnO_2 by understanding how its shape and crystalline structure develops during a PC electrodeposition synthesis process as a function of specific variables such as duty cycle.

D.U.6 Abundance of Microplastics in Freshwater Drum (*Aplodinotus grunniens*)

Veronica Sannes
Co-author: Eric Strauss
Mentor: Eric Strauss, Biology

Microplastics are small plastic particles less than 5 mm long and are a growing concern as they continue to pollute our soil, atmosphere, and water. They are not biodegradable and thus can take decades to centuries to decompose. Microplastics also harm humans because they can be consumed by organisms and later eaten by us or enter our drinking water. In this study, we quantified the abundance of microplastics in Freshwater Drum, a common fish species in the Upper Mississippi River System (UMRS). Digestive tracts were extracted from fish collected from UMR navigation pools 4, 8, 13, 26, the Open River reach, and the La Grange pool of the Illinois River. Microplastics were separated from other gut contents and counted microscopically. Current analysis shows that 73% of Freshwater Drum individuals contain microplastics. Of the five different types of microplastics (fiber, foam, fragment, film, and bead) fibers were the most abundant. Analysis also indicates that smaller Freshwater Drum retain more microplastics per gram of weight than larger fish. Quantification and analyses are ongoing to determine additional patterns with microplastics in Freshwater Drum.

D.U.7 The Potential of High-Resolution Satellite Imagery for Delineating Coldwater Streams in the Driftless NE Iowa

Ethan Wedemayer
Co-authors: Niti Mishra and Michael Siepker (Iowa Department of Natural Resources)
Mentor: Niti Mishra, Geography & Earth Science

Climate change is projected to alter the prevalent thermal characteristics of temperate coldwater streams which are crucial habitats for many types of biota. To protect these habitats, we must first know where they exist on the landscape. This study examines the potential of high-resolution satellite imagery combined with in situ observations of stream temperature and geomorphological characteristics to semi-automatically detect coldwater streams. Two watersheds were selected as pilot site for which multi-year panchromatic winter imagery was visually interpreted and the length of recorded coldwater streams was compared against the coldwater reaches mapping by Iowa DNR. In order to be sure of stream locations, two levels of interpretation were used as confidence intervals. The first level of confidence resulted in 25.09 miles of streams, while the second level (slightly less confidence in interpretation) resulted in 50.12 miles. These two levels combine for a total coldwater stream length of 75.21 miles. The DNR interpretation misclassified several coldwater stream stretches as warmwater. Visual analysis of high-resolution winter imagery made it clear that various site properties (channel width, canopy cover/density) as well as imagery characteristics (pixel size, sun angle) influence the interpretation of coldwater streams. These findings provide critical understanding of factors that need to be addressed for developing a semi-automated method for locating coldwater streams.

D.U.8 A Search for the Structural Identity of a Gammaherpes Virus Tegument Protein of Unknown Function

Damon Trump
Co-author: Kelly Gorres
Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein Barr Virus (EBV) and Kaposi sarcoma-associated herpes virus (KSHV) are members of the gammaherpes virus family. These viruses have been directly associated with multiple types of cancers in humans, particularly in Burkitt lymphoma, lung, and gastric cancers for EBV and a variety of immune cell cancers for KSHV. Herpes virions contain a tegument layer with protein functionalities and structures that are relatively unknown. We are particularly interested in a tegument protein of unknown function that has been found to be needed for completion of the lytic cycle. This open reading frame is highly conserved among gammaherpesviruses, including the murine gammaherpesvirus 68 (MHV68). We have produced and purified the MHV68 target protein from *E. coli*. Disulfide bond and oxidation-reduction characteristics were observed in gel mobility shifts. Structural determination will allow us to advance our knowledge in the functionalities of this protein through structural relationships. This advancement will ultimately further our understanding of EBV and its role in human cancers and infections.

D.U.9 Measuring *Drosophila melanogaster* Body Weight and Food Consumption in Relationship to Circadian Rhythm Disruption as a Model for Type 2 Diabetes Mellitus

Maya Jahnke
Mentor: Alder Yu, Biology

Type 2 Diabetes Mellitus (T2DM) is a disease develops when the body fails to produce/use insulin, a hormone secreted by the pancreas, to regulate blood glucose levels. Research has shown that environmental factors such as circadian rhythms can impact the regulation of blood glucose leading to increased predisposition to metabolic diseases. Due to the discovery that *Drosophila melanogaster* and humans have similar metabolic pathways, we can use Drosophila as a model to better understand the impacts of circadian rhythms on diseases such as T2DM. We seek to understand the effects of an irregular light/dark schedule on feeding behaviors by disrupting Drosophila circadian rhythms on 3-hour light/dark schedules, 6-hour light/dark schedules, and 8-hour light/dark schedules and measuring food consumption through blue-dye consumption-excretion methods. The results of this study will provide evidence to determine if there is a relationship between food consumption levels and severely disrupted circadian rhythms. These preliminary experiments can provide a basis for further testing for insulin resistance in circadian-disrupted Drosophila in future experiments. The ability to further understand environmental predispositions to T2DM can be essential in developing treatments and preventative measures to combat this rising epidemic in the human population.

D.U.10 Investigating the Significance of Fumarase Gene Knockouts

Allison Alberts
Mentor: Basudeb Bhattacharyya, Chemistry & Biochemistry

Fumarase is an important enzyme found in all kingdoms of life. Its function is part of the Krebs's cycle required for central metabolism. Beyond its role in central metabolism, fumarase has been shown to be linked to the development of cancers in humans, along with cellular energies, hypoxia, and metabolic pathways. Therefore, gaining a more in depth understanding of how the enzyme functions in living organisms will provide key insights into these cellular and disease processes. The purpose of this project is to create knockouts for fumarase genes, specifically fumarase A and fumarase C in the model organism, *Escherichia coli* (*E. coli*). We will confirm these knockouts using molecular biology techniques and assess their effect on the phenotype of *E. coli* using microbiology assays. This data will facilitate our understanding of fumarase's function which will ultimately spark new opportunities for greater investigation of this important protein.

D.U.11 Exploring the Standardization of Carbon Content within Weapons of the British Celtic Iron Age

Jack Barett
Mentors: Amy Nicodemus and Constance Arzigian, Archaeology & Anthropology

The Celtic culture was an agricultural people who inhabited the entirety of the British Isles during the Iron Age (ca. 800 BC - AD 43). We have written record of the method of steel production through adding carbon to iron first being introduced to the Celtic people after the Roman invasion of AD 43. However, there have been many steel weapons and tools found archaeologically in the British Isles that date prior to the Roman introduction of steel. This thesis aims to investigate when this steel first started being produced by the Celtic people in Britain by examining the amount of carbon (carbon content) in a number of steel weapons found in Britain dating to before the Roman invasion. This investigation will focus primarily on determining if the carbon content of these weapons becomes standardized in the late Iron Age (ca. 378 BC - AD 43) versus the early Iron Age (ca. 800 BC - 379 BC). If the carbon content of these weapons becomes standardized towards the end of the Iron Age, it will show that a formal method of steel production was present in Britain prior to the Roman invasion, rewriting our knowledge of metal production in history.

D.U.12 Effects of Circadian Rhythm Disruption on DNA Repair

Lydia Bergerson and Halle McCormick
Co-author: Alder Yu
Mentor: Alder Yu, Biology

Circadian rhythm is our body's internal clock that controls rhythms in physiological processes. It runs independently but can be reset by light and dark cues. Long-term night shift workers have their circadian rhythms disrupted and have been observed to be at an increased risk of cancer. Faulty DNA damage repair can increase a person's chance of developing cancer. Therefore, we hypothesized that circadian disruption increases inaccurate repair of DNA damage, leading to an

increased chance of developing cancer. Specifically, we hypothesized that circadian rhythm disruption would increase use of an inaccurate DNA double-strand break repair pathway called non-homologous end joining (NHEJ). Using fruit flies as our model organism, we purposefully induced a break in their DNA and observed what method of DNA repair was performed. Non-NHEJ repair (single-strand annealing) restores function of a fluorescent protein in the flies, and NHEJ repair does not. These flies were raised under two different light and dark cycles, alternating every 8 or 12 hours. After comparing the number of SSA and NHEJ DNA repair events in both light/dark cycles, we found no significant difference in the repair pathway usage between 12-hour and 8-hour light/dark cycle flies. Current experiments are investigating the effect of circadian rhythm disruption on the use of a third type of DNA repair mechanism, homologous recombination.

D.U.13 Temperature Sensitive 13-Lined Ground Squirrel Platelet Conformation Reduces Blood Clot Formation

Joey Bolduc, Sierra Furger, McKenzie Nisius, Abram Jackson, and Kaiya Grass
Mentor: Scott Cooper, Biology

Platelets of 13-lined ground squirrels (*Ictidomys tridecemlineatus*) are unique in the sense that they adopt two different conformations: discoid and rod shaped. The squirrels' platelets are locked in the rod conformation during their six month hibernation period, due to cold temperatures and hyper-polymerization of microtubules. Ultimately, the rod conformation prevents the formation of blood clots. Our research investigated the effects of temperate, cold storage specifically, on squirrel and human platelets to better understand what role the rod conformation of squirrel platelets has on long term storage, and how this conformation could potentially be applied to human platelets for blood transfusions. Our assay was designed to study the effects of temperature on platelet activation, when in-vivo or in-vitro cold platelets transition from the rod to discoid conformation. Platelets used in the experiment were treated with activators (ADP, collagen, TRAP, thrombin), and others were treated with taxol to lock them into the inactive rod conformation. All samples were treated with fluorescent fibrinogen and activation was determined via flow cytometer, which detected mean fluorescence. Trends in our data indicate that platelet activation increases in response to increased temperature following cold storage and the addition of ADP in squirrel and human platelet samples.

D.U.14 Physicians Clinical Experiences with Aid-In-Dying: Successes and Obstacles

Lindsey Brown and Jacob Stuhr
Co-author: Erica Srinivasan
Mentor: Erica Srinivasan, Psychology

Aid-in-dying is a practice of medicine where physicians provide a prescription, typically in the form of lethal medication, to terminally ill patients who request to end their own life. Aid-in-dying is an under-researched topic with minimal exploration on the physicians who offer it. Aid-in-dying is currently legal in eleven states; however, there is little information about physicians' experiences. As aid-in-dying is a newer aspect of medicine, understanding physicians' perspectives is crucial for both their practice of medicine and the experience for everyone involved. This study emphasizes physicians' experiences with providing aid-in-dying. The analysis includes preliminary results from a subset of qualitative data on physicians' experiences with both patients and their families during the aid-in-dying process. In situations where the aid-in-dying experience went well, common themes included the patient, family, and hospice being on board, whereas when one party was not on board, problems arose.

D.U.15 Temporal Analysis of Artistic Expression in Parietal Art during the European Upper Paleolithic

Katy Davidson
Mentors: Amy Nicodemus and Vincent Her, Archaeology & Anthropology

In Europe, during the Upper Paleolithic (40,000 – 10,000 BP), early humans were creating the first forms of repeated artistic expression in caves. The different forms of artistic expression are broadly categorized as handprints, geometric designs, and animal imagery. Looking at broad changes in artistic expression throughout the periods of the Upper Paleolithic can indicate changes in potential ritual practices. Archaeologists have studied changes in geometric designs and animal imagery independently. However, changes amongst all three forms of expression have not been compared. This study utilizes data in previously published literature to look at European sites containing art made during the Upper Paleolithic. Each site is analyzed by its location, the period of the Upper Paleolithic it was in use, and the artistic expressions it contains. Each period's artwork was noted separately if a cave was utilized during multiple periods. The data is analyzed temporally by comparing the frequency of the artistic expressions during each period of the Upper Paleolithic. The significance of the difference in frequencies is noted using Chi-squared statistics. The analysis shows that

handprints were utilized in the early periods of the Upper Paleolithic and were replaced by animal depictions in the later periods of the Upper Paleolithic.

D.U.16 Social Status and Integration in the Eastern European Bronze Age: A Comparative Study of Maros Culture Ceramics

Evelyn Gaunt
Mentors: Amy Nicodemus and David Anderson, Archaeology & Anthropology

The Maros Culture existed from 2700 BC to 1500 BC in what is now southwestern Hungary, western Romania, and northeastern Serbia. While being the focus of archaeological research in this region for the last century, there still is a gap in our understanding of Maros settlements and their material culture. This research compares two Maros sites: Pecica Șanțul Mare, the largest easternmost Maros settlement, and Rabe Anka Siget, a smaller settlement to the west. Comparing the ceramic assemblages from these populations will allow for the characterization of any distinctions in ware types and decorative motifs between them. Looking at the proportions of fine ware versus coarse ware ceramics may highlight status differences between these populations. Additionally, stylistic variation, if present, can be used to identify local cultural traditions in pottery decoration techniques. What is demonstrated through this research is that the sites of Rabe and Pecica maintained their own ceramic decoration preferences. Additionally, the sites did not maintain a similar level of fine ware ceramics. This indicates either a difference in the number of high-ranking individuals that lived there, or a difference in the way elites displayed their status.

D.U.17 Does Upstream Areal Wetland Cover Explain Methylmercury Bioaccumulation in At-risk Minnesota Rivers?

Elise Gerum and Andrew Ericson
Co-author: Kristofer Rolfhus
Mentor: Kristofer Rolfhus, Chemistry & Biochemistry

Methylmercury (MeHg) is a potent neurotoxin for both humans and wildlife. The methylation of inorganic mercury is facilitated by naturally-occurring aquatic bacteria that inhabit oxic/anoxic boundaries and environments containing high levels of organic matter. Prior studies have indicated that wetland ecosystems produce greater fluxes of MeHg to rivers as compared to forested, agricultural, and urban landscapes. We therefore hypothesized that MeHg in the lower food webs of six Minnesota rivers were related to the total areal extent of wetlands within the upstream catchment, as delineated by GIS. Lower food web components (including water, periphyton, benthic macroinvertebrates, and preyfish) were collected at 33 locations along six rivers in 2015-16. At each sampling location, the trophic magnification slope, as well as areal % of upstream land use components were calculated. Our results indicate that only 13% of the variation in MeHg in filtered river water and 21% of the trophic transfer efficiency was explained by the total areal % of upstream wetlands. The combination of upstream % (wetland+forest) explained 41% of the variability. Other factors such as catchment slope, flow stage, and food web length are likely contributing to the unexplained variation across sites and will be the focus of further study.

D.U.18 Activation? Phosphorylation? Investigation of Rap1b in Human Megakaryocytes

Joshua Krause, Josh Hetcher, and Joshua Jenness
Mentor: Jaclyn Wisinski, Biology

In platelet-producing megakaryocytes, the signaling protein Rap1b mediates both activation of integrins for cell adhesion and activation of the transcription factor ERK leading to gene expression changes. As a small G-protein, Rap1b acts as a molecular switch with an inactive GDP-bound state and an active GTP-bound state. Additionally, the association of Rap1b within the inner side of the plasma membrane is dictated by cAMP-dependent protein kinase (PKA) phosphorylation. In an unphosphorylated state, Rap1b is attached to the plasma membrane via a lipid anchor. Upon phosphorylation, Rap1b detaches from the membrane and is cytosolic. We hypothesize the location of active Rap1b, dictated by the guanine nucleotide bound (GDP/GTP) and its phosphorylation status, determines which signaling pathways Rap1b contributes to in megakaryocytes. To evaluate this hypothesis, we first need to optimize methods to detect Rap1b activation (GTP binding) and phosphorylation. Using the megakaryocyte cell line (DAMI), we over-expressed green fluorescent protein (GFP)-tagged Rap1b and treated with reagents to stimulate activation (epinephrine) or phosphorylation (forskolin, IBMX). To determine activation, GTP-bound Rap1b will be isolated using magnetic beads coupled to a GST-tagged protein and a Rap1b-GTP-binding domain. This protein-antibody complex is detected using an SDS-PAGE to determine which cell samples have phosphorylated Rap1b protein.

D.U.19 Wealth Inequality after a Global Pandemic: A Study of Political Efficacy and Support for Redistributive Policies

Kassidy Leannais
Mentor: Carol Miller, Sociology & Criminal Justice

The COVID-19 pandemic has highlighted and perpetuated the growing wealth inequality in the United States. Recent data suggests that Americans are growing more concerned about this issue, but this research seeks to understand which individuals support redistributive policies. By comparing results from analysis of data from the 2020 American National Election Time Series Study Survey with data collected from surveying a probability sample of University of Wisconsin-La Crosse undergraduate students, this study will find the potential correlation between political efficacy and support for government intervention of wealth inequality. Finding this relationship will be important in determining how to battle wealth inequality, motivate the American electorate, and re-instill trust in the government.

D.U.20 Food Intake and Body Fat Percentage in Time Restricted Feeding of Fruit Flies

Brenna Lundgren
Mentor: Alder Yu, Biology

In the United States, obesity and associated health risks have been on the rise for the past thirty years. The obesity epidemic has caused a massive number of Americans to attempt to lose body fat through fad diets and exercise, often to limited success. Research indicates that there may be more to weight gain than just the total calories in versus calories out, and one area of interest is the circadian timing of food intake. However, given that the data was self-reported, there runs a risk of research participants failing to report food or underreporting measurements. I am interested in attempting to replicate this in a controlled environment using Drosophila melanogaster fruit flies by restricting their food intake to specific times of day and measuring differences in body fat concentrations. This data could give us a better understanding of how circadian timing of food intake impacts body fat percentage.

