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May 3, 2024

The Bluffs and 3rd Floor Student Union

7:45 a.m. - 1:00 p.m.

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SCHEDULE OF ORAL PRESENTATIONS – page 1

	Union 3110	Union 3120	Union 3130	Union 3310
8:50 to 9:15	<p>O.U.1 Kelvin Scheurer (U) <i>Physics</i> Large Orbiting Mirrors Experiencing Radiation Pressure: Analyzing the Impact of Changing Planet Location</p>	<p>O.U.2 Ashley Everson, Maysa Lang, Yamin Van De Water, and Maggie Andrews (U) <i>Psychology</i> Internship Experiences: Using Behavioral Management with Children of All Abilities</p>		<p>O.U.3 Sophie Byrne and Cassandra Gersbach (U) <i>Sustainability & Environmental Studies</i> Advocacy and Awareness: Crucial Contributions of Communication Efforts to Environmental Organizing</p>
9:20 to 9:45	<p>O.F.4 Lisa Vander (F) <i>Economics</i> Fourth Industrial Revolution: AI and Human Centered Job Creation</p>	<p>O.U.5 Rayeann Jones, Brianna Varsho, and Mikaela Russell (U) <i>Psychology</i> Enhancing the Overall Wellbeing of Children as an Intern within Public Schools</p>	<p>O.G.6 Isabella Naughton (G) <i>Recreation Management & Recreational Therapy</i> Outdoor Recreation Professionals' Perceived Safety and Mitigation Strategies Employed to Minimize Unwanted Behavior</p>	<p>O.U.7 Benjamin Muhr and Josie Gulyash (U) <i>Sustainability & Environmental Studies</i> Mussel Conservation in Wisconsin Aquatic Ecosystems with the Genoa National Fish Hatchery and the U.S. Geological Survey</p>
9:55 to 10:20	<p>O.U.8 Nathan Schacherl (U) <i>Mathematics & Statistics</i> Physics-Informed Neural Networks for Modeling Mathematical Ecology</p>	<p>O.U.9 Leo Chavolla (U) <i>Theatre & Dance</i> Bringing Broadway- Caliber Sound Engineering to UWL</p>	<p>O.G.10 Jacob Hansel (G) <i>Biology</i> Factors Affecting Ectomycorrhizal Community Ecology in the Kickapoo Valley, Wisconsin, USA</p>	<p>O.U.11 Richard Noble and Cameron Willcox (U) <i>Sustainability & Environmental Studies</i> Wisconsin Challenges: Cheese Factory Indoor Air Quality and Illegal Large Bird Injuries</p>
10:25 to 10:50	<p>O.U.12 Simon Fichter (U) <i>Archaeology & Anthropology</i> Equine Life and Labor: Analysis of Bronze Age Horse Exploitation Practices within the Carpathian Basin</p>	<p>O.U.13 Katherine Osborne and Maggie Kaiser (U) <i>Psychology</i> Biased but Well- Behaved: Can Implicit Associations Detected by the IAT Predict Measurable Behaviors?</p>	<p>O.G.14 Kori Kruegel (G) <i>Biology</i> Investigation of the Signaling Pathways of Rap1b in Megakaryocytes</p>	<p>O.U.15 Josh Hood and Travis Key (U) <i>Sustainability & Environmental Studies</i> Public Engagement for Supporting Sustainability</p>

SCHEDULE OF ORAL PRESENTATIONS – page 2

	Union 3110	Union 3120	Union 3130	Union 3310
11:00 to 11:25	<p>O.U.16 Anna Fisher (U) <i>Sociology & Criminal Justice</i> Causes, Consequences, and Correlates of Intimate Partner Violence among College Students</p>	<p>O.U.17 Jada Graham (U) <i>Psychology</i> The Effect of Expectations on Performance and Satisfaction</p>	<p>O.G.18 Noah Duke (G) <i>Biology</i> Effects of Aging on Exercise-Induced Extracellular Vesicle Alteration of Immune Cell Activity</p>	<p>O.U.19 Aubrey Schwonek and Blythe Pollard (U) <i>Sustainability & Environmental Studies</i> Restoring Biodiversity through Community and Environment Connections</p>
11:30 to 11:55	<p>O.U.20 Noah Buck (U) <i>Sociology & Criminal Justice</i> Perceived Barriers to Mental Health Help-Seeking for Older Adults</p>	<p>O.U.21 Nicholas Bruder (U) <i>Psychology</i> Facial Polar Plunge: Activating the Mammalian Divers Reflex</p>	<p>O.G.22 Dannira Kulenovic (G) <i>Biology</i> Examining the Role of Axl Inhibition in Chk1 Inhibitor-Resistant Triple Negative Breast Cancers</p>	<p>O.U.23 Bailey Boyer and Grace Lopez-Johnson (U) <i>Sustainability & Environmental Studies</i> Addressing Climate Justice through Communication and Sustainable Community Efforts</p>
12:05 to 12:30	<p>O.U.24 Megan Moeller (U) <i>Archaeology & Anthropology</i> Identifying Treponemal Disease, “The Great Mimicker”, in Medieval English Burials</p>	<p>O.F.25 Berna Gercek-Swing (F) <i>Psychology</i> Exploring Sexual Attitudes and Experiences among College Students: Insights from a Large-Scale Survey</p>	<p>O.U.26 Gavin Hutchison (U) <i>Biology</i> The Circadian Clock in Alzheimer’s Disease</p>	<p>O.U.27 Kelley Reed and Erika Hohen (U) <i>Sustainability & Environmental Studies</i> Let it Grow (LIG): Local Greenhouse Education & Community Outreach</p>
12:35 to 1:00	<p>O.U.28 Sarah Hendrix (U) <i>Library</i> Accessibility of Diverse Children’s Books in the Alice Hagar Curriculum Center</p>	<p>O.U.29 Val Fish (U) <i>Theatre & Dance</i> One Nation Controlled by The Media: Theatre Journalism and Its Influence on the Evolution of the American Musical</p>		<p>O.U.31 Logan Mechler and Sebastian Bishop (U) <i>Sustainability & Environmental Studies</i> Midwest Fisheries Center Efforts to Combat Invasive Species and Monitor Fish Health</p>

UNDERGRADUATE STUDENT ABSTRACTS

UNDERGRADUATE POSTER PRESENTATION ABSTRACTS

Poster Session A 7:45 am – 8:50 am

A.U.1 Oligomerization of Variants of an NtrC-Like Response Regulator from *Myxococcus xanthus*

Vanessa Giallombardo

Co-author: Daniel Bretl

Mentors: Daniel Bretl (Microbiology) and John May (Chemistry & Biochemistry)

Myxococcus xanthus is a soil bacterium used to study social behaviors such as coordinated, multicellular motility which it uses when preying on other microscopic life and when forming fruiting body structures. *M. xanthus* encodes two-component systems (TCS) that allow it to regulate these behaviors in response to environmental signals. NmpR is an NtrC-like response regulator protein (RR) in a TCS that is believed to be activated under low oxygen conditions, and it transcriptionally regulates genes necessary for oxygen utilization and multicellular motility. NtrC-like RRs self-associate, called oligomerization, in the active, “ON” state. Oligomerization is necessary for proper gene regulation. Previous screening has identified NmpR^{ON} variants that spontaneously arose under conditions when NmpR is normally “OFF”. We hypothesize that NmpR^{ON} variants form higher order and more stable oligomers than NmpR^{WT}. To test this hypothesis, we are using dynamic light scattering (DLS) and differential scanning fluorimetry (DSF) to characterize the size, distribution, and melting temperature of NmpR^{WT} and NmpR^{ON} variants. Understanding the oligomeric state of NmpR^{ON} may further our understanding of the mechanism by which NtrC-like RRs function, broadly. This may have important implications for antibiotic development due to the evolutionary conservation of the structure/function of NtrC-like RRs across numerous bacterial species.

A.U.2 Determination of Cyclic Bacterial Species Variation in PER-Deficient *Drosophila melanogaster*

Brenna Lundgren

Mentor: Alder Yu, Biology

Bacteria in the gut of humans and other animals provide nutrients and other chemicals important to the organism's metabolic health. These bacteria comprise the commensal gut microbiome, and its presence and composition impact growth and development. In mammals, feeding patterns and circadian rhythm influence variation in bacterial abundance throughout the day. However, in the *Drosophila melanogaster* microbiome, preliminary research suggests that certain genera of bacteria may exhibit rhythmicity in the absence of host circadian rhythms and feeding patterns. PER-deficient flies lack an essential protein complex in the brain that regulates circadian. Using pupae of these flies, which do not eat, abundance of species-level candidates for rhythmicity were tested using qPCR and species-specific RNA primers. If variation in bacterial abundance within these species is observed, the data will indicate that cyclic abundance of bacteria in the fly microbiome is controlled by some factor other than the circadian clock and feeding rhythms.