D.U.21 Quantifying the Impact of Invasive Carp on Native Fish Populations

Ethan Manhart
Co-author: James Peirce
Mentor: James Peirce, Mathematics & Statistics

Around 2000, two invasive carp species, bighead carp (*Hypophthalmichtys nobilis*) and silver carp (*Hypophthalmichtys molitrix*), established in the Upper Mississippi River. Recent research has indicated that the introduction of invasive carp has harmed gizzard shad (*Dorosoma cepedianum*), a common freshwater fish species found throughout the central and eastern portions of North America. Within the central and eastern portions of North America, gizzard shad play a number of critical roles in the freshwater community such as serving as prey for other fish species and translocating nutrients from substrates into the water column. Therefore, any reduction in the health of the gizzard shad species could negatively affect the health of the Mississippi River System as a whole. In this project, historical data for the gizzard shad populations collected pre- and post-carp establishment are used to determine key parameters in a mathematical model for gizzard shad length distributions. From the model output we identify and rank the most significant impact invasive carp introduction has had on the gizzard shad species.

D.U.22 Studies of Selected Ligands Interacting with Hen Egg White Lysozyme

Conrad McPherson
Mentor: Kelly Gorres, Chemistry & Biochemistry

Lysozyme is a common enzyme found just about everywhere as it works to combat bacteria. It can be considered a part of our immune system as it helps to fight bacterial infection. This is because some bacteria contain a polysaccharide protective wall to help them survive, and Lysozyme's function is to cleave specific polysaccharide chains via hydrolysis. Polysaccharides are carbohydrates with multiple sugar molecules chained together unlike monosaccharides which are single chain sugar molecules. Glucosamine-6-sulfate has been recently found to bind to Hen Egg White (hew) lysozyme (Gorres, unpublished results). This is very similar molecularly to another carbohydrate known to bind to lysozyme (N-acetyl-glucosamine). We want to observe how Hen Egg White Lysozyme interacts differently with the introduction of carbohydrates with similar structures but have an altercation to their side chain structures. The purpose of this project is

to see how different carbohydrates that are similar in structure effect the Enzyme activity and kinetics when introduced in the reaction. We have gathered data exploring this topic, from enzyme assays with Hen Egg White Lysozyme and our carbohydrates of interest. We found that when N-Acetyl-Glucosamine and Glucosamine-6-Sulfate were introduced into a micrococcus solution they bound to lysozyme similarly. However, some other carbohydrates like D-Glucosamine Hydrochloride bound more effectively and D-Glucosamine-6-Suflate did not bind as effectively. The difference in these carbohydrate's structures lead to this difference in binding efficiency. The next step is to begin thermoflour assay experimentation to explore the kinetics of Hen Egg White Lysozyme. Our carbohydrates of interest may be able to act as either inhibitors or activators for Hen Egg White Lysozyme. If these experiments prove successful, a new ligand may be identified that could be an inhibitor of lysozyme.

D.U.23 Effects of In vitro Cold Storage and Taxol on Apoptosis in Human and 13-lined Ground Squirrel Platelets

Kaitlyn Michalek, Brooklynn Arbs, Emily BonoAnno, Dana Carlson, Vanessa Mbuyi, and James Nitz
Co-author: Benjamin Hsieh
Mentor: Scott Cooper, Biology

Human platelets stored in the cold undergo apoptosis (programmed cell death) and are rapidly cleared from circulation post-transfusion. The platelets of hibernating mammals, such as 13-lined ground squirrels (*Ictidomys tridecemlineatus*), remain in circulation after storage at 4oC, making this organism a novel animal model in this research. Chilled ground squirrel platelets assume a rod-shape, which can be induced with the drug taxol. To investigate the potential role of the rod shape on apoptosis following cold storage, human and ground squirrel platelets were collected and then stored at both room temperature and at 4oC with and without taxol for 7 days. Platelets were labelled with fluorescent markers for apoptosis and analyzed by flow cytometry. Human platelets showed increased expression of apoptotic markers when stored in the cold. Ground squirrel platelets that were stored in the cold showed lower levels of apoptosis when compared to platelets stored at room temperature. However, squirrel platelets stored in the cold showed a significant increase in apoptosis when taxol was added, while human platelets showed no significant difference. Taxol was found to be an ineffective treatment in extending the longevity of human platelets, while it activates apoptosis in squirrel platelets stored in the cold, suggesting that taxol negatively impacts the physiological mechanisms of squirrel platelets.

D.U.24 Gender-Based Human Rights Violations in Ireland, Intergenerational Trauma, and Justice

Olivia Paulson
Mentor: Jodi Vandenberg-Davis, Race, Gender, & Sexuality Studies

This research project investigates how to achieve transformative justice for survivors of institutionalized abuse and their relatives. Transformative justice seeks to respond to harm in a collective, community-based alternative (Kim, 2021). This research is concerned with institutional abuses perpetrated by the Catholic Church and the State from 1922 until 1998 within the "Magdalene Laundries" and Mother and Baby Homes. Magdalene Laundries consisted of incarceration and forcible hard labor. Mother and Baby Homes institutionalized unmarried mothers and often forced mothers to give up their babies. Research demonstrates that the Irish State has failed in fulfilling its promises of reparations for survivors of Magdalene Laundries (McGettrick et al., 2021; The Clann Project, 2021). A redress proposal has been created for survivors of Mother and Baby Homes, however it excludes many people (gov.ie, 2021). Meanwhile, the Church has yet to provide reparations. Relatives of institutionalized women have not been considered for reparations, and oral history from relatives has been limited (JFMR, 2012). To understand how to achieve justice and the impact of intergenerational trauma, I have spoken to survivors and their family members. This research assesses patterns among participants in their experiences of institutionalization, means of seeking justice, and family histories.

D.U.25 Developing a New Method for Histone Protein Purification

Morgan Priem and Daniel Grilley
Mentor: Daniel Grilley, Chemistry & Biochemistry

Nucleosomes, composed of deoxyribonucleic acid (DNA) and histone proteins, play a critical role in gene regulation and cellular function by controlling access to the genetic information stored within DNA. The placement and movement of nucleosomes along strands of DNA is determined, in part, by the presence of adenine (A) and thymine (T) nucleotide rich sequences. Previous studies have demonstrated the significance of these sequences in determining nucleosome placement; however, the role these sequences play in nucleosome dynamics remains unclear. A critical shortcoming preventing easy study of nucleosomes in an undergraduate lab is the high cost and long hours needed to generate histone proteins. This project strives to eliminate this barrier by developing an affordable and effective method for histone purification at an

undergraduate institution. Polymerase chain reaction will be used to construct plasmid DNA which can be transformed using *E. coli* to produce histone proteins tagged with a maltose binding protein. This tag allows for effective purification of histone proteins and is easily removed to produce natural histone proteins. This study seeks to use the purified nucleosomes to test how poly-A sequences impact nucleosome formation. Results of this study will open the door to future studies on how poly-A sequences affect nucleosome dynamics.

D.U.26 The Relationship between Parental Use of Alcohol and Children's Academic Performance

Trinity Rausch
Mentor: Alexander O'Brien, Psychology

The purpose of the proposed study is to investigate the relationship of parental misuse of alcohol and their children's academic performance, including moderating factors of family dynamics, and external protective factors. Research has shown that having a parent who misuses alcohol is detrimental to a student's academics, lowering overall grade point averages and increasing the frequency of skipped classes. Protective factors, such as high parental expectations and religious affiliation, are associated with greater student resilience, and decreased influence of parental alcohol misuse on student academic outcomes. This study will assess both UWL undergraduate students, as well as a broader sample of participants using Amazon Mechanical Turk, to account for the low variability in the UWL population's demographics. It is hypothesized that parental alcohol misuse will be negatively correlated with students' academic outcomes. Additionally, if evidence suggests that particular protective factors reduce the strength of that correlation, the findings of this study may be utilized to create interventions to improve the academic well-being of students who live in a household with a parent who misuses alcohol.

D.U.27 Characterizing the Expression of *Myxococcus xanthus* Genes Controlled by the NmpRS Two-Component System That Senses Oxygen Concentration

Allison Ronk
Co-author: Daniel Bretl
Mentor: Daniel Bretl, Microbiology

Myxococcus xanthus is a bacterium with a complex lifestyle that includes predation, multicellular development, and motility. These social behaviors require *M. xanthus* sense and respond to its environment, which is done, in part, via two component signaling systems (TCS). *M. xanthus* encodes a disproportionately large number of TCS compared to other bacteria, which makes it a model organism to study TCS networks. A typical TCS contains a sensor kinase that biochemically interacts with a response regulator by phosphorylation. For this project, I studied a TCS called NmpRS that contributes to *M. xanthus* motility and response to oxygen. The goal of this project was to determine if NmpR regulates genes bioinformatically predicted to be regulated by this TCS. Specifically, I characterized the expression levels of five predicted NmpR-regulated genes using a molecular tool known as a *lacZ* reporter in wild-type, Δ*nmpR*, and a constitutive NmpR "ON" strain. We found that NmpR does regulate these promoters, but to varying degrees. This characterization is important because NmpR-regulated genes have not yet been defined, and may have important implications for *M. xanthus* motility, multicellular development, or low-oxygen survival. Future study of these genes in *M. xanthus* will inform us what accounts for the different levels of transcription, the function of these genes related to changing oxygen concentrations, and the function of the gene products on *M. xanthus* physiology.

D.U.28 A Spatial and Visual Analysis of Oneota Ceramics: Function vs. Identity

Lauren Stanley
Mentors: Constance Arzigian and Timothy McAndrews, Archaeology & Anthropology

The Oneota have been documented in southern Wisconsin for a span of nearly 350 years, between AD 1300-1625. The Oneota people lived in small, semi-permanent, agricultural groups. They also continuously practiced the cultural tradition of manufacturing many ceramic vessels. Typical Oneota ceramics were globularly shaped and had a distinctive shell temper, but also had varying decorations on the lips, shoulders, and bodies of the vessels. Although these decorations have been extensively observed within Oneota culture, archaeologists have gathered little knowledge surrounding the purpose of ceramic decoration and the how decorative techniques were transmitted among the Oneota people. This research will use ceramics recovered from an Oneota village and cemetery site, excavated in Onalaska, Wisconsin. A select portion of these vessels are decoratively unique and do not correspond with the styles typically seen in the periods they date to. To determine if these abnormalities resulted from the Oneota using decorations to indicate the function of their vessels, or to display their familial identity at this site, a visual analysis of individual vessels' stylistic characteristics

and spatial distributions will be conducted. This analysis is expected to reveal the relational patterns between the vessels and their decorations, their functions, and their locations at this site.

D.U.29 Conversation Content Influences Goals in Interracial Interactions

Emily Veroeven
Mentor: Kevin Zabel, Psychology

There is little research done on how motivations (i.e., control prejudice) are differentially activated in interracial interactions based on content (i.e., what interaction partners discuss) in those interactions. In this study, participants partake in the cover story of analyzing the effectiveness of a new website called "ZipperHQ," a video emailing app. They then interact in a video email conversation with a White or Black same-gender confederate and receive a list of "icebreaker" questions from which a confederate chooses three questions to discuss (three high or low intimate topics). The participant then voices their responses in a video and chooses three questions to ask their "partner." While waiting for an anticipated response, the participant completes a list of questionnaires measuring motivation to control prejudice and be liked. We are still completing data collection. However, our experiment will be analyzed using a between-subjects ANOVA Factorial design. It is hypothesized that if a Black (relative to White) partner broaches high (relative to low) intimate topics, motivation to control prejudicial reactions and to be liked will increase. The research results have the potential to improve the dynamics of intergroup interactions by increasing understanding of which motivations are activated based on content discussed.

Oral Session A2
9:20 am – 9:45 am

O.U.3 Mass Equivalence via a Virtual Quantized Fulling-Davies-Unruh Effect

Andrew Otto
Co-author: Steven Verrall
Mentor: Steven Verrall, Physics

An uncharged particle model, where Planck length, Planck time, and mass energy are the only quanta is developed. This model is consistent with both special and general relativity. A long unsolved problem in physics is the incompatibility of quantum mechanics with general relativity. Other problematic issues include the renormalization of quantum field theory and the multiple hidden dimensions of string theory. The particle model developed in this work does not require renormalization and does not require the multiple hidden dimensions of string theory. Standard quantum theories involve particles with extremely high accelerations. Such particles should possess Rindler horizons, according to special relativity, and acceleration induced thermality, according to the Fulling-Davies-Unruh effect. This work starts by assuming that all elementary particles experience cyclic zitterbewegung motion in a manner independent of charge. It is shown that this motion may be maintained via the mechanics of Rindler horizons and the Fulling-Davies-Unruh effect. This work shows that the equivalence of gravitational and inertial mass, a central assumption of general relativity, may be a consequence of uncharged zitterbewegung motion.

O.U.4 Reciprocal Disclosures of Sexual Assault in Digital Spaces

Paige Jansen
Co-author: Shanna Felix
Mentor: Shanna Felix, Sociology & Criminal Justice

Sexual assault is the most underreported violent crime to formal support providers, such as the police and medical professionals. Reasons for the low rate of reporting can be linked to victim's fear of victim-blaming, fear of not being believed, shame, and negative responses to previous disclosures of the assault. The #MeToo movement, which took off in 2017, popularized social media platforms being used as a space for victims to share their stories and converse with others who have experienced similar traumas. The present study analyzes the digital disclosure of sexual assaults on the platform reddit and the reciprocal disclosures that other users offered off of disclosure posts. Within this study, the similarities and patterns between original and reciprocal disclosures were explored. The implications for clinical practice and future research directions are examined.

O.U.5 Recreation of Oneota Ceramic Manufacturing and Firing Techniques through Experimental Archaeology

Carley Arrowood
Mentors: Constance Arzigian and David Anderson, Archaeology & Anthropology

This study is an investigation of ceramic manufacturing and firing techniques used by precontact Oneota potters, with data being collected through experimental archaeology. The Oneota is an archaeological complex made up of the ancestors of the modern-day Ho-Chunk, Ioway, and Otoe Peoples, who lived in the La Crosse area from AD 1300-1650. They were an egalitarian, agricultural society, known for their construction of large, thin-walled, and shell tempered ceramic vessels. This research applied authentic materials and conditions to various techniques for constructing and firing clay pots, in order to interpret the past activities of Oneota potters. Measurements of wall thickness and rim diameter, as well as evaluations of carbon coring (blackening of the inside of the clay body) and shell temper lamination (aligning of shell temper particles), were compared to Oneota pot sherds that were archaeologically recovered from the Tremaine Site (47Lc95) in Holmen, Wisconsin. Through a statistical comparison between experimental and archaeological pots, this study will demonstrate how coil building, shell scraping, stone rubbing, paddling, and open-air firing are comparable to techniques that would have been utilized in the creation of Oneota pots found in the archaeological record. Through these interpretations, researchers can better understand the pottery manufacturing industry that dominated the Midwest in the times leading up to European contact.

Oral Session B1
9:55 am-10:20 am

O.U.7 Zitterbewegung Electromagnetic Deuteron Model

Emily Friederick
Co-author: Steven Verrall
Mentor: Steven Verrall, Physics

The concepts of the recently developed zitterbewegung electromagnetic (ZEM) proton model are further developed and extended to a ZEM deuteron model. A deuteron consists of a proton fused with a neutron, although the composite structure is highly symmetrical. Deuteron binding energy is calculated purely from electromagnetic effects. This ZEM deuteron model consists of a $-e$ charge open torus surface wrapped around the neck of a $+2e$ charge hourglass-shaped surface. The two surfaces are assumed to rotate at light speed to generate magnetic moments. This work assumes that magnetic moments are conserved when protons and neutrons fuse, forming larger nuclides. The sum of the magnitude of the magnetic moment of an hourglass lobe, and the magnitude of the magnetic moment of the $-e$ charge open torus surface, is assumed to equal that of a neutron. Each hourglass lobe is assumed to have a magnetic moment equaling that of a proton. The vector sum of all three magnetic moments is assumed to equal the deuteron's magnetic moment. This vector sum is assumed to be slightly less than the sum of magnitudes, due to magnetic repulsion forces causing the hourglass surface to wobble relative to the open torus surface. The magnetic repulsion forces are assumed to be balanced by forces of electrostatic attraction. This work shows a direct relationship between deuteron mass energy, the hourglass wobble, and the dimensions of the $-e$ charge open torus surface.

O.U.8 Characterization of Antibiotic- Resistant *Stenotrophomonas maltophilia* Isolates from Wild Painted Turtles

Noah Grover
Co-author: Xinhui Li
Mentor: Xinhui Li, Microbiology

Antibiotic resistance has been a serious threat to public health. Among many antibiotic-resistant bacteria, some extended spectrum β-lactamase (ESBL)-producing, and carbapenem-resistant Gram-negative bacteria have become a major concern because these bacteria can be resistant to many common β-lactam antibiotics. *Stenotrophomonas maltophilia* is a Gram-negative bacterium that can be found in many environments, including clinical environments and can be intrinsically resistant to important antibiotics. We investigated two *S. maltophilia* isolates 9A and 15A, which were isolated from fecal samples of wild painted turtles and identified through whole genome sequencing. Also, through whole genome sequencing, *S. maltophilia* 9A and 15 were found to carry multiple antibiotic resistance genes. Antimicrobial susceptibility profiles of these two isolates were examined through a disk-diffusion assay and results showed that *S. maltophilia* 9A was resistant to ceftazidime, cefotaxime, and produced ESBL, while *S. maltophilia* 15A was resistant to ceftazidime, cefotaxime, and kanamycin. Additionally, a minimum inhibitory test indicated that 15A was resistant to carbapenem. Our study demonstrates that bacteria from wild animals also contribute to antibiotic resistance.

Oral Session B2
10:25 am-10:50 am

O.U.10 Orbiting Mirror Analysis: A Case Study

Hannah Bechtel
Mentor: Shauna Sallmen, Physics

Mirrors have been hypothesized for use in terraforming since the late 1980's. If an extraterrestrial civilization were to use large, lightweight mirrors, for example to warm up the dark side of a tidally locked planet for habitation, would we be able to detect that? When a planet passes in front of (or transits) its star, it blocks some of the light we receive; a cloud of mirrors around an exoplanet could change the shape of the light curve enough for us to know that they are there (depending on the sensitivity of our measurements and the properties of that mirror cloud; Korpela, Sallmen, and Greene 2015). To analyze the dynamics of such possible mirrors, we have to understand the role that radiation pressure plays, which is when photons from a star transfer momentum to other objects. These kinds of mirrors would be thin enough for radiation pressure to have an appreciable effect. Our research team ran single-mirror simulations to see how gravity and radiation pressure impact the stability of these mirrors in orbit, changing variables like the type of star, the initial eccentricity of

the mirror, and other orbital elements. Generally, radiation pressure destabilizes mirror orbits around potentially habitable planets that are closer into their stars, with some notable exceptions. I will examine one in greater detail by analyzing different subsets of mirror orbits.

O.U.11 Effects of Anti-Planned Parenthood Policy on Poverty and Welfare Program Participation

Hope Carter
Mentor: Mary Hamman

This research explores the effect of a change in access to birth control on poverty rates of families. Specifically, we explore how policy in Texas that banned Medicaid reimbursement of Planned Parenthood health centers affects poverty rates among Texas families with children aged 0 to 4 years old. Legal and publicly funded access to contraceptives has been shown to reduce birth rates, mitigate the negative financial effects of unwanted pregnancy and to reduce poverty rates and decrease the gender wage gap in prior research. This research uses data from the Survey of Income Program and Participation to compare the poverty rates and welfare program participation of families affected by the Texas policy to families unaffected by the policy using timeframes before and after policy implementation. Preliminary regression results show a 47% decrease in affected family incomes relative to the national poverty threshold. Therefore, it is reasonable to hypothesize that restricted access to Planned Parenthood services in Texas will have adverse effects on poverty and an increase in welfare program participation like SNAP, TANF, and WIC.

Oral Session C1
11:00 am-11:25 am

O.U.13 Security Selection Model for the Gordon Spellman Fund

Brandon Micech
Mentor: Adam Stivers

In 2005, a student-directed portfolio was created at the University of Wisconsin-La Crosse where an alumnus, Kevin Spellman, donated funds in his grandfather's name. Since 2005, the fund has approximately $443,000 in value and is invested in common stock and cash. The fund is managed by the investment club and students in Investment Analysis and Portfolio Management (FIN 475), with finance faculty and Spellman Fund advisors (investment professionals) providing oversight. The fund follows an investment strategy but has yet to establish a formal method to analyze potential investments. This research aims to solve this issue by creating a stock selection model focused on twenty financial ratio measures that best correlate to future returns of roughly 500 stocks. This will allow me to analyze which common financial ratios matter most. The analysis will also examine what stocks have the best composite score rating from 0-100 based on how correlated each stock’s financial ratio is with future returns. This model will allow future students to select superior stocks to analyze and potentially add to the Spellman Fund based on the fund’s investment criteria. This analysis will be part of the oral presentation at the University of Wisconsin-La Crosse Research & Creativity Symposium where I will present my findings from the Security Selection Model.

Oral Session C2
11:30 am-11:55 am

O.U.14 Searching for Extraterrestrial Civilizations in Galaxies Far Far Away

Raffy Traas
Mentor: Steve Croft, Ph.D., University of California, Berkeley

The Search for Extraterrestrial Intelligence (SETI) endeavors to find evidence of intelligent civilizations beyond Earth, a field currently led by Breakthrough Listen (BL), the $100M, most comprehensive project to date. Historically, studies have searched nearby sun-like stars for civilizations with Earth-like technology – Type I civilizations. BL has expanded the search to include civilizations that have mastered energy usage on a galaxy-wide scale – Type III civilizations. These civilizations would possess technology so powerful that we could detect their presence on Earth, despite being millions of light years away. BL has completed observations of 97 nearby galaxies using the 100m dish of the Robert C. Byrd Green Observatory. The observations presented in this work establish some of the deepest limits to date over such a wide band of radio frequencies (1 – 11 GHz) on the presence of galactic civilizations.

GRADUATE STUDENT ABSTRACTS

Poster Session A
8:50-9:45 am

A.G.31 Oasis: An Evidence-Based Curriculum for Pain Management through Relaxation Techniques in Hospice Residents

Emily Ausman
Mentor: Tara Delong, Recreation Therapy & Therapeutic Recreation

Though therapeutic recreation (TR) is often involved in providing quality of life experiences during end-of-life care, the documented use of therapeutic interventions for the specific purposes of nonpharmacological approaches to pain management is lacking in the literature. The given aging population has 1.55 million individuals on Medicare receiving hospice treatment (1) and 60% of these individuals being in some form of pain, (2) TR is able to capitalize on evidence-based interventions that improve quality of the end-of-life experience. Oasis, an evidence-based curriculum, utilizes a variety of relaxation techniques to assist in managing pain for individuals on hospice. Oasis is a twice a week, 8-week program that uses the World Health Organization Quality of Life - Brief (WHOQOL-BREF) and Numeric Pain Rating Scale (NPRS) to assess pain through the Biopsychosocial theory of pain for residents at a long-term care, skilled nursing facility, who are enrolled on hospice. The programs are designed to manage pain while decreasing the overall usage of opioid medications since over 65% of hospice residents' pain is treated through the usage of opioid medications. (3) With Oasis, the field of TR is able to move towards utilizing evidence-based practices to manage pain in end-of-life residents.

A.G.32 Foraging Habitat of Breeding Flammulated Owls (*Psiloscops flammeolus*) in the Wasatch Mountain Range

Kristen Baranowski
Co-authors: Markus Mika and Meredith Thomsen
Mentors: Markus Mika and Meredith Thomsen, Biology

Flammulated Owls (*Psiloscops flammeolus*) are small, insectivorous predators that are of conservation concern due to climate change and shifts in habitat and available resources. Populations of Flammulated Owls found within the Wasatch Range in northern Utah tend to occupy different habitats compared to other populations of the western US. The primary purpose of this study is to estimate where the owls are foraging during the nesting period to better understand how plant community characteristics influence foraging behavior. I captured male Flammulated Owls and deployed GPS units mounted on birds to obtain foraging location data, took measurements of owl condition before and after two weeks of foraging, and sampled vegetation and nocturnal insects at foraging location points. I documented foraging site characteristics to generate detailed information regarding owl foraging site preferences, and how plant community characteristics and insect abundance change over the breeding period. I predicted that insect biomass and plant diversity would be positively correlated across foraging sites. I further predicted that greater decrease in male owl body condition would be correlated with foraging at sites with lower nocturnal moth biomass, a less diverse plant community, high canopy cover, and located farther from the nest. Information about how owls choose among available habitats, and how habitat quality influences male condition may inform resource agencies on best management practices.

A.G.33 Aging with Resilience: A Therapeutic Recreation Expressive Arts Curriculum for Older Adults Living in Skilled Nursing Facilities

Annika Edmundson
Mentor: Jennifer Taylor, Recreation Management & Therapeutic Recreation

Resilience is characterized as the ability to bounce back from adversity or challenges, which older adults encounter frequently. Older adults (ages 65+) face physical, cognitive, sensory changes, and difficult life events that require one to be resilient. This can include financial challenges, loss of a loved one, and increases in chronic health conditions. By developing resilience, older adults are better equipped to face the challenges that accompany the aging process. With more than 1.5 million older adults living in Skilled Nursing Facilities (SNFs) in 2022, the need for interventions focusing on resilience among older adults is apparent. Aging with Resilience is an evidence-based therapeutic recreation curriculum utilizing expressive arts interventions to increase resilience among older adults. The program is designed to be implemented by a recreational therapist, in-person for 50-minute sessions once a week for eight weeks. The Brief Resilience Scale (BRS) is used to measure resilience in a pro-post design. The scale uses three central constructs of the

Resilience Theory, including risk factors, protective factors, and vulnerability factors. By utilizing this theory, Aging with Resilience's program sessions and goals align with the needs of the population and the necessary components to increase resilience among older adults living in SNFs.

A.G.34 Tending to the Bridge: UDL and Student Achievement

Rachel Frank
Mentor: Jocelyn Newton, Psychology

Wisconsin's 2019 National Report Card revealed that the achievement gap between our White and Black students is the largest in the nation. Helping students overcome learning barriers is crucial to their success. Universal design of learning (UDL) improves student engagement and lessens barriers. This study examines the relationship between student perceptions and practices of UDL on their anticipated grades. This research supports school psychologists' consultations regarding instructional practices and supports for students.

A.G.36 Every Mind Matters: An Evidence-Based Curriculum for Coping Skill Development in Recreation Therapy (RT) Practice

Amy Jeranek
Mentor: Tara Delong, Recreation Management & Therapeutic Recreation

Coping skills are a necessity for everyone as life changes and stress occurs. The evidence-based curriculum, Every Mind Matters (EMM), utilizes art interventions that foster the development of coping skills in adolescents with a diagnosed mental illness in a treatment setting. Expressive arts interventions (EAI) empower patients to take a more active role in their treatment, which facilitates self-discovery, healing, and change. Research states adolescents, specifically with a mental health diagnosis, need to develop active and productive coping skills, however, rarely elaborates on how to develop such coping skills. EMM develops active coping skills through EAI and discussions about coping skills in each session. The patients with complete the Brief Coping with Problems Experienced assessment before and after the program that will examine 14 specific items related to coping skills. This assessment, along with the Coping Skills Theory, provided the framework for the development of EMM. The Coping Skills Theory recognizes that coping skills vary by person which leads to different appraisals of situations, reinforcing the idea that coping skills are a necessity for every person's life. EMM will assist in development of coping skills using art interventions and will enhance the field of RT by utilizing evidence-based information.

A.G.37 The Effects of Dynamic Postural Stability following Cryotherapy in Athletes

Alexandra Kriefski
Mentor: Cordial Gillette, Exercise & Sport Science

PURPOSE: As beneficial as cryotherapy may play in an athlete's recovery regime, evidence indicates that cryotherapy declines dynamic postural stability (DPS). The purpose of this study was to examine warmup intervals post-cryotherapy to identify a warmup parameter for DPS to be regained. METHOD: Seventeen NCAA Division 3 athletes (11M/6F, 20.65 ± 1.46yrs) volunteered for two data collection sessions in a controlled laboratory setting. Participants performed the Y-Balance test standing on their dominate leg. The highest reach score in each direction was recorded. Participants than placed their dominate ankle in a slush bucket between 45-55 °F for 20 minutes. Immediately following, the Y-Balance test was performed again. The second session began with the performance of the Y-Balance test followed by a 20-minute slush bucket. After the slush bucket intervention, participants stationary biked and performed the Y-Balance test again at the 5-, 10-, and 15-minute interval of biking. RESULTS: When looking at specific intervals, the 10-minute (ANT p=0.007) and 15-minute warmup intervals (ANT p=<0.001, P.LAT p=0.001) lead to improvement. Although both warmup intervals showed an increase in Y-Balance performance, the 15-minute interval demonstrated greater improvement. CONCLUSION: Participants improved in Y-balance performance after a 10 and 15-minute warmup intervention post-cryotherapy

A.G.38 Mental Health: The Impact of Teachers' Attitudes on Referrals

Kayla Larson
Mentor: Jocelyn Newton, Psychology

Approximately 1 in 5 youths has a mental health condition, which can have significant impacts on all aspects of life (World Health Organization, 2021). Teachers have a crucial role in supporting students' mental health, including referring students for services. Teachers' personal attitudes toward and understanding of mental health may influence the referrals they make. This study aims to analyze how teachers' attitudes toward mental health impact referral rates for students with mental health concerns.

A.G.39 Instructional Practices That Enhance Early Childhood Teacher Self-Efficacy

Shayde McKay
Mentor: Jocelyn Newton, Psychology

Teacher self-efficacy has a significant impact on student outcomes (Mojavezi & Tamiz, 2012). This is especially true for Early Childhood (EC) programs. The present study aims to identify which instructional practices positively contribute to greater self-efficacy in EC teachers. The outcome of this study will inform school psychologists' consultation skills with EC teachers through the clear identification of appropriate instructional practices which enhance teacher self-efficacy, ultimately improving both student and teacher outcomes.

A.G.40 Teachers' Practice: Are We Fostering Self-Determination in the Classroom?

Destiny Miller
Mentor: Robert Dixon, Psychology

Higher levels of student self-determination have a significant positive impact on school and post-school outcomes, especially for students with disabilities (Shogren et al., 2015; Wehmeyer and Schwartz, 1997; Wehmeyer and Schwartz, 2003.) The present study aims to identify educators' perceptions of their students' current capacities and opportunities for self-determination in the classroom. This research will allow school psychologists to consult with educators on their use of self-determination in the classroom.

A.G.41 Identifying the Lethal Factor for Treatment of *Staphylococcus aureus* by Novel Antibiotic SK-03-92

Madison Moore
Co-authors: Sophia Cannarella, Kyle Gebhardt, John May, and William Schwan
Mentors: William Schwan, Microbiology, and John May, Chemistry & Biochemistry

In 2017 the United States reported that of 119,247 *Staphylococcus aureus* bloodstream infections 16.6% were fatal. The emergence of multi-drug resistant organisms is an ongoing problem in treating these infections. In recent years, a phytoalexin analog called SK-03-92 was synthesized, demonstrating antimicrobial properties and an unknown mechanism of action. RNA microarray results of SK-03-92 treated versus untreated *S. aureus* showed transcriptional dysregulation of the *lrgA*, *srtA*, *brpR*, and *brpS* genes. This suggests that the mechanism of action for programmed cell death by SK-03-92 is through the induction of late-stage competence. To identify the lethal factor was a protein, supernatants from SK-03-92 treated cells containing lethal factor were boiled and treated with proteinase K. Killing activity was ablated following boiling and proteinase K treatment. Isolation of the lethal factor was done using ion chromatography and gel electrophoresis and showed a protein with a molecular weight of about 13 kDa. Preliminary testing of supernatants from wild-type and *cidA* mutant strains suggests the lethal factor might be the holin protein encoded by the *cidA* gene. Understanding the mechanism of action for phytoalexin treatment of bacteria is necessary for further pharmaceutical development.

A.G.42 Student Self-Efficacy: The Role of Adverse and Positive Childhood Experiences

Zachary Noethe Wolford
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

Student self-efficacy is a strong predictor of student achievement (Hattie, 2017) and, therefore, influences the trajectory of academic development. Furthermore, self-efficacy is attributed to a myriad of potential factors including adverse childhood experiences, positive childhood experiences, GPA, gender, and grade level. This research aims to analyze high school student characteristics and childhood experiences to determine how they predict academic self-efficacy – expanding data on childhood experience screenings and informing the implementation of adequate supports within schools.

A.G.43 The Effects of Cuff Placement on Power Output after Fatiguing Blood Flow Restriction Exercise of the Lower Extremity

Hunter Stinson and Teagan Ziegler
Co-authors: Ellen Costic, Matthew Ellison, Parker Plumer, George Nunn, and Patrick Grabowski
Mentor: Patrick Grabowski, Health Professions

Introduction: Blood flow restriction (BFR) uses a pneumatic cuff to reduce blood flow to an extremity during exercise. Research has shown that it can be an effective intervention to produce hypertrophy under low-load conditions. However, research has not compared the effects of cuff placement on power output. **Purpose:** To explore whether changing cuff placement with the use of BFR for lower extremity exercise alters power output in the calf muscles. **Methods:** 10 participants completed a baseline trial measuring maximum power output during three single-leg calf raises. Participants were randomized to a proximal (quad) or distal (calf) cuff placement. With the cuff inflated to 65% occlusion pressure, both groups completed a fatigue protocol utilizing a 3-rep reserve method and maximum force production was recorded immediately after. Following rest, participants repeated the protocol with the opposite cuff placement. **Results:** Peak force for the proximal thigh averaged 987.1±277.5 N compared to 969.1±237.6 N for the proximal leg condition. Both are lower than the non-fatigued average of 1070.6±244.8 N but demonstrate sufficient variability to be statistically insignificant. Average time to peak force was nearly identical for all three conditions. **Discussion:** Preliminary findings suggest that different cuff placements do not affect power output during fatiguing BFR exercises. This might suggest that therapists can vary cuff placement based on patient preference and achieve the same local effects.

A.G.44 Mapping Habitat Availability in an Aging Southwestern Wisconsin Reservoir

Nathan Schimanski
Mentors: David Schumann and Jason Freund, Biology

Muskellunge (*Esox masquinongy*) are popular throughout the Midwest, where anglers spend $425 million annually targeting them. Costly stocking efforts to bolster Muskellunge populations and provide new angling opportunities are common throughout Wisconsin. Since 2006, 21,000 fingerlings have been introduced to Neshonoc Lake, a 606-acre reservoir in southwest Wisconsin. Between 1940 and the 1970s, it suffered heavy sedimentation and habitat degradation, though restoration efforts (carp removal, dredging, and installment of a sediment trap) the fishery potential of the lake has improved. The habitat degradation in aging reservoirs like this makes it important to understand habitat availability and complexity, usage by Muskellunge, and their dispersal after stocking. We described the available habitat, movement, and habitat use of juvenile Muskellunge stocked in Neshonoc Lake. We stocked 100 large fingerlings in Fall 2021, with 30 implanted with acoustic tags. During Summer 2021, we used side-scan images to map the sediments, depth, and available habitat using a Humminbird Helix fish finder. The preliminary results show the main substrate to be silt with sand present, coarse structure mostly present in the form of sunken logs and stumps near shore, and clusters of fish cribs present. We tracked tagged fish using a hydrophone to describe their use of cover structures in the lake. Using this information gives insight to which habitats are available and what ones Muskellunge utilize.