A.U.3 Characterizing the Function of Neurotoxic Effects of Developmental Nicotine Exposure on Breathing

Morgan Hahn

Mentor: Cord Brundage, Biology

Mecamylamine (MCE) is a nicotinic acetylcholine receptor antagonist and isoguvacine (ISO) is a GABA receptor agonist. Both compounds can affect the body's nervous system activity. Bullfrog tadpoles have been used as a model system for neurotoxicology research. We investigated the effect of chronic nicotine exposure on nervous system responses to MCE and ISO in normal CO₂ and hypercapnic (high) conditions. After 10-weeks in either control water or water with nicotine (30 µg/L), the tadpoles' brainstems (n = 5) were removed and connected to software measuring nerve output. When looking at trends in the number of nerve events per minute, there was an increase in the first 10 minutes after nicotine was added, an increase when nicotine+MCE was added, and a decrease in the last 10 minutes after the addition of nicotine. There were no other significant trends for event frequency. There were trends for event amplitude which included a decrease for the first 10 minutes after nicotine addition and for nicotine+MCE addition, and an increase in amplitude during hypercapnic conditions and with the addition of ISO. Additional experiments are forthcoming and will help us further understand the role of nicotinic and GABA receptors in nervous system development.

A.U.4 Discrepancies in Wisconsin Statute: Is the Expansion of the City of La Crosse “Camping Ordinance” Justified and are La Crosse Officials Immune from Public Nuisance Allegations?

Jenasea Hameister

Mentor: James Szymalak, Political Science & Public Administration

In May 2023, the La Crosse Parks and Recreation Department and La Crosse Police Department requested that Section 32-5 of the City of La Crosse zoning code be updated. The request came after community complaints regarding the unsheltered population camping in City-owned parks. In their staff report, the parks and police departments stated that current zoning code regarding camping was difficult to interpret. Due to community complaints surrounding this issue, the La Crosse Legal Department found it appropriate to draft Ordinance 23-0673. The legal department referenced the Ninth Circuit court’s decision in *Brown v City of Phoenix*, where the court found that the City of Phoenix could abate its public nuisance through the enforcement of current statutes, ordinances, and codes. Worried that the public would bring suit, the legal department drafted Ordinance 23-0673 upon request by the parks department and police department. With the rise of concern and stigma surrounding unsheltered populations, this research paper used Wisconsin State Statute, Ninth Circuit court decisions, and other case law to analyze whether the City of La Crosse would have been maintaining a public nuisance had they not passed Ordinance 23-0673, and if city officials would have been held personally liable for the potential of maintaining a public nuisance. The results of this analysis concluded that the City of La Crosse was not maintaining a public nuisance as defined by Wisconsin State Statute.

A.U.5 External and Internal Workload Demands of the Northern Warfare Challenge 2023 and 2024

Madelyn Hansen and Mimi Lucido

Co-author: Anna Jacobson

Mentor: Ward Dobbs, Exercise & Sport Science

Purpose: The purpose of this study was to quantify the internal and external workload demands of the Northern Warfare Challenge (NWC) and compare the results from the 2023 event vs the 2024 event. Methods: Eight male Reserve Officers’ Training Corps (ROTC) cadets in 2023 [mean (SD)] [age, 20.8 (1.1) years; height, 177.5 (8.7) cm; mass, 77.8 (7.3) kg] and eight male ROTC cadets in 2024 [age, 20.8 (1.3) years; height, 177.2 (6.8) cm; mass, 79.9 (8.3) kg] participated in this observational study. Participants were equipped with a physical activity monitor and wore it throughout the duration of the NWC, which monitored internal (e.g., heart rate and breathing rate) and external workload (e.g., accelerometry through g forces), respectively. Weather for NWC 2023 consisted of 0.05 inches of freezing rain, 9.8in of snow, 16.0°F, and wind 12.7mph. Weather for NWC 2024 had no ice or snow, 34.0°F, and wind 4.6mph. Results: The average internal and external workload was greater for NWC 2023 (2739.1 ± 343.9 au; 222.8 ± 64.4 g) than NWC 2024 (1559.3 ± 468.7 au; 218.8 ± 64.3 g), respectively. Internal workload was 1.75x greater and external workload was 1.02x greater. Conclusion: It can be concluded that the change in workload is due to significant weather differences and a 2.3 mile decrease in the route from 2023 to 2024.

A.U.6 Do Ketone Bodies Influence on Epstein-Barr Virus Reactivation through Histone Deacetylase Inhibition?

MJ Hennessey

Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein-Barr Virus (EBV) is a human herpes virus that infects upwards of 90% of the world population. Most people experience no symptoms due to EBV existing in a dormant state known as a latent phase. EBV can reactivate into a lytic phase, in which hosts may be able to spread EBV infection. The mechanism and causes of EBV reactivation are not fully understood. One proposed cause of EBV reactivation is through histone deacetylase (HDAC) inhibition, which is the target of this project. HDAC inhibition interferes with a process of regulating gene expression in cells. Sodium butyrate (NaB) is a known HDAC inhibitor and has also been shown to cause EBV reactivation to increase. The ketone body acetoacetate shares a similar structure to NaB and is a proposed EBV reactivator. In an attempt to show if HDAC inhibition increases EBV reactivation, cells were treated with acetoacetate and then used in Western blots to look for acetylated H3 as a marker of HDAC inhibition as well as BZLF1, an EBV protein, as a marker for EBV reactivation. If cells treated with acetoacetate have an increase in acetylated H3 and an increase in BZLF1, then it could imply that HDAC inhibition is causing EBV reactivation.

A.U.7 Mapping Interactions Important for the Secretion of a Toxic Protein

Miryah Henriksen
Mentor: Daniel Grilley, Chemistry & Biochemistry

The gram-negative bacteria *Proteus mirabilis* secretes a cytotoxic protein called HpmA. This protein plays a key role in bladder infections. HpmA lyses mammalian red blood cells in order for the bacteria to gain access to nutrients needed for survival and replication. HpmA and related proteins are secreted using a two-partner secretion system. Understanding this system, and how HpmA stability impacts secretion, is critical for future pharmaceutical development against the production of the HpmA toxin. The results of quantitative western dot blots measuring the levels of secretion for wild type and select variant proteins will be presented, as well as the implications of secretion levels for the variant proteins.

A.U.8 Recovery Patterns Following the Northern Warfare Challenge

Anna Jacobson
Co-authors: Mimi Lucido, Rachel Schmitt, Alex Gregen, Micah Missall, and Ward Dobbs
Mentor: Ward Dobbs, Exercise & Sport Science

The Northern Warfare Challenge (NWC) is a rigorous competition among Reserve Officers' Training Corps (ROTC) cadets that includes a ~14- to 17-mile ruck while carrying a 13.6-22.7 kg pack. Purpose: The purpose of this study was to observe the influence of the NWC on physical, cognitive, and perceptual performance. Methods: Nine cadets volunteered to participate in this study [mean (SD)] [age, 20.8 (1.3) years; height, 177.2 (6.8) cm; mass, 79.9 (8.3) kg]. Forty-eight hours prior to, and 24-, 48-, 96-hours following the NWC, cadets attended the human performance laboratory between 0530-0630 to perform a battery of tests following a standardized warmup. The testing battery included a subjective rating of recovery via the perceptual recovery status (PRS) scale, a series of countermovement jumps on a force plate, a quick reaction and choice test (SQRT) on an iPad. Repeated measures analysis of variance used to analyze the data with a prior alpha of .05. Results & Discussion: Preliminary results identified a significant difference for PRS across time ($p < .001$) as PRS was lower at the 24-h and 48-h post but returned to baseline levels 96-h post. Other results are still being analyzed, but they will be ready for dissemination at the symposium.