A.G.45 Mental Health Stigma Reduction Toolkit Implementation and Effectiveness

Kate Sorebo
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

Roughly 1 in 5 children in the U.S. experiences a mental, emotional, or behavioral disorder. Only about 20% of these children receive specialized services, however (Weir, 2020). This could be partially explained by the perceived stigma associated with mental health. This study aims to build on the need not only for more research but intervention by evaluating the effectiveness of the WI DPI Mental Health Stigma Reduction Toolkit school-age anti-stigma program and its impact on middle/high school students' public mental health stigma. The state department of education Mental Health Stigma Reduction Toolkit examined in this study includes four detailed teacher lesson plans for students at the middle/high school age group levels (Krubsack & Rogers InHealth, 2021). The effectiveness of the Mental Health Stigma Reduction Toolkit will be evaluated using the California Assessment of Stigma Change (CASC) 21-item short-form assessment. The CASC is useful to examine changes in stigma, affirming attitudes, and care-seeking (Corrigan et al., 2014). Data will be analyzed through a paired t-test looking for changes in students' mental health stigma. Data will be collected on each of the factors measured by the CASC at two points: (a) before the start of the first lesson, (b) following the first lesson. Additional data was collected asking the implementor qualitative questions about each student's current understanding, knowledge of mental health stigma, and how the lessons are progressing.

A.G.46 Surveying the Injury Patterns and Physical Activity Behaviors of ROTC Cadets

Abigaile Wilger
Mentor: Thomas Almonroeder, Health Professions

Cadets in the ROTC population have a high incidence of injury especially lower extremity injuries (Almonroeder et al., 2021). The types of injuries, factors contributing to the injuries, and rates of reinjury during their time as cadets are not well understood. There is also a lack of documentation of these injuries and the factors surrounding these injuries among the cadet population. This study seeks to fill this gap by gathering information on injury types, chronicity of injuries, cadet exercise habits, care received to treat injuries, and barriers to treatment in the form of an online survey. This survey will be distributed to different ROTC battalions and will help inform the ROTC areas where interventions would be beneficial and allow us to provide preventative care. The results of this survey will also inform us where additional research would be most effective in preventing injuries in the ROTC cadet population.

A.G.47 Occurrence of Cyanobacteria and Cyanotoxin Genes Compared to Nutrient Levels in Lake Onalaska

Karly Yablonski
Mentor: Bonnie Bratina, Microbiology

Aquatic cyanobacteria blooms are a global environmental concern due to their ability to produce toxins. A combination of environmental factors can lead to cyanobloom formations, but the trigger for cyanotoxin production is largely unknown. Common factors associated with cyanoblooms include excess nutrients, temperature, dissolved oxygen, and pH. Nutrient-rich lakes are likely to experience cyanoblooms due to the presence of soluble reactive phosphorus (SRP), ammonium, and nitrate. It is crucial to monitor these nutrients in eutrophic lakes to potentially predict future bloom formation and the occurrence of elevated cyanotoxin levels. Lake Onalaska, a eutrophic lake located along the Mississippi River, is popular for fishing and water sports in the summer. There are no known cyanobloom or cyanotoxin reports on Lake Onalaska, but it has a dense aquatic plant ecosystem that flourishes in nutrient-filled water. Nutrient levels should be checked yearly at various spots on Lake Onalaska to determine the likelihood of cyanobloom formation that correlates with cyanotoxin production. Therefore, water samples were collected twice a month, between July to September 2021, and nutrient concentrations were determined via spectrophotometry. Cyanotoxin and cyanobacteria (16S rRNA) genes were quantified using a qPCR kit. This data will look for correlations between each nutrient and quantified genes for cyanobacteria populations and their cyanotoxins in Lake Onalaska.

Poster Session B
9:55 am-10:50 am

B.G.21 Sprouting Connection: A Therapeutic Recreation Evidence-Based Curriculum to Increase Social Connectedness of Older Adults in Skilled Nursing Facilities

Heidi Baughman
Mentor: W. Thomas Means, Recreation Management & Therapeutic Recreation

In 2019, 1 billion people were aged 60 years and older (older adults), and this number is projected to increase significantly to 1.4 billion by 2030 and 2.1 billion by 2050. Research has shown that older adults who reside in skilled-nursing facilities are more socially isolated than community-dwelling older adults. This can lead to loneliness and depression, among other negative effects. Sprouting Connection gives older adults in skilled-nursing facilities the opportunity to connect with one another through group-based therapeutic horticulture activities to increase social connectedness. An evidence-based curriculum is created utilizing empirical research within the field of recreational therapy, and other interdisciplinary fields, to ensure well-roundedness and benefits to those who participate. This curriculum uses the Broaden-and-Build Theory, which states that positive emotions broaden an individual's awareness, thoughts, and actions, which leads to building skills and resources. To integrate this theory, each session focuses on positive experiences through building different social skills and promoting the development of long-standing and fulfilling relationships. Sprouting Connection consists of an 8-week program and 1-hour staff training designed for recreational therapists. The goals and effectiveness of Sprouting Connection will be assessed through pre- and post-assessment utilizing The Friendship Scale, which evaluates feelings of social isolation.

B.G.22 The Care Partners Happiness Project: A Therapeutic Recreation Evidence-Based Curriculum Employing Positive Psychology

Emma Dodson
Mentor: Jennifer Taylor, Recreation Management & Therapeutic Recreation

Dementia is a progressive neurocognitive disorder that affects the brain, the individual with the disease, and care partner of the individual. Care partners can experience various emotions and feelings related to wellbeing such as burden, stress, or even satisfaction and reward. The Care Partners Happiness Project: Happiness for the Journey (CHP), an evidence-based therapeutic recreation curriculum is intended for care partners of older adults with neurocognitive disorders. A care partner can be defined as, "a person who takes part in with another or others the provision of health, welfare, maintenance, and protection of an individual". By utilizing the theoretical framework of the Broaden and Build Theory developed by Fredrickson, each session is designed to utilize evidence-based strategies to increase happiness. The end goal is to broaden care partners' knowledge, build upon enduring personal happiness resources, and increase overall happiness among care partners. The curriculum will be implemented in-person during 45-minute sessions, once a week for 10 weeks, at a community-based rehabilitation facility, by a Certified Therapeutic Recreation Specialist (CTRS). The Subjective Happiness Scale (SHS) and modified Differential Emotions scale (mDES) will measure subjective happiness and positive and negative emotions using a pre-post test design.

B.G.23 BOOM! Whacky Music: An Evidence-Based Recreational Therapy Curriculum for Families with Children with Developmental Disabilities in a Community-Based Setting

Elizabeth Folz
Mentor: W. Thomas Means, Recreation Management & Therapeutic Recreation

The Core and Balance Model of Family Leisure Functioning describes five influential factors of family leisure functioning: family leisure involvement, family leisure satisfaction, family communication, family functioning, and satisfaction with family life. Each factor considers family cohesion (core) and family adaptability (balance) overall. For families with children with developmental disabilities, family interactions can be challenging and inclusive leisure programming that fits their needs is hard to find. In literature, there is a gap in family-based programming offering opportunities for improvement in family functioning for this population. As a result, a family-based music curriculum for this population in a community-based setting was created. Research has shown music can increase empowerment, increase communication skills, and even increase overall awareness of family dynamics; therefore, it is a great intervention to utilize for improving overall family functioning while also being grounded in an established model. During 60-minute sessions led by a CTRS once per week for eight weeks, participants will utilize boomwhackers, pitched plastic tube percussion instruments, family discussions, and physical art activities as tools to foster skills related to improved family

functioning. Evaluation of goals will be determined by a pre- and post-assessment, the Family Adaptability and Cohesion Evaluation System IV (FACES-IV).

B.G.24 Identification of Suppressor Mutations in *nmpR* that Restore Type-IV Pili-dependent Motility in *Myxococcus xanthus*

Ava Gehrke and Vanessa Giallombardo
Co-author: Daniel Bretl
Mentor: Daniel Bretl, Microbiology

Myxococcus xanthus is a Gram-negative bacterium that relies on social behaviors such as motility, fruiting body formation, and predation. Social motility of this bacterium is dependent on the production of type-IV pili which is regulated by the two-component system PilSR. A strain of *M. xanthus* in which *pilR* has been deleted is non-motile, however after extended incubation, restored motility was observed. Previous experiments have shown that these strains with restored motility have suppressor mutations in a different two-component system, NmpRSTU. Specifically, these mutations were found in the response regulator *nmpR* that restored motility by causing NmpR to be in a constitutively active, or "ON" state. In this study, we sought to increase the number of known mutations in *nmpR* that would lead to this "ON" state of the protein. To find mutations in *nmpR*, a non-motile Δ*pilR* strain with a plasmid encoding for high expression of *nmpR* was grown, plated onto motility agar, and monitored for restored motility. Mutants that displayed restored motility were isolated, purified, and sequenced. This screen has identified 19 unique mutations in *nmpR.* It is hypothesized that these mutants induce a conformational change of NmpR that mimics the phosphorylated "ON" state of the protein. This mutational analysis can give broad insight into the structure and function of response regulators due to the conserved structure of these proteins across many bacterial species.

B.G.25 Placing Biases in the Rearview Mirror: Teacher Subjectivity on Discipline

Carissa Hemb
Co-author: Robert Dixon
Mentor: Robert Dixon, Psychology

Classrooms today are becoming increasingly culturally and linguistically diverse. In contrast to this, teachers remain a predominately white demographic. As a result of these potential dynamics at play, teachers may possess personal biases which impact how student behaviors are interpreted in the classroom, resulting in the potential for increased disciplinary referrals. Based upon results of this study, school psychologists can advocate for best culturally responsive classroom management practices to reduce discipline disproportionality in our schools.

B.G.26 Does Exposure to Multiple Neonicotinoids Cause Additive Toxicity in *Pimephale promelas* Larvae?

Anya Jeninga
Co-authors: Sara Duffy, Myah Fraundorf, Elisabeth Harrahy, Ph.D. (University of Wisconsin-Whitewater), and Tisha King-Heiden
Mentor: Tisha King-Heiden, Biology

Neonicotinoids are a widely used class of insecticides popular for their specificity to invertebrates; however, recent studies suggest they may negatively impact vertebrates as well. Their frequent application and high water solubility, which allows for leaching into surface waters, raises concerns for non-target aquatic organisms. The neonicotinoids thiamethoxam and imidacloprid are commonly found together in surface waters in the Central Sands region of Wisconsin at levels exceeding ecological thresholds. Neonicotinoids have been reported to exhibit increased toxicity, often referred to as additive effects, on non-target aquatic insects, but information is limited in regard to their potential additive effects on non-target vertebrates. Here we present our preliminary work examining the effects of larval exposures to one or two neonicotinoids simultaneously on fathead minnow *Pimephales promelas.* In ongoing work, fish were treated with either imidacloprid only or imidacloprid and thiamethoxam mixed in a 1:1 ratio (0, 0.02, 0.2, 2, 20, 200 µg/L) via waterborne exposure with 100% daily renewal for eight days. Effects of the larval exposures on survival, hatching, growth, predator escape response, and foraging efficiency were compared to each other as well as to larvae exposed to thiamethoxam only to determine the presence or absence of any additive effects. Initial findings suggest that the toxicity in mixtures may be greater than thiamethoxam alone. On-going analyses regarding the potential additive effects of neonicotinoids on vertebrates may be useful for setting water quality guidelines in Wisconsin.

B.G.27 *Myxococcus xanthus* and the *nmpRSTU* system as a model for bacterial Two-Component Systems

Colin McAllister
Mentor: Daniel Bretl, Microbiology

To regulate complex social behaviors, *Myxococcus xanthus* utilizes numerous two-component systems (TCS). Bacteria utilize TCS to respond to stimuli and consist of a histidine kinase (HK) that recognizes a stimulus, and a paired response regulator (RR) that is phosphorylated by an active HK. The RR can then interact with DNA to regulate transcription. Social motility gene expression of *M. xanthus* is regulated by at least three TCS, including the NmpRSTU TCS. My research focused on autoregulation of NmpR (the RR output) and importance of heme binding to NmpU activity (an HK of the system). To investigate NmpR autoregulation, *lacZ* reporter fusions were constructed with different versions of the *nmpR* promoter: wild-type or mutated NmpR-binding sequences. Fusions were transformed into various *M. xanthus* mutants and activity measured. Changes to the NmpR-binding sites decreased activity even in constitutively active strains, with single deletions lowering, and double deletions almost entirely abolishing activity. These activities *in vivo* correlated with binding *in vitro*. Then, to understand how signal turns NmpR "on", I investigated the importance of heme binding to NmpU function. Mutant NmpU unable to bind heme drastically reduced and delayed autokinase activity, and never reached wild-type levels. These results indicate that binding heme, and therefore O_2, is important to NmpU functionality, and indicates that NmpR gene regulation may be tied to environmental O_2 concentrations.

B.G.28 Discover Sled Hockey

Paige Pawlak
Mentor: Lisa Savarese, Recreation Management & Therapeutic Recreation

Therapeutic recreation (TR) is the use of leisure and recreation activities to improve the overall health and well-being of individuals across all functional domains. Research on sled hockey as a form of TR is lacking, especially as it relates to individuals with disabilities. Thus, Discover Sled Hockey was created to examine individuals with intellectual and physical disabilities who participate in sports-based program. This research concluded that these individuals experience an increase in positive social identity. Discover Sled Hockey is an evidence-based curriculum, grounded in the Social Identity Theory, designed to assist adults with intellectual and physical disabilities in developing an identity using sled hockey. The Athletic Identity Measurement Scale measures the identity of individuals over an eight-week program meeting once per week for 75-90 minutes. Participants learn the fundamental skills of sled hockey, which can lead to developing an identity. The goals of this program are to develop a social identity, understand exclusivity, and limit negative affectivity. The program is created for the TR staff at the RecPlex in Pleasant Prairie, WI. While participating in the program, individuals are provided with a helmet, shoulder pads, elbow pads, knee pads, gloves, sticks/picks, a sled, and a safe, supportive environment.

B.G.29 The Effects of Cadence Manipulation on Joint Loading Patterns and Stride-to-Stride Variability in Female Runners

Kelsey Redman, Sami Casper, Danielle Wissink, and Cheyanne Massie
Co-author: Thomas Almonroeder
Mentor: Thomas Almonroeder, Health Professions

Altering running cadence is commonly done to reduce the risk of running-related injury/re-injury. The purpose of this study was to examine how altering running cadence affects joint loading patterns and stride-to-stride joint loading variability in female runners. Twenty-four uninjured female recreational runners ran on an instrumented treadmill with their typical running cadence and with a running cadence that was 7.5% higher and 7.5% lower than their typical. Ground reaction force and kinematic data were recorded during each condition and principal component analysis was used to capture the primary sources of variability from the sagittal plane hip, knee, and ankle moment time series. Runners exhibited a reduction in the magnitude of their knee extension moments when they increased their cadence and an increase in their knee extension moments when they lowered their cadence, compared to when they ran with their typical cadence. They also exhibited greater stride-to-stride variability in the magnitude of their hip flexion moments and knee extension moments when they deviated from their typical running cadence. These differences suggest that runners may benefit from altering their cadence within and between runs to vary to loads placed on the lower extremity joints.

B.G.30 Hillview Health and Wellness Program

Jessica Barczak, Leah Blazkovec, Hillary Deml, Amelia Sable, and Hannah O'Mara
Mentors: Erin McCann and Jenny Leren, Health Professions

Research has demonstrated a positive correlation between older adults who participate in leisure activities and their well-being (Knecht-Sabres et al., 2020). After completing a needs assessment at Hillview Assisted Living Facility, a strong need for further leisure participation opportunities was identified by residents. Additionally, the Program Coordinator at the facility highlighted the need to increase physical activity among the residents. After gathering data regarding their interests, motivations, and resources, the Hillview Health and Wellness Program was developed. The goal of this program is to utilize leisure tasks to facilitate increased physical activity, improved social participation, and overall improved quality of life to support productive aging in place. The program has been developed by five students in the Occupational Therapy Master program at the University of Wisconsin- La Crosse and will be supervised by faculty. Sessions will be led weekly by the students, consisting of an ice breaker activity, warm up, and a main activity. Fundamental components for chosen activities include social participation, physical activity, and incorporation of leisure interests. The program will be conducted for 5 weeks with the goal of being continuously run and maintained by Hillview staff for enhancement of their weekly routines and social engagement.

B.G.31 Implementing a Wellness Group at Aptiv: Redefining an Active Lifestyle

Rosie Giese, Mercedes Antolak, Michaela Bemis, Lauren Boettinger, Nicole Pfeffer, and Alex Yedinak
Mentors: Laurie Schaffer and Jenny Leren, Health Professions

"Redefining an Active Lifestyle" is a community-based wellness program developed by University of Wisconsin- La Crosse Occupational Therapy students to address the local and national phenomenon of decreased physical activity participation rates among adults with disabilities. Establishing a healthy lifestyle supports strength, endurance, range of motion, and mood to promote high levels of participation and independence in daily activities. The goals of the program included increasing the participants' positive attitudes toward fitness and wellbeing. The positive attitudes were measured by observations of curiosity, initiation of tasks, and engagement in activities. Additionally, a goal was that the participants would increase their minutes of active participation to improve overall health. A total of $256 was granted through UWL Research, Education, and Educational Leadership Mini Grant in order to implement the programming at Aptiv Adult Day Services. The supplies were used in different activities, including adapted bowling, pool noodle hockey, cornhole tournaments, and balloon tennis. The items purchased with the grant money and a detailed plan of the implemented program were given to Aptiv at the conclusion of the program for future use so that Aptiv is able to continue to address the need for exercise amongst adults with disabilities.