A.U.9 Hacking the Housing Market: Analyzing the Interaction between Policy and Housing

Mitchell Kocialkowski
Mentors: Nabamita Dutta (Economics) and Adam Stivers (Finance)

By delving into historical trends, contemporary data, and future projections, I aim to provide a comprehensive analysis of the housing market's health using multiple counties in the Midwest. Key indicators such as the price-income ratio, the age of housing stock, and the diversity of housing types offer valuable insights into the state of affordability, accessibility, and quality of housing. regulatory framework in Wisconsin, including by-right zoning and the Comprehensive Planning and Smart Growth Law, which plays a pivotal role in shaping the supply and affordability of housing. By examining these policies, I aim to assess the impact on market dynamics, identifying both the positive and negative outcomes. This analysis will not only shed light on the complex interplay between regulation and housing market performance but also highlight the importance of informed policymaking to address the pressing needs of communities. My study contributes to the ongoing dialogue on how to balance regulatory measures with market forces to promote a healthy, accessible, and sustainable housing market.

A.U.10 Factors Released from Breast Cancer Cells May Affect Megakaryocytic DAMI Cell Proliferation

Katie Johnston, Amber Johnson, and Maya Biese
Mentor: Jaclyn Wisinski, Biology

Platelet production by bone marrow resident megakaryocytes and clearance by hepatocytes regulate blood platelet counts. Low platelet counts delay cancer treatment due to bleeding risk, while high platelet counts can correlate with increased metastasis of some cancers. Metastatic breast cancer can make its way into the bone marrow and may influence megakaryocyte proliferation to increase platelet production. We hypothesize that metastatic breast cancer cells (BT549 cells) and/or osteoblasts release something that alters the rate of proliferation of megakaryocytes (DAMI cells). Moreover, breast cancer cells may release substances that affect osteoblastic bone cells to release other factors that may alter proliferation of megakaryocytes (DAMI cells). To test this hypothesis, DAMI cells were incubated with conditioned

media from BT549 breast cancer cells, osteoblasts, and osteoblasts incubated with BT549 cells (termed double conditioned media), and an MTS proliferation assay was conducted for 4 days. Proliferation of DAMI cells incubated with conditioned medias was compared to DAMI cells in 1% FBS growth media. Our next step is to determine if our results are specific to BT549 breast cancer cells by comparing DAMI cell proliferation rates when incubated with released substances from non-invasive breast cancer cells (MCF7 cells).

A.U.11 The Effects of Cold Storage on Mitophagy in Thirteen-Lined Ground Squirrels and Human Platelets

McKenzie Nisius, Katie Christensen, Luke Schneider, Tristan Anderson, and Chase Tessness
Mentor: Scott Cooper, Biology

Thirteen-lined ground squirrels undergo unique physiological changes during hibernation which extends the shelf-life of platelets when stored in the cold. Human platelets stored in the cold undergo mitophagy, destruction of mitochondria by fusion with lysosomes. We measured mitophagy in thirteen lined ground squirrel platelets using mitotracker and lysotracker and observed the results with the confocal microscope. Comparisons between human and ground squirrel platelets stored at room temperature or in the cold were made to see if ground squirrel platelets were resistant to mitophagy in the cold. These findings could have potential medical applications for prolonging the storage of human platelets for transfusions.

A.U.12 My Language, My Country: Study of Language and National Identity across Ireland and the United States

Mikaela Robarge
Mentor: Carol Miller, Sociology & Criminal Justice

The present research explores the relationship between language and national identity between Ireland and the United States as it relates to hegemonic positioning in the World Systems. From the perspective of linguistic composition, the United States and Ireland hold conflicting relationships between language and national identity. In the United States, citizens prioritize pro-English sentiment toward American identity that fails to account for the nation's growing linguistic diversity. On the other side, revitalization efforts by the Irish government to preserve Irish Gaelic after decades of linguistic censorship struggle to promote citizens' support regarding the importance of the language to Irish identity. The following research studies the respective populations' attitudes to language and whether speaking these languages makes them truly American or Irish. The 2013 National Identity III survey conducted by The International Social Survey Programme was used to examine these relationships by running tests between participants' country nationality to the participants' response to the level of importance that the respective language (English/Irish Gaelic) has on being truly American or Irish. Study outcomes as they relate to World Systems theory point to a larger importance of English to American nationality compared to Irish Gaelic to Irish nationality due to the two countries' positions within the cycles of hegemony and the fluctuations of power each language.

A.U.13 Unlocking Economic Potential: Comparing Entrepreneurship and Freedom in the Midwest

Lindsey Scheurer
Mentors: Nabamita Dutta (Economics) and Adam Stivers (Finance)

Entrepreneurship is often credited as a key driver in a thriving economy. This research investigates how entrepreneurship and freedom interact and impact each other in Wisconsin and the surrounding states. This study explores various entrepreneurship indicators, measurements of freedom, multiple macroeconomic variables, and their relationships with each other. Using a quantitative analysis of data on these variables, insight is provided for what helps and hinders the entrepreneurial success in these states and informs policies going forward.

A.U.14 The Influence of Lasso Lifting Wrist Straps on Maximal Isometric Mid-Thigh Pull Strength

Rachel Schmitt
Co-author: Ward Dobbs
Mentor: Ward Dobbs, Exercise & Sport Science

The isometric mid-thigh pull (IMTP) is a test to measure maximal lower body strength that involves individuals pulling upward on an immovable bar for 5-seconds. To limit the influence of grip strength, lasso lifting wrist straps may be used,

but it is unknown to what extent they moderate IMTP performance. **PURPOSE:** This study examined the influence of using lasso lifting wrist straps on IMTP performance. **METHODS:** Thirty-two collegiate wrestlers performed two maximal IMTPs on a set of portable force plates to measure peak force (PF) on several occasions; prior to their training camp [familiarization], post training camp, and during the middle of their competitive season. During the familiarization, lasso wrist wraps were not utilized, but they were implemented during all other trials. Repeated measures analysis of variance was used to evaluate PF across trials. **RESULTS:** There was a significant difference in PF across trials ($p < .001$) as the familiarization session (2430 ± 389 N) was lower than post-camp (3236 ± 648 N) and mid-season (3184 ± 916 N). **CONCLUSION:** It is recommended that a familiarization session be conducted with the use of wrist wraps to get acquainted with the IMTP technique and minimize the potential loss in PF attributed to grip strength.

A.U.15 Comparison of Loaded Plyometrics vs. Unloaded Isometrics on Achilles Tendon Stiffness

Logan Stauffer, Kristy Nachreiner, Brody Sipiorski, Payton Jenks-Recker, Grace Willmott, and Connor Mumm
Mentor: Salvador Jaime, Exercise & Sport Science

Tendon stiffness is a tendon's ability to absorb and rapidly produce force. Previous research indicates that both plyometric and isometric training increase tendon stiffness and enhance force production. There is lack of research containing externally loaded plyometric vs. unloaded isometric training on tendon stiffness. **Purpose:** To compare loaded plyometrics to isometrics to determine which modality improves Achilles tendon (AT) stiffness better by measuring ground reaction time and AT thickness. **Methods:** This study will include 12 participants (18-24 years old) randomly assigned into two equal groups. One group will complete two weeks of bi-weekly loaded plyometric training and the other group will do two weeks of bi-weekly isometric training. The initial testing of the Achilles will include an ultrasound measurement between lateral and medial malleolus and a 12-inch depth drop vertical jump and 12-inch depth drop broad jump. Post-initial testing, subjects will be given their respective programs and given technique demonstrations. Subjects will independently follow the program for the entire study. Subjects will allow 48 hours minimum between sessions. The same tests will be administered on the final meeting day after two weeks of respective training. **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.

A.U.16 Interleukin-15 (IL-15) Expression in Epstein-Barr Virus (EBV) Infected Cells Varies in Time

Madeline Teale
Mentor: Kelly Gorres, Chemistry & Biochemistry

The Epstein-Barr Virus (EBV) is one of the most widely spread viruses worldwide, with most individuals contracting the virus at one point or another. EBV is in the lytic cycle when the virus is replicating its genome and spreading, whereas the latent cycle is when EBV is not actively invading other cells. The BZLF1 gene determines if the EBV lytic cycle is activated. Atypical antipsychotics, like Clozapine and Aripiprazole, reduce the ability of the EBV virus to express BZLF1. By treating EBV-infected cells with Aripiprazole, we can see the effects on the BZLF1 gene and host cell genes. We will compare to the expression of the BZLF1 viral gene with the expression of the interleukin-15 (IL-15) cellular gene. Cellular genes are needed to initiate BZLF1 expression, which is why we are looking at IL-15 to see if its expression is associated with the EBV and BZLF1 expression. IL-15 is associated with many types of inflammation, including those caused by viral infections and different types of cancers. Since EBV is also associated with cancers, an IL-15 response could be an indicator of the disease. We will also determine if the markers signaling EBV replication occur in the beginning stages of the lytic cycle, or if they happen later. From these experiments, we will be able to determine if the IL-15 gene plays a role in controlling or signifying the status of the EBV lytic cycle, which could open the way for further similar markers to be discovered.

A.U.17 Regional Differences of Stress-Induced Increase in Intestinal Permeability

Lexi Valeri
Co-authors: Lauren Broman, Abby Klecker, and Matthew Wright
Mentor: Sumei Liu, Biology

Stress impairs the intestinal epithelial barrier and may contribute to gut disorders. However, it is unclear whether different regions of the intestine respond differently to stress. Mice in the stressed groups were restrained 1h/day for 5 days. Control mice remained in their cage without being restrained. On day 5, the duodenum, jejunum, ileum, proximal colon, and distal colon were removed, and the mucosa/submucosa layers were mounted onto the Ussing Chambers. Transepithelial

resistance (TER) was recorded to measure paracellular permeability. FITC-insulin (4kD) and horseradish peroxidase (HRP, 40 kD) were added to the luminal chamber, and the flux rates to the basolateral side were used to assess paracellular and transcellular permeability, respectively. Stress resulted in a significant decrease in TER only in the distal colon of male and female mice. FITC-insulin flux was unaffected by stress in male mice; however, significantly increased in the distal colon of the stressed female mice. HRP flux was significantly increased in the proximal colon of the stressed male, while showing no significant change in females. The results suggest that large intestinal epithelium is more vulnerable to stress compared to the small intestine, and male and female mice respond differently to stress. Aiming toward the specific intestinal regions impacted by stress may aid in the creation of medications that better target the vulnerable regions of the gut.

A.U.18 Characterizing the Response of Extracellular Vesicles to Aging and Resistance Training: Neurons

Caelen Lansing and Corbin Guy
Mentor: Jennifer Klein, Biology

Exercise can have a positive impact on reducing the age-related dysfunction that is experienced by individuals over the course of the human lifecycle. The specific processes through which aging proceeds, as well as the impact of exercise on these processes is relatively unknown. This project evaluates how exercise can influence the aging process of the brain through the analysis of extracellular vesicles (EV) derived from muscles during exercise. Isolated EV samples were collected from healthy adults directly preceding, immediately after, and 24 hours after a bout of acute resistance training. The influence of the EVs isolated in each of these conditions is evaluated through the treatment and analysis of neuronal stem cells with the isolated EVs, with microscopy being used for the evaluation of neurogenesis. The purpose of this study is to characterize the impact of EVs on the body's neural response to aging and acute resistance exercise.

Poster Session B 8:50 am – 9:45 am

B.U.1 Characterization of *Myxococcus xanthus* Phenotypes in Low Oxygen Environments

Skylar White
Co-author: Daniel Bretl
Mentor: Daniel Bretl, Microbiology

Myxococcus xanthus is a soil bacterium known for its complex lifestyle and cooperative behaviors that contribute to its growth and survival in diverse soil environments. To regulate these behaviors, *M. xanthus* encodes many two-component systems (TCS) that regulate gene expression. *M. xanthus* uses TCSs to respond to stimuli from outside of the cell and regulate behaviors such as growth, motility, microbial predation, fruiting body formation, and sporulation. Recently, the Bretl lab has characterized a TCS in *M. xanthus* named NmpRSTU that likely senses reduced oxygen concentrations. Despite being an obligate aerobe, *M. xanthus* must encounter soil environments (spatially or temporally) with reduced oxygen levels. Yet, most of the research on *M. xanthus* has been done in well-aerated environments due to its strict metabolic oxygen requirement. Therefore, there is little knowledge of the characteristics of *M. xanthus* in low-oxygen environments, and no understanding of the role of NmpRSTU in these same environments. My project focuses on characterizing the growth, survival, development, and motility of *M. xanthus* in low oxygen and determining the role of NmpRSTU. For each behavior, we hypothesize that there will be a difference between wild type and $\Delta nmpR$ mutants, which would indicate the NmpRSTU system regulates these phenotypes under low oxygen conditions.

B.U.2 Purification of a Viral Tegument Protein of Unknown Function

Owen Thompson
Mentor: Kelly Gorres, Chemistry & Biochemistry

Epstein-Barr Virus (EBV) and Kaposi sarcoma-associated herpes virus (KSHV) are members of the large gammaherpes virus family. These viruses have been shown to be the cause of multiple types of cancers and infections in humans, particularly mononucleosis, Burkitt lymphoma, lung and gastric cancers for EBV, whereas KSHV has been implicated in certain immune cell cancers. Herpes virions contain a tegument layer with protein functionalities and structures that are relatively unknown. We are particularly interested in a tegument protein (ORF48) of unknown function which has been linked to the lytic cycle in virus progression in murine models. This open reading frame is highly conserved among

gammaherpesviruses, including the related virus, murine gammaherpesvirus 68 (MHV68). We have produced and purified MHV68 ORF48 from *Escherichia coli* in hopes of performing structural analysis. Structural determination will allow us to advance our knowledge in the functionalities of this protein through structural relationships. This advancement will ultimately further understanding of EBV and KSHV and their roles in infections and subsequent cancers.

B.U.3 Effects of Orchid-Specific Bacteria in Addition to Orchid Mycorrhizal Fungi on the Germination of *Platanthera chapmanii*

Tyler Kaiser

Co-authors: Paul Schweiger, Jaspreet Kaur, Jyotsna Sharma, Ph.D. (Texas Tech University)

Mentor: Jaspreet Kaur, Biology

While it is known that seeds of the Orchidaceae family require a special interaction with orchid mycorrhizal fungi (OMF) to germinate and to grow, the role of orchid associated bacteria (OAB) in orchid ecological niche remains severely underexplored. OAB may provide unique benefits to orchids and their OMF by either enhancing the colonization of OMF through hormonal provisioning or by supplementing their nutritional niche via nitrogen fixation or phosphate solubilization. Therefore, our study aims to test the hypothesis that the introduction of bacteria in orchid mycorrhizal symbiotic cultures will promote orchid seed germination under in-vitro conditions. To test this hypothesis, we selected five OMF and two OAB isolates, and a factorial experiment was placed by inoculating orchid seeds with 1) only OMF, 2) only OAB or 3) both, OMF and OAB. A total of five replicates were used to represent each treatment combination. The data collection is in progress whereby the culture plates are being monitored for percent seed germination. The data will be analyzed with standard statistical procedures. Overall, we predict that the inoculation of OAB will supplement the seed germination by OMF and therefore treatment combinations with the co-inoculation of OAB and OMF will exhibit highest seed germination.

B.U.4 Deep Learning for Remnant Hill Prairie Identification

Dirk Lueck

Mentor: Niti Mishra, Geography & Environmental Science

The Driftless Region of Wisconsin, with its unique geological history, hosts remnant hill prairies crucial for endangered species. Monitoring and identification of these remnant prairies is critical for conservation efforts. However, to date, no inventory has been completed to identify the extent and locations of these remnant hill prairies. Machine deep learning techniques have proven effective for identifying and mapping complex ecological changes and habitats and from satellite imagery. This research looks to develop methods for identifying and monitoring remnant hill prairies within the driftless using a deep learning framework with remotely sensed multispectral imagery and spectral-spatial fusion techniques on 2022 NAIP imagery. A hierarchical classification approach was utilized starting with a four-class classification followed by further refining of classes to distinguish remnant quality. These results will enhance our understanding of remnant hill prairies, contributing to a more precise conservation strategy. This framework integrates multispectral imagery and spectral-spatial fusion techniques, ensuring computational efficiency and accuracy. Outcomes include a map of Driftless Region hill prairies and an automated identification methodology, expediting future monitoring and conservation efforts. This project pioneers advancements in deep learning and remote sensing techniques for complex ecological applications within spatially and spectrally intricate ecosystems.