B.G.32 Mosher Veteran's Wellness Program

Aleah Jones, Emily Hlavacek, Alison Makinen, and Sierra Watrud
Mentors: Erin McCann, Health Professions, and Michelle Goldsmith, COTA, Tomah Health

The Mosher Veteran's Wellness Program aimed to promote prolonged wellness and quality of life for veterans living at Mosher Home through social engagement and meaningful participation in group activities. Four skilled occupational therapy graduate students addressed social isolation and mental health problems that are prevalent in the veteran community. Twenty-two veterans die by suicide each day in the U.S. due to mental health disorders such as PTSD, anxiety and depression and are less likely to seek mental health services due to stigma and decreased knowledge of available resources (National Council for Mental Wellbeing, 2021). Each session, residents participated in fun and engaging group activities and received a take home packet with health tips and mind games for continued learning and brain stimulation. The outcomes for our program included increased socialization and participation in leisure activities to promote mental health, overall wellness, and feelings of self-efficacy. In order to achieve these outcomes, our program implemented group activities, education and strategies on how to stay healthy, and provided hands-on opportunities and ideas for leisure engagement and socialization activities.

B.G.33 Be Well: An Occupational Therapy Program for Improved Health and Wellness at Forest Park

Katelyn Schulte, Brennah Fulton, Lindsey Schwartz, Ryan Pulvermacher, and Brittany Voigts
Mentor: Erin McCann, Health Professions

Be Well: Health and Wellness at Forest Park consisted of a 5-week, health and wellness program, committed to providing opportunities for social participation, leisure engagement, and education on health promotion to enhance quality of life for the residents of Forest Park. The program was conducted by five skilled University of Wisconsin – La Crosse occupational therapy grad students under the supervision and mentorship of Erin McCann, OTD, OTR/L. Our vision was to address the needs of community dwelling adults, with or without disabilities, living within the Forest Park community who were negatively impacted by the COVID-19 pandemic resulting in isolation and limited opportunities for social interaction. Social participation is pivotal to positive mental health outcomes and overall wellness. Therefore, our program addressed this need by creating a positive atmosphere that fosters connection amongst the residents and engagement in stimulating activities. Focus groups and an initial survey provided us with the residents' interests and areas of need which informed our planning efforts. Each session included interactive activities, demonstrations, and education to promote healthy habits amongst the residents. Surveys completed both before and after each session allowed for data collection regarding participants' feelings towards their personal health and wellness and access to opportunities for social engagement within their community.

B.G.34 UW-La Crosse Occupational Therapy Neurological Conditions Support Group

Kayla Vrieze, Christine Moore, Katie Meeker, Tiffany Salentine, McKayla Scheuer, and Sierra Squires
Mentor: Erin McCann, Health Professions

The UWL OT Neuro Support Group, operated by six occupational therapy students, is a social group that aspires to help individuals with neurological conditions and their caregivers improve quality of life through promotion of social engagement and participation in activities of daily living. Across the lifespan, individuals face the possibility of suffering a neurological condition, thus increasing the need for programs related to providing support and compensatory strategies to assist such individuals with occupational performance. The goals of the support group, increasing social engagement and participation, were achieved through five sessions that addressed daily challenges, adaptive equipment, community resources, caregiver assistance, physical/recreational activities, and social participation. Data was collected pre-and post-program through surveys using 10-point Likert scaled questions and goal setting. Analysis of survey data indicated that all participants increased confidence in leisure and recreation, meeting their social needs, and the use of adaptive equipment. The main findings indicate that the support group was effective and beneficial for participants in improving confidence and social participation. In conclusion, it is clear that a support group for neurological conditions is needed in the La Crosse area as many participants reported benefiting from the program and expressed interest in future support group attendance.

Poster Session C
11:00 am-11:55 am

C.G.26 Vertical Ground Reaction Forces during Landings in a Game-Like Volleyball Scenario

Valerie Adank, Jenna Danninger, Joseph Kopp, and Kayla Manuell
Co-authors: Drew Rutherford and Thomas Kernozek
Mentors: Drew Rutherford and Thomas Kernozek, Health Professions

Acute and chronic lower extremity injuries associated with landing are common in volleyball players. Force platforms have traditionally been used to analyze these mechanics in laboratory settings; however, few researchers have attempted to support these findings outside of the laboratory. Studies also have not analyzed the frequency of landing types due to the inability to instrument players during a game. The aim of our study was to investigate jump landings among volleyball hitters during a scrimmaging scenario with live play. Healthy college aged male and female volleyball players were fitted with Novel Loadsol® in-shoe pressure sensors to measure vertical ground reaction force (vGRF) during 10 minutes of game play. A custom program was used to extract each landing event from these recorded data. Statistical analysis of differences in average and peak vGRF by landing type (bilateral, unilateral right [R], and unilateral left [L]) and sex was performed. Males had higher average and peak vGRF compared to females during landing ($p<0.001$, $p=0.023$). The average unilateral L vGRF were larger than bilateral and unilateral R landings ($p<0.001$, $p=0.029$). Peak unilateral L vGRF were also larger than bilateral and unilateral R landings ($p<0.001$, $p=0.019$). There was no difference in landing

type frequencies between sexes (p=0.861). This study has the potential to inform future studies regarding the examination of impact during landing activities specific to volleyball players.

C.G.27 A Novel Approach: Femoral Cartilage Thickness in Response to Vibration Compared to Squats in Young Adults

Tom Chaffee, Heather Hammil, Niki Patel, and Steni Sackiriyas
Mentor: Steni Sackiriyas, Health Professions

Background: Loading activities, like walking and running, can lead to changes in cartilage thickness. Individuals with increased cartilage thickness may have more force attenuation and lubrication for joint mechanics. *Purpose*: This study aimed to examine the effects of mechanical vibration therapy compared to squats on medial femoral cartilage thickness in healthy, young adults. *Methods*: 34 participants rested for 30 minutes to unload their femoral cartilage, followed by either 10 minutes of seated vibration or three sets of 15 squats, followed by another 30 minutes of rest. Ultrasound was used to capture images of cartilage following each rest and treatment. ImageJ Software was used to measure thickness and SPSS was used for statistical analysis. *Data Analysis*: There was no significant group-by-time interaction effect for medial femoral cartilage thickness over the three timepoints (p=0.41). *Conclusion*: The results show no immediate effects on cartilage thickness from either 10 minutes of seated vibration or body weight squats. However, a potential lasting effect may be present following vibration as shown by an increase of medial femoral cartilage thickness 30 minutes post. This warrants further research with a larger sample size and a longer follow up period. *Clinical Relevance*: This study provides valuable information for clinicians as these methods may not be useful to incorporate into a therapeutic session for the outcome of increased medial femoral cartilage thickness.

C.G.28 Assessment of Coldwater Stream Designations in Northeast Iowa Using Temperature Loggers and High-Resolution Satellite Imagery

Ali Chalberg
Mentor: Eric Strauss, Biology

Water temperature is an important habitat component of aquatic ecosystems. Brook and Brown Trout are economically important species in Driftless Area streams that require stable water temperatures less than 20 °C, i.e., coldwater streams. One of the initial steps in managing trout populations is targeting streams with adequate temperature habitat. In northeastern Iowa alone there are currently an estimated 100 misclassified streams. Correctly reclassifying these streams is needed to efficiently allocate fisheries efforts towards trout streams. Using a combination approach of temperature loggers and remote sensing image analysis, we will suggest revisions of stream classification. Previous literature suggest thermal regimes within streams can be assessed by determining the relationship of weekly mean air temperature on weekly mean stream water temperature and can be used to determine coldwater streams. Preliminary data seems to be promising and is closely resembling previous literature. Coldwater streams are primarily driven by groundwater springs and remain ice-free when the landscape is frozen. Automated usage of high-resolution satellite imagery to delineate ice-free streams during winter has thus far has yielded inconclusive results. However, manual interpretation although tedious is yielding accurate results. The combined results from this study will be used for reclassification of stream designations and a methodology that can be used across the Driftless Area region.

C.G.29 Effect of Immediate Post-Trial Feedback during Drop Landings on Impact and Joint Positions in Healthy Female Athletes

Rachel Kiminski and Cori Williams
Co-authors: Kyle Cluppert, MS (Viterbo University), Owen Mills, ATC (Viterbo University), Drew Rutherford, Becky Heinert, MS, PT (Gundersen Health System), and Thomas Kernozek
Mentors: Thomas Kernozek and Drew Rutherford, Health Professions

Non-contact anterior cruciate ligament (ACL) injuries may be attributed to increased vertical ground reaction force (vGRF) and dynamic knee valgus. Post-trial feedback may effectively train athletes to alter these mechanics. This study examined how immediate visual and verbal feedback alters vGRF and frontal plane lower leg position during landing and transfer to game-like drills as measured by acceleration. 31 female collegiate athletes performed 3 trials of game-like drills, 6 blocks of drop landings with varying feedback and dual-task conditions (30 trials), then 3 additional trials of game-like drills. High-speed video and force plate data were obtained during drop landings. During feedback trials, participants received visual representations and individualized verbal feedback to reduce vGRF and improve lower extremity alignment. vGRF and knee to ankle ratio (K:A ratio) were compared at baseline, with feedback, and without

feedback and between trials with and without a dual task. Game-like drill accelerations were compared before and after drop landing training. Differences occurred in vGRF ($p<0.05$) and K:A ratio ($p<0.05$) across blocks, K:A ratio with and without a dual task ($p<0.05$), and game-like drill acceleration ($p<0.05$). Single session immediate visual and verbal feedback may effectively improve drop landing mechanics that transfers to game-like play, thus reducing ACL injury risk in sport.

C.G.30 Reliability of the Huntleigh Dopplex ABIIity System Measured by Novice Clinicians in Older at Risk and Young Subjects

Brian Zahn, Miki Kobayashi, Taylor Martocci, Cassidy McCann, Gianna Pricco, and Tessa Traynor
Mentor: John Greany, Health Professions

Purpose: The objective of this investigation was to determine the reliability of a new automatic Ankle Brachial Index (ABI) system for the diagnosis of Peripheral Arterial Disease (PAD). **Subjects:** Participants consisted of a convenience sample of 65 healthy young adults (20 males, 45 females) age 23.7 $\pm$ 2.1 years and 12 older adults (7 males, 5 females) age 73.4 $\pm$ 10.6 years. **Methods:** Six testers had 4 hours of training administering an automated ABI. Subjects rested for 10 minutes prior to data collection. Dopplex ABIlity pressure cuffs were placed on bilateral feet and arms. Three trials were taken with the last 2 analyzed. Test-retest reliability data were reported as ICCs (3,1) and validity of SBP values from paired t-tests (auscultatory versus device). **Results:** Reliability (ICCs) of ABI data demonstrated moderate test-retest reliability (0.64-0.69) and good-excellent reliability of SBP for all extremities data (0.85-0.92) for all subjects. The mean ICC for young subjects was 0.59 and older subjects 0.91 (excellent). A paired T-test analysis showed no differences between brachial SBP values from auscultation and Dopplex ABIlity device. **Conclusion:** The study confirms that the Dopplex ABIlity provides good to moderate reliable data. One measure of validity showed similar results for systolic blood pressure. **Clinical Relevance:** The Dopplex ABIlity may be considered a reliable method for screening individuals with or without risk factors for PAD.

Poster Session D
12:05 pm – 1:00 pm

D.G.30 Comparison of Force-Measuring Instruments across Multiple Movements: A Validation Study

Erin Buck, Molly Ciszewski, Hannah Werner, Elizabeth Yamriska, Drew Rutherford, and Thomas Kernozek
Mentors: Drew Rutherford and Thomas Kernozek, Health Professions

Force platforms have long been the gold standard for measuring impact via ground reaction forces during a variety of human movements. Unfortunately, traditional in-ground force platforms are not easily accessible or affordable for many physical therapy clinics. Wearable sensors provide more opportunities for clinicians and researchers to measure impact forces in real life applications. Wearable force detection devices used in this study include the Shimmer tri-axial accelerometer and Novel Loadsol pressure insole sensors. The purpose of this study is to validate the use of wearables in measuring impact force with functional activities against in-ground laboratory force platforms. Twenty-one participants were fit with an accelerometer to their posterior pelvis and Loadsol insoles in standardized footwear. Data collection consisted of measurements of maximal impact or ground reaction force during six different functional activities. Future analysis will focus on comparison of peak acceleration and impact forces between the force platforms and the wearable accelerometers and pressure insoles. It is hypothesized that the forces from the force platform and wearables will be comparable and demonstrate good validity for use in real-world dynamic tasks. These findings will support feasibility in using wearable sensors for measurement in a variety of dynamic tasks.

D.G.31 Interrater Reliability of Femoral Cartilage Thickness Measurements in Young Adults Using Ultrasound Imaging

Tom Chaffee, Caitlin Fallon, Logan Goral, and Amy Brown
Mentor: Steni Sackiriyas, Health Professions

INTRODUCTION: Cartilage thickness can be measured using various imaging techniques. Advanced imaging like computed tomography and magnetic resonance imaging can be expensive, time consuming, and inaccessible. Ultrasound (US) imaging has shown accuracy when measuring cartilage thickness and may be a viable option within the physical therapy clinic. The purpose of this study was to examine interrater reliability of student physical therapists (SPTs) measuring femoral cartilage thickness via US. METHODS: Participants included 34 adults between 18-35 years old

without history of LE injury or surgery in the last year. Participants rested for 30 minutes in long-sitting with a pillow under their knees. Their dominant leg was then placed in 140 degrees of knee flexion and 3 US images were taken of their femoral cartilage. Six researchers independently took 3 measurements perpendicular to the cartilage per image (medial, central, and lateral) using ImageJ. The measurements were averaged and a mean for each participant was determined for each of the six SPTs. SPSS was used to calculate an ICC value (absolute agreement, 2-way mixed, 95% CI). RESULTS: There was good interrater reliability (ICC=0.867, $p<.001$) in the measurements using US image analysis between six SPTs. DISCUSSION: Our results indicate sufficient evidence that SPTs were able to reliably measure average femoral cartilage thickness in US images with minimal training.

D.G.32 The Effects of Face Masks on Sprint Performance, Heart Rate, Rating of Perceived Exertion in College Athletes

Justin Donkin
Co-authors: Kimberley Radtke, Andrew Jagim, Ph.D. (Mayo Clinic Health System), Ward Dobbs, and Dominique Peckumn
Mentors: Kimberley Radtke, Exercise & Sport Science, and Andrew Jagim, Ph.D., Mayo Clinic Health System

Research regarding the effects of facemask usage during exercise performance in athletic populations is very limited because of the unprecedented nature of the Coronavirus pandemic. As the pandemic continues, mask requirements and recommendations remain in place, and the potential effects of wearing a facemask during exercise, especially when performance is important, remains a concern. While vaccine distribution is increasing and the ongoing need for mask wearing in sport may be limited, the need to study the physiological and performance impact of mask wearing is warranted in the event of future pandemics or other health related concerns. The purpose of this study was to investigate the effects of facemask usage on repeat sprint test performance, heart rate, respiratory rate, rating of perceived exertion, rating of perceived dyspnea and oxygen saturation (SpO2) in athletes. Over a 6-day period, participants completed a commonly used repeat sprint test protocol during three separate testing conditions (no mask, surgical mask, and cloth mask). Heart rate and respiratory rate were measured using a Zephyr Bio Harness device. A pulse oximeter was used to measure SpO2, and rating of perceived exertion (RPE) and rating of perceived dyspnea (RPD) scales were used to quantify perceived internal stress during each testing condition. Results from this study will be analyzed and presented at the Research and Creativity Symposium.

D.G.33 Offloading Effects on Achilles Tendon Loading Variables during Running in Females

Mikey Friedman and Andrew Pardee
Co-authors: Thomas Kernozek and Drew Rutherford
Mentor: Thomas Kernozek, Health Professions

Harness-based body weight support (BWS) systems have been effective in reducing patellofemoral joint loading variables during running. These systems are relatively new with little information regarding how loading is altered across other joints. Therefore, research on the efficacy of these systems for Achilles' tendon loading variables has not been shown. We examined how Achilles tendon loading variables were different when using a Harness-based BWS system during running. Twenty-four healthy college aged females free from lower extremity injury were included. Participants completed two trials with and without a BWS running at a standardized speed. Kinetic data from an instrumented treadmill was combined with kinematic data from a 3D motion capture system to determine ground reaction force (GRF), Achilles' tendon loading variables, cadence, and kinematic variables of the ankle. Peak GRF, Achilles' tendon force, Achilles' tendon impulse, peak ankle plantarflexion, ankle moment, medial and lateral gastrocnemius force, soleus force, as well as average cadence during running were reduced (between 3.3 and 16.9%) with Harness-based (BWS) systems. Foot strike angle was not different with BWS. Harness-based BWS may prove useful during the rehabilitation of runners to reduce Achilles tendon loading.