B.U.5 Understanding the Secretion of a Toxic Protein

Katelyn Phelps

Mentor: Daniel Grilley, Chemistry & Biochemistry

HpmA is a hemolytic protein secreted by the bacterium *Proteus mirabilis*. HpmA uses a two-partner secretion (TPS) pathway, which utilizes a B-component, HpmB, for transport across the outer membrane of the cell. During secretion, HpmA adopts its functional folded structure. This project aims to understand how the energetics of folding and HpmA-HpmB interactions impact HpmA secretion. To test the HpmA secretion model, we have isolated proteins that extend the TPS domain by multiples of two residues. We have determined the stability of these longer constructs via CD-monitored Protein Denaturation. Longer proteins revealed a new denaturation transition, suggesting a new pause point for extended helices. To determine which constructs best act as templates to catalyze the folding of the remainder of the protein as it is secreted, we determined their activity via Template Assisted Hemolytic Activity (TAHA) Assays. Together, template length and location of cutoff influenced folding interactions. HpmB is thought to identify HpmA via polypeptide-

transport-associated (POTRA) domains. We are determining the strength of HpmA interactions with the POTRA domains using Surface Plasmon Resonance (SPR) experiments. These experiments allow us to determine which portions have the fastest association rates, and therefore preferentially bind to HpmB's POTRA domains. Understanding the preference and strength of HpmA-HpmB interactions will aid in determining the overall process of HpmA secretion.

B.U.6 Investigating the Relationship between Parental Involvement and Socio-Economic Status

Antonia Marlis
Mentor: Tesia Marshik, Psychology

Education is a fundamental part of personal development; however, it is not equally accessible and distributed across different socio-economic backgrounds. Most critically, there are significant differences in academic achievement between certain demographic groups that disproportionately impact students living in low socio-economic communities. Seeing this disparity, it is important to investigate interventions that can improve academic achievement in students from low socio-economic backgrounds. One intervention is parental involvement, which has been linked to academic achievement in several studies (Zellman & Waterman, 1998). Nonetheless, there is research that indicates that parents from low SES backgrounds are significantly less involved in their children's education (Zhang et al., 2023). This research proposal is aimed to further investigate the relationship between socioeconomic status and parental involvement.

B.U.7 Wari Imperialism: A Regional Perspective

Ellie Arndt
Mentors: Timothy McAndrews and Elizabeth Peacock, Archaeology & Anthropology

The Andean Region of South America has been an archaeologically significant topic of interest for centuries. One of the most prolific groups to control the Peruvian highland region was the Wari, dominating the Middle Horizon (CE 600-1000). Centered in the Ayacucho Basin, their influence extended well outside of their original starting place. Large Wari administrative centers, Pikillacta and Jincamocco, were built in the Lucre Basin and Carahuarazo/Sondondo Valley respectively. The level of direct control used by the Wari in the regions they colonized has been a topic of much debate and interest. Katharina Schreiber developed the Mosaic of Control model, which describes the Wari expansionary methods as non-uniform and heavily based on factors already present in the region being consolidated. In this paper a comparative study of the Lucre Basin and Carahuarazo/Sondondo Valley will be conducted, using Katharina Schreiber's model as a lens to explain the differences and similarities found. The comparison will be rooted in architectural forms and settlement pattern occupation sizes displayed in both regions through time. A chronological organization of analysis will allow for the impact of the Wari's imperial expansion to be seen at the local level. Tracking changes through time in the local village site of Minaspatá, in the Lucre Basin, will be a critical point of analysis in order to emphasize/challenge the results found in the comparative analysis of both administrative sites.

B.U.8 The Effect of Radiation on Circadian Rhythms

Peyton Breunig
Mentor: Alder Yu, Biology

Earth's 24-hour day/night cycle has dramatically shaped the life on this planet. As a result, organisms (including humans) on Earth have created ways to cyclically express genes and regulate body processes based on the time of day. As humans endure the rigors of spaceflight into Earth's orbit more frequently, the effect on human circadian rhythms in space has been examined more closely. Spaceflight has been known to disrupt circadian rhythms in astronauts and space-flown animals. Some of this is likely due to non-24-hour mission schedules or the physical discomforts of spaceflight. However, these factors do not wholly account for the circadian rhythm disruption seen in spaceflight. A previous study in the lab showed that the cyclically expressed gene period (PER) in fruit flies (*Drosophila melanogaster*) had reduced amplitude when exposed to neutron radiation. This reduced amplitude could explain disrupted circadian rhythms during spaceflight. This study builds off the previous study to test the hypothesis that radiation lowers the amplitude of gene expression for other components in fruit flies' circadian clock. This study uses qRT-PCR to determine the gene activation of fruit fly genes timeless (TIM) and vriille (VRI) of previously irradiated samples.

B.U.9 Mechanisms and Consequences of Nicotine Exposure in Tadpole Respiratory Responses

Zoey Carlson

Mentor: Cord Brundage, Biology

Maternal smoking during pregnancy is a major risk factor for sudden infant death syndrome (SIDS), with nicotine likely the active agent. Tadpoles have been used as a model for studying how nicotine exposure affects the developing brain as brain activity recordings associated with breathing show impaired functioning following ten weeks of exposure to 30 μ g/L nicotine. How those neurologic effects translate into behavior changes in the animal has not been studied in-depth and will be further tested within this research. An experimental group, exposed to 30 μ g/L nicotine for ten weeks, and a control group of tadpoles will be video recorded individually for 20 minutes in separate tanks to measure behavior and activity. The primary variable analyzed will be total surfacing events, defined as a tadpole's periodic air breathing at the water's surface. Variable analysis will be conducted through the software program EthoVision XT. The number of surface events should differ between control tadpoles and those chronically exposed to nicotine. The potential change in surfacing events would correlate with not only the results seen in tadpole brain recordings, but also demonstrate how developmental nicotine disrupts breathing activity and increases the risk of SIDS development in infants.

B.U.10 Implementing a More Accurate Equation for Simulated Radiation Pressure

Caleb Davey and Ethan Hellenbrand

Mentor: Shauna Sallmen, Physics

This work is one part of a research project that aims to better our understanding of satellite orbits around Earth-like exoplanets in situations where pressure from starlight significantly affects the trajectory of the satellite. Our research involves coding and running simulations of a system with a star, planet, and satellite designed to reflect sunlight onto the perpetually dark side of a tidally locked planet. Such a planet has one side that perpetually faces its star, causing the other side to never get any sunlight. The satellite has a mirror with a surface area of 1 square km and is lightweight with a weight of 1000 kg. This makes the radiation pressure (RP) on it more significant and able to affect its orbit. The equation that we have been using for RP from the star assumes that because the planet and the mirror are far away from the star it can be considered a point source. We are checking to see if a more accurate equation that includes the star's size substantially changes our results. The RP from the two equations differs by at most 0.02 percent. However, slight changes sometimes have big effects in orbital situations. We will present a comparison of the results for simulations run with both RP equations. If there are differences, we expect them to be bigger in situations where the planet is closer to the star.

B.U.11 Effect of Unilateral Knee Extension Fatigue on Contralateral Knee Extension/Flexor Muscle Performance

Alex Gergen, Grace Maerz, Seth Rieman, Micah Missall, Max Gutenberg, and Morgan McNeill

Mentors: Salvador Jamie, Ward Dobbs, and Naoko Giblin, Exercise & Sport Science

Unilateral movements are commonly used across the world in exercise, sports, and everyday activities. Previous research has shown that unilateral fatigue may have an effect on contralateral muscle performance. However, there is conflicting research on the exact nature of the effects this may have. Purpose: To investigate the effects of unilateral fatigue status of knee extensor muscles (fatigued vs. non-fatigued) on isometric and isokinetic torque, surface electromyography (sEMG) activity, perception of fatigue, and rating of perceived exertion (RPE) of the contralateral knee extensor and flexor muscles. Methods: 10-20 participants (18-34 yrs.) will complete three visits (familiarization, control, dominant-leg fatigue). The familiarization consists of a standardized warmup and a run-through of all testing protocols. Testing sessions: participants will complete two maximal voluntary isometric contractions (MVIC) of the non-dominant leg (pre- and post-fatiguing protocol), a fatiguing protocol (five sets of single dominant-leg knee extensions to failure), and three sets of isokinetic testing of the non-dominant leg (post-fatiguing protocol), with RPE, sEMG, and local perceived fatigue ratings collected throughout testing. Control will include a sham fatiguing protocol. 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.

B.U.12 Wisconsin Lithic Source Identification Using Portable X-Ray Fluorescence Technology

Judy Crook

Mentors: Constance Arzigian and Heather Walder, Archaeology & Anthropology

The accurate identification of raw materials used to make archaeological stone tools can lead to a better understanding of past human behaviors like procurement patterns, population migrations, and interactions or trade and exchange between cultural groups. The macroscopic similarities between different sources of the same raw materials in southern Wisconsin make them hard to distinguish. This study aims to work toward solving the problems with accurate source identification using non-destructive methods. A Niton XL3t portable x-ray fluorescence (pXRF) analyzer was used to measure amounts of 96 elements from the periodic table in chert and silicified sandstone samples collected from outcrops and quarries and artifacts recovered from southern Wisconsin. Three of the silicified sandstone sources have been proven discernable using this method (Roessler 2016). It is expected that Parfrey's Glenn silicified sandstone will be distinguished from the previously studied group. It is also possible, but not yet certain, that the chert sources will also be distinguishable using this technology. The significance of this study will help us determine if pXRF technology can be reliably used to further develop our understanding of where people moved throughout the landscape and their interactions and exchanges with other cultural groups.

B.U.13 Quantum-Dot Based Single-Photon Detection with Solid-Immersion Lens Integration

Isaiah Delebrea

Co-authors: Nicholas Raden, Brecca Bettcher, Kayli Buchli, and Eric Gansen

Mentor: Eric Gansen, Physics

Quantum-dot, optically gated, field-effect transistors (QDOGFETs) have been shown to exhibit photon-number-resolving capabilities and are promising devices for future quantum networks; however, with their mm-sized active areas, it has proven difficult to efficiently couple light into them. Here, we demonstrate how a high-index, cubic zirconia, solid-immersion lens (SIL) can be used to improve the free-space coupling of light into QDOGFET single-photon detectors. We will show how SIL-integration can be used to reduce the loss associated with photons missing the active area of the QDOGFET and how it can be used to direct the photons to the quantum dots that exhibit the largest and most uniform responses. While the former improves the overall detection efficiency of the system, the latter ensures that the detector is operating with its optimal sensitivity and photon-number resolution. Our presentation will include the results of measurements where statistical analysis of the detected photons is employed to evaluate the performance of SIL-capped detectors and to produce the response maps that we use to identify the optical seed point of photons.

B.U.14 Plants and Stress

Samantha Ankeny

Mentor: Ryan McKelley, Psychology

The purpose of this study is to assess student stress levels in environments with live house plants, artificial plants, or no plants. Previous research has shown that exposure to greenery can help to improve mood (Chang & Chen, 2005) and that interacting with plants can help to reduce stress (Lee et al., 2015), but has not addressed the effects of houseplants in an indoor environment on stress levels. Seventy-five participants who signed up for the study were randomly assigned to one of three rooms: with no plants, houseplants, or artificial plants. The plant conditions matched artificial/real plants, and all conditions had the same furniture setup. Participants were connected to biofeedback equipment throughout the experiment. They were given a 10-minute timed anagram task to induce stress and then responded to surveys, including demographics, the State/Trait Anxiety Inventory, Nature Exposure Scale, and Environmental Perception. Data was collected November-December 2023 and is currently being analyzed. I anticipate that participant stress levels will be lower when in a room with plants compared to a room with no plants. Further, I anticipate that live plants will provide more stress reduction than artificial plants. Results will help make us aware of how to help reduce student stress through environmental measures.

B.U.15 Connecting Clinically Observed Metabolic Deficiencies to Protein Structure and Function

Megan Gregory

Mentor: Todd Weaver, Chemistry & Biochemistry

Human fumarase (FH), an enzyme in the citric acid cycle, is an essential step in the metabolic pathway that fuels our bodies. When this enzyme is mutated, previous clinical cases were shown to result in a less functional enzyme and therefore a decreased quality of life. To better understand the specific impacts these mutations had on the structure and function of FH, circular dichroism, non-denaturing gels, and Michaelis-Menten kinetics were conducted on a clinically observed variant. These experiments resulted in the findings that this variant had quaternary structure which is crucial to functionality of this enzyme. However, this variant also had significantly diminished catalytic abilities in comparison to the normal FH. This decreased catalytic ability allows more fumarate to build in the citric acid cycle and thus may lead to DNA repair damage. Overall, this clinically observed variant has highlighted the importance of conserved structure and function for essential metabolic enzymes and therefore the human body.

B.U.16 The Effects of Task-Specific Post Activation Performance Enhancement (PAPE) on Vertical Jump Height and Maximum Running Velocity

Madelyn Hansen, Slater Fitzgerald, Makenzie Haldiman, Aaron Schmitz, Colten Hanson, and Erin Jonas

Co-author: Salvador Jaime

Mentor: Salvador Jaime, Exercise & Sport Science

This study aims to assess the efficacy of a task-specific post-activation performance enhancement (PAPE) protocol in enhancing performance compared to a well-structured warm-up. While the mechanisms underlying PAPE remain elusive, potential factors such as increased muscular temperature, intramuscular fluid, and muscle activation are proposed. Purpose: This study aims to clarify the benefits of a task-specific PAPE protocol when paired with a comprehensive warmup. We hypothesize that including a task-specific PAPE protocol will significantly improve performance in both vertical jump and running velocity groups. Methods: The research involves healthy individuals aged 18-35, randomly assigned to two groups for testing vertical jump height or maximum running velocity. Each group will undergo three conditions: limited warm-up, comprehensive warm-up, and comprehensive warm-up with a task-specific PAPE protocol. Testing conditions will be separated by at least 48 hours. Results and Analysis: Data collection and analysis are currently ongoing, with results expected before the symposium.

B.U.17 Qualitative Quartz Queries: A Quick Experimental Replication of Expedient Tool Use-Wear

Matt Johnson, Kyle Kohlstedt, Madalyn Lilly, Fionna Miller, and Nora Woolley

Co-authors: Spring 2024 ANT/ARC 346 students

Mentor: Heather Walder, Archaeology and Anthropology

Students in the Spring 2024 Ethnoarchaeology and Experimental Archaeology course (ANT/ARC 346) at UW-La Crosse conducted a semester-long experiment investigating how stone tools may have been made and used at archaeological sites where quartz was the primary raw material available for flintknapping. By replicating past human behaviors using quartz flake tools, it is possible to identify diagnostic wear patterns visible at the macroscopic and microscopic scale. Such use-wear patterns can then be compared to artifacts from archaeological sites, such as an Archaic through Late Woodland (5000 – 1000 BP) lakeshore occupation in Red Cliff, Wisconsin being investigated in collaboration with the Red Cliff Band of Lake Superior Chippewa. Students produced stone tools from quartz beach cobbles collected in northern Wisconsin, using the bipolar percussion method followed by hard hammer and soft hammer reduction with stone, antler, and copper hammers and striking tools. Students used these tools to cut animal hide, scrape and whittle wood, butcher and process meat, scale and clean fish, and modify bone and antler to simulate toolmaking activities. Results aid in interpreting possible uses of archaeological artifacts that may have similar abrasions and use-wear as those identifiable on the experimental lithic tools produced in this study.

B.U.18 Determining Local Fire History Using Magnetic Susceptibility and Macroscopic Charcoal

Brady Hurner and Dominic Vanden Elzen

Mentor: Joan Bunbury, Geography & Environmental Science

Macroscopic charcoal (>125 μm) preserved in lake sediments can be indicative of local fire history. Sediment cores were collected in June of 2019 from Mud Lake located in the Mud Lake Fen and Wet Prairie State Natural Area in Jefferson

County, Wisconsin. The analysis of these cores includes the upper 200 cm of sediment, which accounts for the past 3,000 years. Research has shown that peaks in magnetic susceptibility correspond with peaks in charcoal accumulation. Charcoal within this lake sediment core will be identified and quantified using standard methods, and a magnetic susceptibility record is available for this core. Therefore, the goal of this study is to investigate the correlation between magnetic susceptibility and charcoal accumulation to determine the local fire history at this site over the past 3,000 years. A chronology was generated using seventeen ^{210}Pb age determinations and three radiocarbon (^{14}C) dates. Charcoal accumulation rates and magnetic susceptibility records will be presented, as will correlations between these two variables.