D.G.34 The Influence of Cooling on Metabolic Heat Gain and Sprint Performance

Alyssa George
Co-authors: Salvador Jaime, Cordial Gillette, and Ward Dobbs
Mentor: Ward Dobbs, Exercise & Sport Science

During exercise, the increase in metabolism drives a rise in core temperature that has been shown to attenuate force production when temperatures reach 39.4 to 40 °C. **Purpose:** The purpose of this study is to investigate the influence of systemic and localized cooling on internal load (i.e., core temperature and heart rate), and external load (i.e., cycle

ergometer sprint performance). **Methods:** Eight participants will perform five exercise trials, including a familiarization trial, performed on an electronically braked cycle ergometer intended to simulate 45-minutes of intermittent exercise at various intensities (i.e., moderate, high, and passive recovery). Exercise trials will be randomly administered and consist of wearing a cooling vest continuously (VC), wearing a cooling vest intermittently (V), wearing ice packs on the thighs intermittently (T), and a control trial with no ice packs (C). Heart rate, core temperature, and work rate are measured throughout each trial. A two-way analysis of variance with planned contrasts will be utilized to evaluate the influence of cooling modality on internal and external load across time. **Results & Discussion:** This abstract is being submitted as a work in progress. Data collection is ongoing but will be complete and ready for dissemination prior to the symposium.

D.G.35 Documenting Sleep in the House Centipede (*Scutigera coleoptrata*)

Bug Hartsock
Co-author: Barrett Klein
Mentor: Barrett Klein, Biology

Sleep is a process that we understand from a personal perspective, but represents a great mystery with respect to its evolution, function, and how widespread the behavior actually is. One example of this knowledge gap is the lack of documentation of sleep in the entirety of the Myriapoda, the subphylum of arthropods that includes centipedes and millipedes. House centipedes (*Scutigera coleoptrata*) are a common household animal, an often uninvited roommate that originated in the Mediterranean. I will attempt to document sleep in the house centipede which will have larger implications for elucidating the evolutionary origins of sleep. Sleep can be broken into three essential indicators: an inactive versus active state, a greater response threshold during inactivity, and homeostatic regulation of the behavior. Infrared video recording will be used to document house centipede behavior, and any changes in that behavior. Vibratory stimuli will be used both to determine the response threshold during activity and inactivity, as well as used randomly to disrupt inactive periods and test for homeostatic regulation after disruption. House centipede behavior is intertwined with our own, as these animals live within the often ignored ecosystem that is our home environment. The results from this study will help us further understand the behavior of these small residents of the household ecosystem, and will be the first documentation of sleep in the Myriapods.

D.G.36 Effects of Post Exercise Carbohydrate Supplementation on the Regulation of Metabolism and Carbohydrate and Fat Oxidation

Shea Kennedy and Tara Matuska
Co-author: Daniel Freidenreich
Mentor: Daniel Freidenreich, Exercise & Sport Science

The primary purpose of this study is to determine the best type of carbohydrate to consume after exercise in order to promote recovery and decrease harmful side effects. This will enhance the American College of Sports Medicine guidelines for carbohydrate intake post exercise. The participants complete four acute exercise tests (AETs) separated by 48 hours that consist of 30 minutes of running on the treadmill at 65% of their VO2max. Each will be followed by a different carbohydrate supplement beverage. The three beverages consist of the disaccharide sucrose, the oligosaccharide maltodextrin, and a hydrothermally modified cornstarch along with water as our placebo. The order of carbohydrate supplementation during the four trials is randomized, and the participants are blinded to it. Blood samples are drawn before exercise, immediately after, 15 minutes post, 30 minutes post, and 60 minutes post exercise. To compare carbohydrate supplements, we are measuring carbohydrate and fat oxidation, blood glucose and lipids and oxidative stress as uric acid.

D.G.37 Muscle Gun Vibration vs. Pneumatic Compression on DOMS Following a Bout of Muscle Damage

Kadie Krzykowski and Lauren Kloss
Co-authors: Ward Dobbs and Daniel Freidenreich
Mentors: Salvador Jaime and Ward Dobbs, Exercise & Sport Science

Background: Delayed onset muscle soreness (DOMS) is a phenomenon that typically occurs after a bout of strenuous exercise. Athletic professionals and avid gym goers juggle between what methods of recovery are best for relieving DOMS. Novel methods to improve recovery and mitigate DOMS, such as muscle gun vibration (MGV) and intermittent pneumatic compression (IPC), have little-to-no scientific support. Purpose: To evaluate the effectiveness of MVG and IPC immediately-post and 24-hours following a bout of resistance exercise-induced muscle damage. We hypothesize that these techniques would provide a more effective recovery as compared to passive recovery. Methods: 19 healthy, college-

aged subjects participated in this study. All subjects performed two trials, along with one familiarization, involving a 6x10 back squat damaging protocol at 70% of their 1-repetition max followed by unilateral quadricep recovery treatment of either MVG or IPC. Trials were separated by one week of rest. Performance measurements (countermovement jumps and maximal voluntary isometric contractions) were collected at baseline, immediately-post damage protocol, post-treatment, and following 24-hours of recovery. Quadricep circumferences and visual analogue scale questionnaire of situational pain were also measured. Results & Discussion: Data collection is complete, but data analysis is ongoing. This abstract is submitted as a work in progress and will be ready for dissemination prior to the symposium.

D.G.38 Using Axl Kinase Inhibitors to Overcome Checkpoint Kinase 1 Inhibitor Resistance in Triple Negative Breast Cancers

Dannira Kulenovic
Mentor: Sierra Colavito, Biology

Breast cancer is one of the most diagnosed cancers worldwide. Though mortality rates have decreased over the last decade due to the development of targeted treatment options, drug resistance is proving challenging to overcome in some patients. Triple negative breast cancers provide a particular challenge as they cannot be targeted by conventional therapies. Our lab has identified Checkpoint kinase 1 as a viable treatment option for triple negative breast cancers, and we have developed cell lines that are resistant to AZD7762 as a model for Checkpoint kinase 1 inhibitor resistance. Previous research has shown that the tyrosine kinase Axl is upregulated in many cancers and promotes tumor growth, motility, and invasiveness through a variety of signaling pathways. Axl expression has also been shown to be involved in drug resistance. I will be using a variety of molecular biology techniques to determine the role of Axl in AZD7762 resistance in triple negative breast cancer cells. I will be exploring the function of the Axl inhibitor R428 (BGB324) in combination with AZD7762 to determine if a combination treatment method would be effective in reducing cancer growth, motility, and invasiveness. My research will inform future researchers and drug developers of the viability of targeting Axl in combination with other treatment options in the fight against breast cancer.

D.G.39 Residual Effects of Status-Post COVID-19 in UWL Athletes

Cathleen Ly and Laura Ziegelmeyer
Co-authors: Kimberley Radtke, Andrew Jagim, Ph.D. (Mayo Clinic Health System), Chapin Wehde, Joel Luedke, L.A.T. (Mayo Clinic Health System), and Teresa Eber Lee, Ed.D. (Winona State University)
Mentor: Kimberley Radtke, Exercise & Sport Science

As of March 2020, there have been over 78 million cases of COVID-19 and more than 900,000 deaths in the U.S. due to this virus and related complications. Many individuals have recovered from the virus completely within a few weeks, while others continue to experience “long-haul” symptoms. Some studies have reviewed the residual effects of COVID-19 in older adults, but minimal research has been done in the young athlete population. It is imperative to understand how the virus affects this population to ensure a safe return-to-play protocol for athletes recovering from COVID-19. Thirty apparently healthy UWL athletes were tested to assess their heart rhythm, lung function, and aerobic capacity. Fifteen of these athletes had no prior history of COVID, while the other 15 athletes had a history of COVID. Repeat electrocardiograms (EKGs), were performed to investigate any heart rhythm abnormalities that may have been caused by the virus. A pulmonary function test (PFT) was performed to assess lung function using age-predicted values for forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and a ratio of FVC/FEV1. Lastly, each athlete completed a treadmill graded exercise test (GXT) to assess aerobic capacity in which maximal oxygen consumption (VO2max), respiratory exchange ratio (RER), maximal heart rate (HRmax), and ventilatory equivalent (Ve) were measured. The results from this study will be presented in a poster presentation format.

D.G.40 Muscle Desaturation and Resaturation Patterns during Increasing Incremental Exercise in Trained and Untrained Males

MaKayla Mielke and Hannah Schwartz
Mentors: Salvador Jaime and Jacob Caldwell, Exercise & Sport Science

During exercise, increased blood flow perfusion in response to local vasodilatory substances are important for greater oxygen uptake within the skeletal muscle seemingly in an intensity-dependent fashion to keep up with metabolic demands. Although most data suggest increasing exercise intensity will lead to a higher demand of oxygenated blood supply to the skeletal muscles, previous research involves homogeneity in the methodology without consideration of the potential impact of metabolic accumulation. Purpose: This study is aiming to investigate whether microvascular blood flow and

muscle oxygen consumption (mVO2) are more sensitive to changes in exercise intensity or duration. Furthermore, whether there are differences in responses in untrained compared to trained males. Methods: This study will include 24 male subjects between the age of 18 and 30. The first trial consisted of an incremental exercise test on an electronically braked cycle ergometer to measure maximal oxygen consumption (VO2max) and peak power output (PPO). The second trial, subjects performed at 25%, 50%, 75%, and 100% of their PPO for 5-minute bouts with 2 minutes of occlusion on the dominant leg in between increments. Order of exercise intensity was randomized to avoid the order effect. Sessions were separated by at least 48 hours. Results and discussion: Data collection and analysis is ongoing. This abstract is submitted as a work in progress and will be ready for dissemination prior to the symposium.

D.G.41 Single Leg Balance Performance between Injured and Uninjured Collegiate Cross-Country Runners

Nicole Schroeder and Drew Rutherford
Co-authors: Thomas Kernozek and C. Nathan Vannatta, DPT (Gundersen Health System)
Mentors: Drew Rutherford and Thomas Kernozek, Health Professions

Long distance runners are at a high risk of sustaining both acute and chronic leg injuries. It has been hypothesized that history of injury could be due to altered motor control strategies. Performance on a single leg balance (SLB) test may approximate motor control strategy during running, as the SLB task mimics the stance phase during running. The purpose of this study was to examine measures of sway in SLB between runners with a history of injury and those without. Freshman Division III cross-country runners completed an eyes-closed SLB task on an in-ground force platform. Posturography data were obtained for center of pressure standard deviation in the antero-posterior (AP) and medio-lateral (ML) directions, as well as average velocity and 95% ellipse area. An ANOVA examined differences between injury group and within leg (dominant, non-dominant). A subsequent ANOVA examined sub-group differences in those who had reported injury on their dominant, non-dominant, or both limbs. Larger variability in AP sway for both dominant and non-dominant legs was observed in those who had bilateral injuries compared to those with unilateral limb injuries. Increased AP sway may be explained by an altered sensorimotor control strategy via a decreased emphasis on lower extremity proprioception in the unilaterally injured population. Future studies may focus on performance measures other than SLB to elucidate differences in motor control strategies in injured and uninjured populations.

D.G.42 The Toolbox that Makes S.E.N.S.E.

Kailee Simon
Mentor: Lindsey Kirschbaum, Recreation Therapy & Therapeutic Recreation

Despite efforts to prioritize pain management, inpatient pediatric patients continue to report undermanaged pain. Recreational therapy (RT) services can address these needs and promote overall well-being through activity-based interventions. However, findings indicate evidence-based curriculums for this population do not exist within the field of RT. The Toolbox that Makes S.E.N.S.E. is an evidence-based curriculum grounded in Gate Control Theory (GCT) which proposes that pain is influenced by sensory, affective, and cognitive components. The curriculum consists of eight, 45-minute sessions that use sensory activities as a therapeutic approach to increase adaptive pain coping skills assessed pre and post curriculum by the Pediatric Pain Coping Inventory (PPCI). The PPCI consists of five coping skill dimensions (e.g., cognitive self-instruction, problem-solving, distraction, seeking social support and catastrophizing) which serves as a framework for curriculum goals and content. Coping skills are represented within the S.E.N.S.E. acronym for age-appropriate recall and comprehension. Utilizing a workbook, the patient will work one-on-one with a Certified Therapeutic Recreation Specialist (CTRS) to build their “toolbox” of pain coping skills and techniques. Designed through a rigorous review of literature, this curriculum is an evidence-based approach to pediatric pain management and a contribution to the advancement of the RT field.

D.G.43 Predicting Ground Contact Forces from 2D Video During Running

Brandon Treadwell and Josh Hendrickson
Co-authors: Thomas Almonroeder and Kelsey Redman
Mentor: Thomas Almonroeder, Health Professions

Excessive ground contact forces during running appear to contribute to injury in runners. As a result, runners are often interested in determining how they can adjust their running pattern to reduce ground contact forces. Unfortunately, measuring ground contact forces requires an instrumented treadmill (i.e., treadmill with force plates built into the belts), which are too costly for use outside of a laboratory setting. However, it may be possible to indirectly estimate the magnitude of the ground contact forces using metrics taken from a video recording. Video recordings are much easier to

collect outside of a laboratory, as video cameras are widely available. The primary objective of this study is to examine the extent to which ground contact forces can be estimated using metrics derived from video recordings taken with a standard video camera.

D.G.44 Evaluation of Performance Measures with and without a Face Mask When Performing 30 Minutes of Self-Paced Exercise

Grace Vogt
Co-authors: Kimberley Radtke, Andrew Jagim, Ph.D. (Mayo Clinic Health System), Dominique Peckumn, Carl Foster, and Teresa Eber Lee, Ed.D. (Winona State University)
Mentor: Kimberley Radtke, Exercise & Sport Science

Facemasks have been found to be an important preventative measure against the fight against COVID-19 transmission. In response to this pandemic, as well as any possible infectious disease outbreaks that could occur in the future, it's important to know how mask usage impacts our lives. Limited research has been performed when comparing performance measures with and without a surgical mask or an N95 mask when completing 30-minutes of self-paced exercise among older community dwelling adults. The purpose of this study was to compare exercise workload, heart rate, rating of perceived exertion, rating of perceived dyspnea, respiratory rate, oxygen saturation, and end-tidal carbon dioxide when performing 30 minutes of self-paced exercise with and without the use of a surgical mask and a N95 mask.

D.G.45 Investigating Floodplain Forest Succession in Restored Habitat on the Upper Mississippi River

Caleb Williams
Co-authors: Meredith Thomsen and Niti Mishra
Mentor: Meredith Thomsen, Biology

Floodplain forests are communities with critical ecological importance that have been greatly disturbed and reduced through human activity. In the Upper Mississippi River much of this habitat was destroyed in the 1930's with the completion of the lock and dam system, permanently inundating large areas of the floodplain. Over the past 30 years the US Army Corps of Engineers has constructed a series of islands in Pool 8 near Stoddard, WI. Constructed islands vary in size, pool position, height above mean pool level, soils used, and approach to revegetation. Using publicly available NAIP (National Agricultural Imagery Program) imagery from various time points following construction of the Pool 8 Islands and supervised image classification methods, we will quantify several metrics including percent cover of woody plants at set time points after island construction, and time to canopy closure. Using this data we will attempt to determine the environmental factors most likely to be influencing forest succession on the Lower Pool 8 islands, using a model-fitting approach to evaluate the relative importance of annual variation in flooding, landscape position, and island construction methods, including seeding, tree planting, elevation, and soil conditions. This project will improve our understanding of how habitat restoration projects develop over time, providing insights for the planning and implementation of future floodplain restoration projects.

D.G.46 Evaluation of Residual Effects of Post Status COVID-19 in UWL ESS Fitness and Pre-Professional Students

Vanessa Winter and Emily Hultin
Co-authors: Kimberley Radtke, Richard Mikat, Andrew Jagim, Ph.D. (Mayo Clinic Health System), and Teresa Eber Lee, Ed.D. (Winona State University)
Mentor: Kimberley Radtke, Exercise & Sport Science

Covid-19 took the world by storm when it was officially declared a pandemic in March of 2020. Many people have recovered from this highly contagious virus but still experience residual side effects that interfere with their day-to-day life. These side effects can last up to 1-2 years post infection, and some may never fully recover. The purpose of this study was to see, to what extent, if these residual effects are found in college-aged young adults. A 12-lead EKG was be performed to identify any heart irregularities. A pulmonary function test and a graded exercise test were completed to identify any impairments in lung function and/or aerobic capacity. The results from this study will be compared to a fitness assessment that the participants completed during the Fall of 2019 (Pre-Covid-19). This study will be important to exercise scientists and the general public seeking to understand the short-term and long-term effects of Covid-19 on UWL students.

D.G.47 The Prevalence of Bunions in a Healthy College Aged Population

Ashley Woltmann, Andrew Leydet, Brooke Salfer, Aaron Bartz, and Campbell Hofstetter
Co-author: Thomas Greiner
Mentor: Thomas Greiner, Health Professions

A bunion is defined as a crooked big toe that can result in painful swelling. The cause of a bunion is unknown. There are hypotheses that environmental factors such as shoe type or genetic factors such as familial history may play a role in the development. In the United States, bunions affect 19 million people aged 18 to 65-years old. The condition can contribute to changes in walking and balance that may negatively affect activities of daily living. This study evaluates the presence of bunion-like conditions in a healthy, college-aged population with no current pain or conditions of the foot. Measurements were taken from 110 college-aged people to evaluate the presence of bunion-like conditions, along with factors including shoe size and sex. Results showed that, on average, men had a smaller inward deviation of the big toe and wore shoes that were larger than their recommended shoe size. This demonstrates a potential correlation between these two factors. The results of this study will help to clarify the association of a bunion-like appearance with foot pain. These data can then be used to refine diagnosis and treatment options in the event a patient develops a painful foot condition.

Oral Session A1
8:50 am-9:15 am

O.G.2 What Controls the Co-occurrence Patterns of Driftless Trout?