B.U.19 Analyzing the Effectiveness of Mental Health Community Care: Caring for Ourselves & Each Other

Kaydee Johnson and Sophia Root
Mentor: Keely Rees, Public Health & Community Health Education

Young adult mental health has been concerning since the COVID-19 pandemic. To tackle the stigma and accessibility surrounding mental health, Mental Health Community Care: Caring for Ourselves & Each Other (MHCC) is a training program that focuses on community support and mental health promotion among young adults. This research will serve as a post-data collection of MHCC via focus groups. Discussion with participants several months after the training will give insight into how effective the training was and how the participants used the skills they learned. This research is ongoing and will conclude at the end of April 2024. Results will be shared via a poster presentation at the 6th Annual Creativity Symposium. These focus groups will take place from February to April and will consist of 6-8 participants, audio recording devices, a hand scribe and a discussion facilitator. We expect to learn if and how participants increased their healthy behaviors, utilized protective factors, and engaged in resiliency actions for themselves and the people around them. Possible implications of this research may include efforts to support the implementation of more mental health training at the university and community levels, increase quality of life, create a sense of social connectedness, and strengthen the public health workforce.

B.U.20 Quantifying DNA Fragments by Temperature-Dependent SPR Measurements

Cora Lubahn and Courtney Masarik
Co-author: Aric Opdahl
Mentor: Aric Opdahl, Chemistry & Biochemistry

We are developing instrumentation for performing the simultaneous quantitation of multiple types of DNA fragments in a biological sample. While there are many instrumental methods for detecting DNA fragments, such as by microarray technology or PCR, correlating a signal back to the actual amount of DNA in the sample is challenging. Here we present a new approach for obtaining such information by applying a temperature gradient across a surface plasmon resonance (SPR) sensor. The temperature dependence of the sensor response yields information analogous to a DNA denaturation profile, which systematically varies with target concentration. A detailed analysis of the time and temperature response of the sensor allows for a quantitative determination of DNA fragments.

B.U.21 Selective Activation of Phosphorylated Rap1b in Megakaryocytes

Jack Morrison, Eden Jacobson, and Carver Nelson
Co-author: Kori Kruegel
Mentor: Jaclyn Wisinski, Biology

Disorders resulting in platelet activation (sticking together), such as diabetes, are becoming more common. The problems caused by platelet activation impose significant healthcare costs. However, the mechanism by which cell signaling occurs causing megakaryocytes to differentiate into platelets is poorly understood. Prostaglandin E2 (PGE2) is a molecule that is used as a diagnostic marker for type 2 diabetes. It is known that PGE2 binding to the EP3 receptor transmits a cellular signal, causing activation of the protein Rap1b. Rap1b is a small G-protein that is involved in megakaryocyte proliferation and differentiation. Megakaryocytes differentiate into platelets, which allow blood to clot. Prior research done in this lab suggests that Rap1B can be activated and phosphorylated simultaneously. We hypothesize that EP3 signaling results in preferential activation of phosphorylated or unphosphorylated Rap1b. This can be tested using the pharmacological agent Sulprostone and by using Rap1b phosphorylation mutants, performing a pulldown assay, and then immunostaining for activated Rap1b that is phosphorylated. Confirming that Sulprostone can give rise to activated and phosphorylated Rap1b could help elucidate the cell signaling mechanism by which megakaryocytes differentiate into platelets. Further understanding this mechanism could allow for the development of new ways to manage disorders involving platelet activation.

B.U.22 Generation of Mammalian Host-Adapted *Borrelia* by Cultivation in Peritoneal Dialysis Membrane Chamber Implantation in Rats

Andrew Momsen

Mentor: Cord Brundage, Biology

Borrelia burgdorferi is a bacteria that causes Lyme's disease. The immune system creates antibodies against specific proteins called antigens on the surface of the bacteria, and these antibodies allow the immune system to eliminate the bacteria. The specific protein on the surface of *Borrelia* that is being targeted in this project is OspC7. This protein was targeted because it has been shown in previous studies that the OspC7 antigen created the most successful anti-bacterial response in humans. This antigen is only expressed on *Borrelia* that are inside of a host, leading to the term "host adapted *Borrelia*". Normally antigens can be created by culturing bacteria artificially in labs, however this does not produce host adapted *Borrelia*. Currently OspC7 antigens used for vaccines are produced from genetically modified bacteria. A recent study showed that host adapted *Borrelia* could be produced using a dialysis membrane inside of a rat. This project aims to test the efficacy of growing different types of *Borrelia* in dialysis membranes inside of rats and to test if the proteins on these bacteria are effective in creating an immune system response.

B.U.23 How Working Students (Don't) Balance School and Work

Sidney Paulson

Mentors: Elizabeth Peacock and Constance Arzigian, Archaeology & Anthropology

As the number of college students who work while attending school continues to grow due to the rising costs of college and the defunding of higher education at the state level, the working college student makes up a significant sector of college students. Although these students have jobs and could drop out of college and just work, they are getting college degrees in order to improve their future job prospects and develop skills to help them in their future careers. Understanding the experiences of these students is crucial to finding ways to support their success. Using surveys and interviews we have found that many working college students feel invisible to their university institutions, which often assume their full-time students are supported in other ways, and isolated from their peers due to their competing responsibilities. Most students who work during the school year are doing so to meet their basic living needs and to reduce their need to take on hefty student loans. Because of this, many working students have little opportunity to reduce their work hours when courses become more demanding. Oftentimes, work interferes with a student's ability to attend class, study, or complete assignments on time. While the experiences of working college students are unique to every individual, many feel that the resources available to them on campus are insufficient for their needs or inconvenient for them to access and see greater visibility of these issues as crucial.

B.U.24 Attitudes toward Counseling and Stigma

Molly Petersen

Mentor: Bianca Basten, Psychology

Mental health concerns are becoming more prevalent, especially in college students. Many college students are affected by their own self-stigma and perceived public stigma when it comes to making decisions to seek mental health help. I hope to dig deeper into why these stigmas exist and whether we can change college students' attitudes toward seeking help. The purpose of this study is to determine how priming a self-compassionate mindset changes attitudes toward seeking counseling help, one's own self-stigma, and perceived public stigma. Participants will complete an interactive activity that either activates or does not activate a self-compassionate mindset. The activating activity will include open-ended questions about how one helps a friend in a time of difficulty. The participants who will receive the non-activating activity will answer open-ended questions about time management. Participants will then answer survey questions that measure their attitude toward counseling, self-stigma, and perceived public stigma related to seeking mental health counseling. I hypothesize that participants who are primed with a self-compassionate mindset will be more likely to have a more positive attitude toward counseling, a decreased self-stigma, and a decreased perceived public stigma. Results may help us develop interventions to increase individuals' likelihood of seeking mental health counseling. IRB approval has been obtained and data collection will be completed by April.

B.U.25 Production and Purification of a Biofilm Regulatory Protein

Aliyah Pillai

Mentor: Daniel Grilley, Chemistry & Biochemistry

The bacteria, *Staphylococcus aureus*, is responsible for a high proportion of hospital acquired infections through association of the bacteria into communities called biofilms. Recent studies on the regulation of biofilm production have theorized a Biofilm regulator protein regulator (BrpR) as an important component in the connection of bacteria with one another. Up to this point, the focus of this research has been on the production and purification of BrpR. *Escherichia coli* cells have been used to accomplish the production BrpR, however the protein has proven elusive using standard purification methods. The results presented focus on methodology of BrpR production using different cell lines and growth conditions as well as alternative purification strategies. Moving forward, successful purification of BrpR will allow for characterization of the protein structure and will ultimately allow us to test the hypothesis that the BrpR binds specifically to DNA sequences that regulate biofilm formation. Identifying the biological function of BrpR may lead to future therapeutic targets for treating *S. aureus* infections.

B.U.26 The Effect of Genetically Disrupting Circadian Rhythms on the Usage of Mutagenic DNA Repair

Olivia Rossman, Sophia Maida, Trisha Jajtner, and Kyrstin Rochester

Mentor: Alder Yu, Biology

It is believed that long-term shift work may increase the risk of certain cancers, however, no research has concluded a clear association. Disrupting the circadian rhythm is thought to have mechanistic links to tumor promotion by the accumulation of mutations via unrepaired or incorrectly repaired DNA damage. Using the Rr3 system, it is possible to determine the relative use of repair via single-stranded annealing (SSA) versus the mutagenic non-homologous end joining (NHEJ). We want to know if genetic disruption of the period (*per*) gene in *Drosophila melanogaster* influences the probability of the mutagenic NHEJ repair method. To conduct this experiment, we are crossing flies containing the Rr3 construct to another strain that will create a double strand break. This allows us to visually identify the repair mechanism being used by each fly with a fluorescence microscope. The DsRed protein is expressed after repair by SSA while it is not after repair by NHEJ. We hypothesized that disrupting the circadian rhythm genetically will increase the usage of the mutagenic NHEJ. Preliminary results suggest a high rate of NHEJ repair in period mutant flies.