Kristina Rands
Co-author: David Schumann
Mentor: David Schumann, Biology

Recreational anglers targeting abundant trout populations in the Driftless Area provide a direct economic impact of $952 million annually. Native Brook Trout (*Salvelinus fontinalis*) populations have declined in the region despite the abundant groundwater inputs. Although Brook Trout and Brown Trout (*Salmo trutta*) numerically dominate the area's streams, relatively little is known about how environmental conditions influence their perceived interactions but few studies have quantitively demonstrated this in the Driftless. Specifically, we estimated the occurrence probabilities of each trout & the probability that each trout is present in a stream habitat based on the presence or absence of other trout species. Fish assemblages were sampled via backpack electroshocking from 4 streams with three stream reaches (400 m) per stream (; *N*=12). Brown Trout were sampled at every stream transect; Brook Trout were less widespread with a naïve detection probability of 0.36. Occupancy and detection models were fit to observed detections by the Markov Chain Monte Carlo framework. The top-performing model for detection (p) only included intercept values and occupancy (Ψ) included Brown Trout catch rates and intercept values. Expansion of the number of sample sites will be completed to conclude what environmental and physical factors influences the trout assemblages.

Oral Session A2
9:20 am-9:45 am

O.G.6 Perceptions of Resilience: An Exploration into the Impact of Perceived and Actual Risk

Gabrielle Strittmater
Mentor: Jenna Starck, Exercise & Sport Science

INTRODUCTION: Resilience theory suggests that it is not the nature of adversity faced that is most important, rather one's ability to overcome it. This study explores the impact of perceived and actual risk on resiliency. PURPOSE: The purpose of this study was 1) to identify student perceptions of resiliency while experiencing adventure education (AE) and outdoor pursuits (OP) settings, and 2) determine how AE (perceived risk) and OP (actual risk) contribute to participants' perceptions of resiliency. METHODS: Sixteen freshman participated in this study. Quantitative data was collected using the Brief Resilience Scale to estimate participants' resilience nightly post AE and OP experiences. A repeated measures analysis of variance (RMANOVA) was used for quantitative analysis. Qualitative data was collected via interviews and reflections from participants and analyzed through open, axial, and final coding to develop a thematic structure. RESULTS: Quantitative data presented the RMANOVA approached but was not statistically significant ($p = 0.132$). Qualitative themes are as follows: 1) When perceiving risk, feeling safe promoted self-confidence, 2) Social support impacted students' perceptions of resilience, 3) Intrinsic motivation promoted growth when facing adversity. CONCLUSIONS: This study suggests that AE and OP orientation programs have the capacity to build resilience skills regardless of the type of risk.

Oral Session B1
9:55 am-10:20 am

O.G.9 Spatial and Temporal Variability of Aquatic Insect Emergence in Pool 8 of the Upper Mississippi River

Brad Morris
Co-authors: Ross Vander Vorste and Molly Van Appledorn, Ph.D. (USGS-Upper Midwest Environmental Sciences Center)
Mentor: Ross Vander Vorste, Biology

Large rivers transport nutrients and energy from aquatic to terrestrial ecosystems via insect emergence. In addition, these rivers provide dynamic flow regimes and diverse habitats, ranging from main channel to floodplains, contributing to the spatial and temporal variability of aquatic habitats. However, little is known about how spatial and temporal variability influences insect emergence. In the study, we quantified spatial and temporal variability in insect emergence diversity and abundance across Pool 8 of the Upper Mississippi River near La Crosse, WI, USA. By looking at the effect of inundation duration and distance from main channel on aquatic insect emergence. Environmental data and insect emergence were collected at nine different sites, that varied in distance from main channel and inundation duration which is nested within the distance classes. Dissolved oxygen levels were elevated in the far distance sites compared to the close and mid-distance sites, however, there were no differences in temperature, pH, and conductivity. Preliminary results of emergence (n=29) suggest overall emergence is affected by distance from main channel. Diversity and evenness are not affected by distance from main channel or inundation duration. Future processing of samples will aim to quantify peaks in emergence timing. Identifying hotspots and hot moments in insect emergence will help managers better promote and protect this important aquatic-terrestrial transfer of energy.

Oral Session B2
10:25 am-10:50 am

O.G.12 Land Acknowledgments Are Insufficient

Kyrsha Balderas and Gabby White
Mentor: Becki Elkins, Student Affairs Administration

Being Indigenous women in higher education felt isolating due to the lack of resources. We found community with each other because we wanted equal opportunities as our peers to achieve graduation. We critically examined our access to resources, which lead to a course assignment. This assignment allowed us to bring awareness and start conversations about Indigenous communities. After a negative experience with a member of the UWL community, we created an Instagram account to continue the conversation. As this project grows, we envision enacting these phases (community, reflection, action, and resources) to ultimately achieve funding for UWL Indigenous students. We are calling for UWL to move beyond acknowledgement into a commitment to support Indigenous people through action. Action could look like providing funding, hiring more staff/faculty, establishing meaningful relationships with the surrounding tribal communities, and opportunities to educate the UWL community about Indigenous people.

Oral Session D1
12:05 am-12:30 am

O.G.15 Genetic Bottleneck Effects on Influenza A Replication

Francesca Scala
Co-author: Peter Wilker
Mentors: Peter Wilker and Michael Hoffman, Microbiology

Influenza A causes a mild to severe seasonal respiratory illness that can lead to hospitalization and death. The impact of seasonal influenza epidemics and the unpredictable emergence of influenza pandemics requires further study of the evolution of Influenza viruses. Influenza viruses are known for their genetic diversity due to the high mutation rate of its polymerase and genetic reassortment. Viral diversity allows the virus to overcome barriers such as new environmental conditions, drugs, and population immunity. As an influenza virus starts circulating in the human population, host-to-host

transmission repeatedly reduces the size and genetic diversity of the viral population, generating a bottleneck. Past research using A/Victoria/361/2011 (H3N2) shows that artificial bottlenecks through serial passaging of one virus particle hinder its ability to replicate. We aim to determine what bottleneck size allows this newly generated virus to regain its vastly compromised replicative capacity. Multicycle growth curves will be used to determine changes in replicative capacity for each newly generated virus at the end of the serial passages. Sanger sequencing will be used to evaluate the consensus sequences of the serially passaged viruses. Results will provide insights on bottleneck effects on replicative capacity and which mutations are responsible for such changes.

FACULTY & STAFF ABSTRACTS

Poster Session C
11:00 am-11:55 am

C.F.31 Out to the Edge: Predicting Risky Hiking Behavior on the Bluffs

Katy Kortenkamp (Psychology) and Marissa Miller
Co-authors: Jake Salzman, Morgan Richman, Lauren Jann, Calla Valiquette, Kristin Gruenweller, and Colleen Moore, Ph.D. (Emerita, Montana State University and University of Wisconsin-Madison)

Recreation in nature promotes well-being but also poses risks. Thousands of search and rescue operations occur every year in U.S. parks, most commonly involving hikers; however, most studies of outdoor risk-taking focus on extreme sports. This project focused on hikers' risk-taking behaviors on the bluffs, with the goal of predicting risky behavior and testing the effectiveness of warning messages. In fall 2021, undergraduate researchers were stationed at two bluff overlooks in Hixon Forest. As hikers departed the overlook, a researcher asked if they would complete a survey, and 107 hikers agreed (74% response rate). The survey measured hikers' beliefs about the risks, how close they got to the bluff edge, their reasons for going as close as they did, and demographics. One of three warning signs was also presented in the survey. How close hikers got to the edge was predicted by beliefs about the risks, fear of heights, thrill of looking over the edge, and group size. Respondents who got closest to the edge reported that the warning signs would have caused them to stay farther back. These results may help park managers increase their understanding of how beliefs and warnings predict risky hiking behaviors.

C.F.32 Selfies to Die For: Perceptions of Dangerous Selfies in Natural Areas

Katy Kortenkamp (Psychology), Lauren Roff, and Marissa Miller
Co-authors: Abby Aussem, Jake Salzman, and Colleen Moore, Ph.D. (Emerita, Montana State University and University of Wisconsin-Madison)

In the past 10 years, researchers have started investigating the growing problem of dangerous selfies. Hundreds of people have gotten injured or died while taking selfies in hazardous situations, most commonly in natural areas close to cliff edges, water, or wild animals. Little research has examined causes or ways to prevent these accidents. For this project, college student participants completed an online study that included photographs of people taking selfies in natural areas in potentially dangerous situations. The pictures differed in terms of the type of hazard (cliff edge, wild animal), the distance from the hazard, and whether the selfie taker is alone or with others. Participants rated each selfie situation in terms of risk, likely consequences, potential benefits, and whether they would take the selfie. Half of the participants were randomly assigned to receive information about the dangers involved with taking selfies in these types of situations before they viewed and responded to the images. Participants also responded to questions about general selfie safety, social norms, and beliefs, as well as social media use, personality traits, and demographics. Data analyses examined the effectiveness of warning information and other factors that predict dangerous selfie perceptions and intentions.

Oral Session A
8:50 am-9:45 am

O.F.1 Business Sophomore Students' Perceptions of Accounting Profession; Evidence for Any Change in Two Decades

Recep Pekdemir, Accountancy
Co-authors: Mehmet Kocakulah, Uzay Damali, and Melis Ercan, Ph.D. (Istanbul University)

Decades passed since the scholarly studies appeared on the different stakeholders' opinions, thoughts, and perceptions on accountants, accounting professionals, and accounting profession throughout the world. Since then, globalization, technological innovations, evolutions, and developments pervasively appeared, and made people and society well-informed and more knowledgeable since information needed has become more accessible. Thus, we could argue that the people can make more effective decisions for their life and future since they could have more options or alternatives to select. The paper examines and tests if the business college students' thoughts and perceptions of the accounting profession have changed in the current environment where people have been in the knowledge-based society. Early studies argued that the accounting profession has had a negative image and reputations around the world before smartphone technologies were innovated. Many of those concluded that accounting profession is stereotyped as being conformist, cold, submissive, and lacking social skills. Thus, the paper first scans and summarizes certain previous studies on the matter that were realized before smartphone technologies popped up, and then conducts a survey to achieve the goal of the study. The paper provides updated information about the business college students' thoughts and perceptions of the accounting profession, and states any changes occurred.

2021 RECIPIENTS OF STUDENT RESEARCH GRANTS

2021 RECIPIENTS OF UNDERGRADUATE RESEARCH AND CREATIVITY GRANTS

Name	Department	Mentor	Title
Allison Alberts	Chemistry & Biochemistry	Basudeb Bhattacharyya	Fumarase "Knocking" Our Socks Off
Riley Allison	Chemistry & Biochemistry	Valeria Stepanova	Study of Photosensitization of Curcuminoids and Related Compounds
Ky Ariano	Microbiology	Paul Schweiger	Determining the Functional Role of the GOX1969 Protein in *Gluconobacter oxydans*
Arini Arsana	Chemistry & Biochemistry	Kelly Gorres	Molecular Characterization of Protein of Unknown Function (ORF48) in a Gamma-Herpesvirus
Arini Arsana	Chemistry & Biochemistry	Kelly Gorres	The Development of Quantitative PCR Assay for the Detection of Invasive Species, Faucet Snail (*Bithynia tentaculata*) in Water Sample
Katie Banie	Psychology	Ryan McKelley	There's No Crying in Baseball: Correlates of Competitive Anxiety and Personality in Athletes
Anna Buchberger	Archaeology & Anthropology	Christine Hippert	The Articulation of Indigenous Knowledge in the Everyday Practices of People of Bribri Descent in Talamanca, Costa Rica
Olivia Bull	Art	Kathleen Hawkes	Exploring Mental Illness through Abstract Painting and Photography
Alexis Burns	Biology	Alder Yu	Effect of a Mutated Circadian Clock Gene on Gut Microbe Rhythms
Anna Buss	Biology; Exercise & Sport Science	Jennifer Klein and Daniel Freidenreich	Effect of Exosomes on Differentiation in Exercising vs Non-exercising Participants
Anna Buss	Biology	Jennifer Klein	Determine the effect of older versus younger peoples' exosomes on muscle cell differentiation and proliferation
Kennedy Bussan	Chemistry & Biochemistry	Valeria Stepanova	Development of Green Synthesis of Chalcones Using Glass Beads as a Catalyst
Tiana Carlson	Chemistry & Biochemistry	Kelly Gorres	Effect of Ketones and Histone Deacetylase Inhibitors on Epstein-Barr Virus Lytic Cycle Activation
Hope Carter	Economics	Mary Hamman	Effects of Anti-Planned Parenthood Policy on Poverty and Welfare Program Participation
Carter Caya	Chemistry & Biochemistry	Todd Weaver	Using Mutations to Understand Protein Structure Movement and Rate of Reaction of Fumarase C
Evan Draxler	Chemistry & Biochemistry	Sujat Sen	In-Situ Spectroscopic Study during the Synthesis of Manganese Dioxide Nanoparticles for Use in Low-Cost Batteries
Brice Durocher	Chemistry & Biochemistry	Kelly Gorres	Epstein Barr Virus and the effects of Calcium β-hydroxy, β-methylbutyrate on the Activation of the Lytic Cycle
Kyle Faivre	Chemistry & Biochemistry	Valeria Stepanova	Development of Mild Green Synthesis of Chalcones

Name	Department	Mentor	Title
Kyle Faivre	Chemistry & Biochemistry	Valeria Stepanova	Synthesis of Hemi-curcuminoids to Be Used in Asymmetric curcuminoid synthesis
Samuel Flaig and Ashlee Gander	Biology	Ross Vander Vorste	Effect of Increasing Temperature and Presence of Salinity upon *Gammarus pulex* and Its Ability to Decompose Organic Waste Matter
Sarah Fleegal	Microbiology	William Schwan	Determining the Significance of Mutations in the *brpS* Gene on Biofilm Formation in *Staphylococcus aureus*
Evelyn Gaunt	Archaeology & Anthropology	Amy Nicodemus	Comparative Ceramic Analysis of the Bronze Age Maros and Otomani Culture Groups of the Carpathian Basin
Kyle Gebhardt	Chemistry & Biochemistry	John May	Determining the Effects of O-Antigen on Salmonella enterica Copper Resistance
Kyle Gebhardt	Chemistry & Biochemistry	John May	Testing Amino Acid Mutations on *Salmonella* Copper Resistance Protein DcrB
Emma Grapentine	Microbiology	William Schwan	How Do Point Mutations in the OmpR Gene Affect the Ability of the OmpR Protein to Regulate *fimB* Transcription in Uropathogenic *Escherichia coli*
Marisa Griesel	Chemistry & Biochemistry	John May	Investigating the Antimicrobial Mechanism of Riluzole that Blocks *Salmonella enterica* Antibiotic Resistance to Polymyxin B
Noah Grover	Microbiology	Xinhui Li	Characterization of Two Multi-drug Resistant *Stenotrophomonas maltophilia* Isolates from Wild Painted Turtles (*Chrysemys picta*)
Grace Happe	Theatre Arts	Gregory Parmeter and Laurie Kincman	Establishing Intimacy Practices Within the UWL Department of Theatre Arts
Jenna Hayes	Chemistry & Biochemistry	Kelly Gorres	Curcumin and Curcumin Derivatives Inhibit the Lytic Cycle of the Epstein-Barr Virus
Miryah Henriksen	Chemistry & Biochemistry	Valeria Stepanova	Study of Decomposition of Curcuminoids in Extreme Temperature Conditions
Maya Jahnke	Biology	Alder Yu	Measuring *Drosophila melanogaster* Body Weight and Food Consumption in Relationship to Circadian Rhythm Disruption as a Model for Type 2 Diabetes Mellitus
Mitchell Johnson	Philosophy	Daniel Schneider and Mary Krizan	The Metaphysical Problems of Personifying a Perfect Deity
Sam Kallis	Chemistry & Biochemistry	Valeria Stepanova	Determination of the pKa of Curcuminoids Using H1 Nuclear Magnetic Resonance Spectroscopy
Chloe Kepler and Elizabeth Titera	Psychology	Kevin Zabel	Retweets to Riots: Political Polarization in Online Settings
Chinguun Khurelbaatar and Francisco Zavala	Exercise & Sport Science	Ward Dobbs	Velocity Profile Difference in Deadlift between Competitive Powerlifters and Recreational Lifters
Stephen Koch	Mathematics & Statistics	Barbara Bennie	Statistically Predicting Future Class Sizes

Name	Department	Mentor	Title
Ben Kossman	Biology	Anton Sanderfoot	Microplastics Contribution to Decreased Cellular Efficiency
Joshua Krause	Biology	Jaclyn Wisinski	Rap1b as a Potential Regulator of Megakaryocyte Proliferation
Josie Lammers	Chemistry & Biochemistry	John May	Characterizing the Lipid-binding Properties of a Salmonella Copper Resistance Protein
Kassidy Leannais	Sociology & Criminal Justice	Carol Miller	Wealth Inequality after a Global Pandemic: A Study of Political Efficacy and Support for Redistributive Policies
Danielle Lindholm	Public Health & Community Health Education	Karen Skemp	Effects of Apple Cider Vinegar on Body Composition, Cholesterol, and Blood Glucose Levels
Brenna Lundgren	Biology	Alder Yu	Food Intake and Time-Restricted Feeding of Fruit Flies
Ella Mack	Chemistry & Biochemistry	Sujat Sen	Investigation of Enhanced Corrosion Resistance Properties of Highly Textured Zinc Thin Films
Lilyanna Massman	Chemistry & Biochemistry	Daniel Grilley	Characterizing the Structure of a Toxic Protein
Audrey Mattmiller	Biology	Jaclyn Wisinski	Give Me Rap1b or Give Me Death: Modified Rap1b Could Provide Megakaryocytes with Protection from Programmed Cell Death
Emily Mauch	Biology	Jennifer Klein	Characterization of MicroRNA Content of Muscle Exosomes and Their Effects on Regulatory Myogenic Factors
Emily Mauch	Biology; Exercise & Sport Science	Jennifer Klein and Daniel Freidenreich	Characterizing the MicroRNA Content of Muscle Exosomes Isolated from Young and Old Human Subjects
Halle McCormick and Lydia Bergerson	Biology	Alder Yu	Effects of Circadian Rhythm Disruption on DNA Repair
Brandon Micech	Finance	Adam Stivers	Security Selection Model for the Gordon Spellman Fund
Joe Miller	Mathematics & Statistics	Nathan Warnberg	Rainbow Numbers of Graph Products
Bjorn Mortenson	Chemistry & Biochemistry	Sujat Sen	Measuring Breakthrough Pressure of Gas Diffusion Layers for Use in Gas-fed CO2 Electrolysis
Emma Ann Oberg	Biology	Alder Yu	Genetic Analysis of Wild Caught *Salmo trutta* Gut Microbiome
Ashton Osterhaus and Dylan Tousey	Biology	Alder Yu	Effect of Gut Microbes on Circadian Rhythms Expressing Human Amyloid-Beta gene
Olivia Paulson	Race, Gender, & Sexuality Studies	Jodi Vandenberg-Daves	Gender-Based Human Rights Violations in Ireland, Intergenerational Trauma, and Justice
Halle Pavelski	Microbiology	Michael Hoffman	Investigating the Role of M Protein Dimerization in HPIV3

Name	Department	Mentor	Title
Brianna Pearson	Biology	Jennifer Klein	Development of a Regulatory T Cell Biomarker for Food Allergen Tolerance during Oral Immunotherapy
Morgan Priem	Chemistry & Biochemistry	Dan Grilley	Developing a New Method for Histone Protein Purification
Trinity Rausch	Psychology	Alexander O'Brien	The Relationship Between Parental Use of Alcohol and Children's Academic Performance
Kayla Rondeau	Chemistry & Biochemistry	Sujat Sen	Electro-synthesis of Manganese Dioxide Nanoparticles for Use in Low-Cost Rechargeable Batteries
Allison Ronk	Microbiology	Daniel Bretl	Characterizing the Expression of *Myxococcus xanthus* Genes Controlled by a Novel Two-component System that Senses Oxygen Concentration
Veronica Sannes	Biology	Eric Strauss	Abundance of Microplastics in *Aplodinotus grunniens* (Freshwater Drum) in the Upper Mississippi River
Caroline Sargent	Biology	Sumei Liu	Role of CRF1 and CRF2 Receptors in Stress-induced Increase of Intestinal Permeability
Andrina Savor and Alison Stangler	Psychology	Alexander O'Brien	Impact of Face Masks on Confidence of Facial Expression Recognition
Madison Schutze	Chemistry & Biochemistry	Kelly Gorres	Invasive Lionfish Detection by Quantitative Analysis of Environmental DNA
Michael Seaman	Biology	Ross Vander Vorste	DNA Barcoding of Odonata Voucher Collection
Rachel Senft	Chemistry & Biochemistry	Kelly Gorres	Stabilization of the ORF48 protein from a Cancer-associated Virus
Shreya Shrestha	Sociology & Criminal Justice	Justine Egner	UWL Health Graduate and Pre-health Undergraduate Students Race Biases in Healthcare
Hannah Soczka	Public Health & Community Health Education	Emily Whitney	Understanding Knowledge and Attitudes of Health Literacy in Pre-Professional Undergraduate Students: A Case Study
Evan Steiger	Microbiology	Bernadette Taylor	Development of an Enzyme-linked Immunosorbent Assay to Detect *Roultella*-specific Antibodies in Rheumatoid Arthritis and Normal Donor Serum
Ben Stelter	Microbiology	William Schwan	An Examination of *brpS* Point Mutations and Their Effect on *srtA* and *lrgA* Transcription
Skyler Theisen	Biology	Eric Strauss	Using Air-Water Temperature Relationships to Predict Locations in Spring Coulee Creek that are Susceptible to Trout Habitat Loss Due to Increasing Air Temperatures
Ethan Thompson	Biology	Peg Maher	Iron Supplementation and Status Evaluation and Monitoring in College Athletes
Owen Thompson	Chemistry & Biochemistry	Kelly Gorres	Kaposi's Sarcoma Associated Herpesvirus ORF48 Protein Made Soluble for Study

Name	Department	Mentor	Title
Claire Trudeau	Chemistry & Biochemistry	Valeria Stepanova	Synthesis of Curcumin Using Only Necessary Ingredients
Claire Trudeau	Chemistry & Biochemistry	Valeria Stepanova	Synthesis of Novel Unnatural Asymmetric Curcuminoids with Improved Water Solubilities
Damon Trump	Chemistry & Biochemistry	Kelly Gorres	A Search for the Structural Identity of MHV68 ORF48 Protein: Advancements Towards the Understanding of Epstein Barr Virus (EBV)
Emily Veroeven	Psychology	Kevin Zabel	Conversation Content Influences Goals in Interracial Interactions
Rachel Way and Emily Veroeven	Psychology	Bianca Basten	Let's Eat: Perfectionism, Social Media, and Problematic Eating Behaviors
Ethan Wedemayer	Geography & Earth Science	Niti Mishra	Satellite Remote Sensing Based Detection of Coldwater Streams in the Driftless NE Iowa
Brandon Worachek	Chemistry & Biochemistry	Kelly Gorres	Analysis of the Secondary Structure and Structural Stability of Murine Gammaherpesvirus 68

2021 RECIPIENTS OF THE GRADUATE RESEARCH, SERVICE, AND EDUCATIONAL LEADERSHIP AWARDS

Name	Program or Department	Faculty Sponsor	Title
Carissa Ahrenhoerster	Clinical Microbiology	Michael Hoffman	Production and Examination of Three Novel Nuclear Transit Mutants of HPIV3 Matrix Protein
Kristen Baranowski	Biology	Markus Mika	Composition of Flora Across Foraging Patches of Breeding Flammulated Owls (*Psiloscops flammeolus*) in Deciduous Forest Stands
Vanessa Czeszynski	Biology-Aquatic Science	Eric Strauss	Dissolved Organic Carbon Linkages to Nutrient Dynamics in Lakes and Streams in the Northern Highlands Region of the Midwest
Caleb Fitzmaurice	Biology	Alder Yu	Circadian Rhythms and the Gut Microbiome in *Drosophila melanogaster*
Emma Hartsock	Biology	Barrett Klein	Documenting Sleep in the House Centipede (*Scutigera coleoptrata*)
Caleb Kasper	Biology	Tom Volk and Todd Osmundson	Investigation of Fungal Endophytes Harbored in *Cannabis Sativa* (hemp) as Potential Aid in Phytoremediation Effort
Shea Kennedy	Clinical Exercise Physiology	Daniel Freidenreich	Effects of Post Exercise Carbohydrate Supplementation on the Regulation of Carbohydrate and Fat Metabolism
Lia Landowski	Biology-Aquatic Science	Anita Davelos	Analysis of Ecological Shift Effects on Floodplain Forest Regeneration
Tara Matuska	Clinical Exercise Physiology	Daniel Freidenreich	Post Exercise Carbohydrate Supplementation on the Regulation of Carbohydrate and Fat Metabolism
Madison Moore	Clinical Microbiology	Madison Moore	Identifying the lethal factor protein secreted by *Staphylococcus aureus* treatment with SK-03-92 drug
Meghann Naughton	Athletic Training	Kari Emineth and Naoko Giblin	The Determination of Proper Placement for Fine-Wire Indwelling Electrodes in the Posterior Tibialis Muscle
Patrik Perner	Biology	Eric Strauss	Influence of Sediment Characteristics and Oxygen Demand on Winter Hypoxia in Backwater Lakes of the Upper Mississippi River
Kristina Rands	Biology	David Schumann	An Investigation of Diet Comparison's and Co-Occurrence Patterns of Brook, Brown, and Tiger Trout in the Driftless Region of Southwestern Wisconsin
Rebecca Rohrer	Biology	Jennifer Klein	Undiagnosable Neuromuscular Disease Leads to Pain, Suffering, and Mismanagement of Symptoms
Francesca Scala	Microbiology	Peter Wilker	Genetic Bottleneck Effects on Influenza A Replication

Name	Program or Department	Faculty Sponsor	Title
Nathan Schimanski	Biology	David Schumann	Habitat Availability and Use by Stocked Muskellunge in an Aging Reservoir
Drew Schwarz	Athletic Training	Naoko Giblin	The Effect of Anti-Pronation Kinesiology Taping on Running Load and Posture
Charlotte Sekorski	Biology	Anita Davelos	Microbial sediment communities of Myrick Marsh through time and space
Gavin Sneller	Athletic Training	Daniel Freidenreich	Identifying Predictors of Non-Functional Overreaching/Overtraining in Wrestlers
Grace Vogt	Clinical Exercise Physiology	Kimberley Radtke	Evaluation of Performance Measures with and Without a Facemask When Performing 30 Minutes of Self Paced Exercise
Caleb Wyss-Williams	Biology-Environmental Science	Meredith Thomsen	Lower Pool 8 Islands Forest Succession Survey Project
Karly Yablonski	Clinical Microbiology	Bonnie Bratina	Occurrence of Cyanobacteria and Cyanotoxins genes compared to nutrient levels in Lake Onalaska
Laura Ziegelmeyer and Cathleen Ly	Clinical Exercise Physiology	Kimberley Radtke	Evaluation of Residual Effects from Status Post COVID in UWL Athletes

PRESENTER INDEX

A, B, C, D are the poster sessions
A=Asynchronous; S=Synchronous
P= Poster; O=Oral Presentations; E=Exhibits
F=Faculty & Staff; G=Graduate Students; U=Undergraduate Students

NAME	ABSTRACT(s)	NAME	ABSTRACT(s)
Haindfield, Connor	B.U.10	Mack, Ella	C.U.15
Hammil, Heather	C.G.27	Makinen, Alison	B.G.32
Hanson, Mia	A.U.25	Manhart, Ethan	B.U.12, D.U.21
Harrington, Anya	A.U.12	Manuell, Kayla	C.G.26
Hartsock, Bug	D.G.35	Marshall, Kaylan	B.U.13
Hemb, Carissa	B.G.25	Martocci, Taylor	C.G.30
Hendrickson, Josh	D.G.43	Massie, Cheyanne	B.G.29
Henriksen, Miryah	A.U.13	Massman, Lilyanna	A.U.22
Hernandez, Yecenia	A.U.14	Mattmiller, Audrey	A.U.1
Hetcher, Josh	D.U.18	Matuska, Tara	D.G.36
Hlavacek, Emily	B.G.32	Mbuyi, Vanessa	D.U.23
Hofstetter, Campbell	D.G.47	McAllister, Colin	B.G.27
Holvick, Alyxandra	C.U.12	McCann, Cassidy	C.G.30
Hultin, Emily	D.G.46	McCormick, Halle	D.U.12
Jackson, Abram	D.U.13	McKay, Shayde	A.G.39
Jahnke, Maya	D.U.9	McPherson, Conrad	D.U.22
Jansen, Paige	O.U.4	Mechler, Logan	A.U.20
Jeninga, Anya	B.G.26	Meeker, Katie	B.G.34
Jenness, Joshua	D.U.18	Micech, Brandon	O.U.13
Jeranek, Amy	A.G.36	Michalek, Kaitlyn	D.U.23
Jones, Aleah	B.G.32	Mielke, MaKayla	D.G.40
Kantrovich, Jenna	A.U.15	Miller, Brandon	C.U.16
Kedrowski, Jeanna	A.U.16	Miller, Destiny	A.G.40
Kennedy, Shea	D.G.36	Miller, Marissa	C.F.31, C.F.32
Kepler, Chloe	C.U.21	Moore, Christine	B.G.34
Kernozek, Thomas	D.G.30	Moore, Madison	A.G.41
Khurelbaatar, Chinguun	A.U.17, B.U.17	Morris, Brad	O.G.9
Kiminski, Rachel	C.G.29	Morris, Kimberly	C.F.33
Kissel, Timothy	A.U.18	Nisius, McKenzie	D.U.13
Kloss, Lauren	D.G.37	Nitz, James	D.U.23
Kobayashi, Miki	C.G.30	Noethe Wolford, Zachary	A.G.42
Koch, Stephen	A.U.19	Nordbeck, Morgan	B.U.14
Kopp, Joseph	C.G.26	Oberg, Emma Ann	D.U.4
Kortenkamp, Katy	C.F.31, C.F.32	O'Mara, Hannah	B.G.30
Kossman, Ben	A.U.2	Osterhaus, Ashton	B.U.15
Kratt, Jasmine	C.U.13	Otto, Andrew	O.U.3
Krause, Joshua	D.U.18	Panico, Annie	C.U.3
Kriefski, Alexandra	A.G.37	Pardee, Andrew	D.G.33
Krzykowski, Kadie	D.G.37	Patel, Niki	C.G.27
Kulenovic, Dannira	D.G.38	Paulson, Olivia	D.U.24
Kunkel, Grace	C.U.14	Pavelski, Halle	C.U.17
Laffin, Alyssa	A.U.20	Pawlak, Paige	B.G.28
Lammers, Josie	A.U.21	Pekdemir, Recep	O.F.1
Landt, Thomas	B.U.9	Pfeffer, Nicole	B.G.31
Larson, Kayla	A.G.38	Polk, Hailey	C.U.24
Leannais, Kassidy	D.U.19	Pricco, Gianna	C.G.30
Lenards, Maisie	B.U.11	Priem, Morgan	D.U.25
Leydet, Andrew	D.G.47	Pugel, Allison	B.U.19
Lundgren, Brenna	D.U.20	Pulvermacher, Ryan	B.G.33
Ly, Cathleen	D.G.39	Rands, Kristina	O.G.2

NAME	ABSTRACT(s)	NAME	ABSTRACT(s)
Rausch, Trinity	D.U.26	Thompson, Owen	A.U.27
Redman, Kelsey	B.G.29	Titera, Elizabeth	C.U.21
Remack, Cole	B.U.18	Tousey, Dylan	B.U.15
Robarge, Mikaela	C.F.33	Traas, Raffy	O.U.14
Roff, Lauren	C.F.32	Traynor, Tessa	C.G.30
Rondeau, Kayla	D.U.5	Treadwell, Brandon	D.G.43
Ronk, Allison	D.U.27	Trettin, Emma	C.U.22
Rozek, Ellen	C.U.12	Trudeau, Claire	C.U.23
Rutherford, Drew	D.G.30, D.G.41	Trump, Damon	D.U.8
Sable, Amelia	B.G.30	Veroeven, Emily	A.U.29, D.U.29
Sackiriyas, Steni	C.G.27	Vogt, Cora	A.U.28
Saikie, Boden	A.U.25	Vogt, Grace	D.G.44
Salentine, Tiffany	B.G.34	Voigts, Brittany	B.G.33
Salfer, Brooke	D.G.47	Vrieze, Kayla	B.G.34
Salinas, Mya	C.U.18	Watrud, Sierra	B.G.32
Sannes, Veronica	D.U.6	Way, Rachel	A.U.29
Sargent, Caroline	C.U.1	Wedemayer, Ethan	D.U.7
Savor, Andrina	A.U.23	Werner, Hannah	D.G.30
Scala, Francesca	O.G.15	White, Gabby	O.G.12
Schenck, Heather	B.U.10	Wilger, Abigaile	A.G.46
Scheuer, McKayla	B.G.34	Williams, Caleb	D.G.45
Schimanski, Nathan	A.G.44	Williams, Cori	C.G.29
Schlieckau, Jardon	A.U.7	Wilson, Jamin	A.U.30
Schoen, Jamie	C.U.34	Winter, Vanessa	D.G.46
Schoneboom, Aubrey	B.U.16	Wissink, Danielle	B.G.29
Schroeder, Nicole	D.G.41	Woltmann, Ashley	D.G.47
Schuler, Jordan	A.U.17, B.U.17	Worachek, Brandon	B.U.20
Schulte, Katelyn	B.G.33	Yablonski, Karly	A.G.47
Schultz, Hayley	A.U.7	Yamriska, Elizabeth	D.G.30
Schwartz, Hannah	D.G.40	Yedinak, Alex	B.G.31
Schwartz, Lindsey	B.G.33	Zahn, Brian	C.G.30
Seliger, Erin	B.U.18	Zavala, Francisco	A.U.17, B.U.17
Senft, Rachel	A.U.24	Ziegelmeyer, Laura	D.G.39
Simon, Kailee	D.G.42	Ziegler, Teagan	A.G.43
Soczka, Hannah	C.U.19		
Sorebo, Kate	A.G.45		
Spierings, Arin	C.U.20		
Squires, Sierra	B.G.34		
Stangler, Alison	A.U.23		
Stanley, Lauren	D.U.28		
Steiger, Evan	B.U.19		
Stelter, Benjamin	C.U.35		
Stepanova, Valeria	C.U.6		
Stewart, Rylee	A.U.25		
Stinson, Hunter	A.G.43		
Strittmater, Gabrielle	O.G.6		
Stuhr, Jacob	D.U.14		
Swenson, Brooklyn	A.U.1		
Theisen, Skyler	B.U.3		
Thompson, Ethan	A.U.26		

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COMMENTS OR SUGGESTIONS?

We welcome your comments and suggestions about the Symposium.
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