B.U.27 Investigating the Possibility of Cross-Calibration of Bone Density Scanners within a Medical Interprise

Mason Rogers

Mentor: Angela Weiler (Health Professions) and Ann Voslar, M.ED, CNMT, RT(N) (Froedtert Hospital)

Bone density measurements are crucial in diagnosing and monitoring the progression of a patient's bone loss. This institution's current bone density scanner protocol requires all of a patient's scans to be done on one scanner. This research examines the protocol's validity. This policy change would increase patient satisfaction and reduce the backlog of patients at the main site. Data was collected at five locations within this hospital system. Four of the locations have a GE Lunar Idxa, while one site has a GE Lunar Prodigy scanner. A Lunar Spine phantom was scanned using the spine protocol on each scanner 10 times, recording the bone mineral density value (g/cm²). The five sites will be designated as A, B, C, D, and E. Standard deviations were calculated to find the average variation that each scanner had over the 10 scans. The average BMD from each site was compared to other sites individually to find the percent differences. Each percentage only attributes the difference between those two respected sites. The ISCD sets the standards of practice for bone density and accredits health systems. Their standards state that if there is a greater than 0.5% difference in BMD, then they can't be compared. The data collected shows that 50% of the comparisons have less than 0.5% difference without any previous cross-calibration. Half of the site combinations are already within the accepted range, but more research needs to be conducted to support cross-calibration in this system.

B.U.28 Circadian Clock Disruption and Feeding Behavior in *Drosophila melanogaster*

Liliana Ruiz

Co-author: Maya Jahnke

Mentor: Alder Yu, Biology

It is thought that experiencing a third-shift schedule can cause the circadian clock to be disrupted. The disruption of the circadian clock can ultimately lead to an increased risk for metabolic disease. This could be because food consumption is

controlled by the circadian clock. Disrupting the circadian clock may also disrupt feeding behavior, which could explain the increased risk for metabolic disease. We asked whether disrupting the circadian clock would cause changes in the choice of high-sugar vs. low-sugar food. To determine if the disruption of circadian clocks in *Drosophila* causes food preference changes, the FlyPad device was used to present a choice of high vs. low-sugar food and record sip count for each. Food choice was compared between flies raised on a normal schedule and a disrupted schedule. The preliminary results revealed that all flies prefer high-sugar food. We predict that flies on the disrupted schedule will have an increased preference for high-sugar food.

B.U.29 Detection of Gut Microbiome Changes in *Drosophila* Larvae

Samantha Spencer
Mentor: Alder Yu, Biology

The gut microbiome influences the health of organisms and has been shown to interact with circadian rhythms. *Drosophila* have a gut microbiome, and previous studies have shown time of day changes in the microbiome, but the relation to circadian rhythms is still unclear. The microbiome in the larval stage is also not well studied. In this study, two groups of *Drosophila* larvae were studied. One group was raised in a cyclic incubator with 12 hours in light and 12 hours in darkness. The other group was raised in constant darkness. If the gut microbiome changes are due to the circadian clock, it is expected that the changes present in the cyclic larvae will also be present in the larvae in constant darkness. Early third instar larvae were then removed during different times of day at regular intervals and the gut was dissected. The DNA from the gut was then prepped and sent to be sequenced. The DNA will be used to identify the genera of bacteria present in the gut. Bacterial abundance will be followed over the course of the day and compared with previous results for adult *Drosophila*.

B.U.30 A Qualitative Review of Women's Politeness in the Workplace

Maggie Stangl
Mentor: Gregory Ormes, Communication Studies

This study used qualitative interviews to investigate the nature of women's politeness in the workplace through research interviews which gathered information about politeness expectations and how women use communication to accommodate these expectations. Existing literature revealed that there are several common expectations for women's politeness in the workplace that are present in American business culture. These include expectations of minimal assertiveness from women, complacency when women's ideas are valued less, and expectations that women should put in more effort to fit into workplaces that are non-accommodating. This literature also explored the ways in which these expectations are enforced, including micro-aggressions and differential treatment of women. As of February 26th, there have been 7 participants in the research for data collection, but more are expected. These interviews are expected to build upon the existing understanding of how women might respond to hostile work cultures or direct face-threatening acts while accommodating the expectations of politeness enforced on them. Interview questions aim to explore the workplace environments of participants and how participants respond to the politeness expectations that their workplace enforces. So far, participants have reported instances of disparate treatment that they were expected to handle differently than their male coworkers among other events of note.

B.U.31 Fire History from South-Central Wisconsin Using Lake Sediments

Dylan Stukins and Soren Doerfler
Mentor: Joan Bunbury, Geography & Environmental Science

Charcoal is a dark colored, organic substance derived from the combustion of plant matter. Macroscopic charcoal particles (>125 μm) separated from lake sediments provide evidence of fires in close proximity to a lake. In 2019, a sediment core was collected from Mud Lake in Jefferson County, Wisconsin. Here we use the top 200 centimeters to investigate the local fire history of the site over the past 3,000 years. One cubic centimeter of sediment taken at one-centimeter increments is processed using standard methods, and the number of macroscopic charcoal fragments present in the sample are recorded. Intervals with higher charcoal accumulation rates generally suggest periods of hotter and/or drier conditions, whereas intervals with low charcoal accumulation rates generally suggest cooler and/or wetter conditions. A chronology was developed using a combination of lead-210 and radiocarbon dating methods to assign ages to the sediment layers. Preliminary charcoal counts suggest that earlier periods were hotter and drier, followed by much cooler and wetter conditions up to the present day. These data will be compared with other paleoclimate records from the region to determine the fire history over the past 3,000 years, and during the Little Ice Age and Medieval Climate Anomaly.

B.U.32 Single-Site Variants Disrupt the Function and Natural Movement of a Metabolic Protein

Paige Thiesenhusen and Melody Moore
Mentor: Todd Weaver, Chemistry & Biochemistry

Central metabolism, including the ubiquitous Krebs Cycle, incorporates an integrated series of reactions regulated via metabolite availability and enzyme/protein function. The sequence-structure-function paradigm underlies protein function, where the pre-determined one-dimensional genetic sequence directs a folded and functional three-dimensional protein structure. Our research is focused upon the sequence-structure-function paradigm associated with fumarase, a Krebs Cycle enzyme. In previous research, the movement of a highly conserved loop has been associated with interactions between tyrosine, a polar aromatic amino acid, at position 418 and serine residues at positions 318 and 319. To ascertain the role of tyrosine 418, we used single-site replacements to introduce six different residues that are either polar, nonpolar, or charged. With these residues, we were able to define the characteristics needed for substrate binding and product turnover. Replacement of tyrosine 418 with positively charged lysine differentiates substrate binding from product turnover. We have structural support that the loop conformation is locked into an ordered conformation which prevents efficient product turnover. The kinetic and structural results indicate that the tyrosine is part of coordinated movement within the active site. The larger scope of this project gives us insight into how important the sequence-structure-function paradigm is to human health.

B.U.33 Athletes and Injury: Working through the Village of the Injured and Weary

Isaac Wegner
Mentor: Elizabeth Peacock, Archaeology & Anthropology

The relationship between injured athletes and their collegiate athletics programs is paramount to the retention and health of student-athletes. My project argues that injuries place athletes into a tenuous mental and physical state in which they must receive adequate social support to recover physically and psychologically while maintaining their connections to their respective collegiate athletic programs. Without adequate social support from coaches and teammates, and healthy team cultures around injury, athletes are more likely to burn out physically and mentally leading to higher rates of attrition within sports programs. My research focused on surveying and interviewing UWL student athletes past and present on their relationships with injury and how their social support impacted this relationship. Using a 26 question Qualtrics survey, one 5-person focus group, and 3 semi-structured interviews I found that student-athletes had negative relationships with injury that were worsened by coaches and teammates who pushed my interviewees to push through injury. Likewise, I found that students who sat out and rehabilitated injuries over a moderate period (4-6 weeks), had healthier relationships with their coaches and teammates. This shows that student athletes need strong social support to handle the strain of competition and the hardship of injury.

B.U.34 Investigation of the Signaling Pathways of Rap1b in Megakaryocytes

Devin Woodcock and Ross Hobson
Co-authors: Brooklyn Swenson and Kori Kruegel
Mentor: Jaclyn Wisinski, Biology

The G-protein, Rap1b, mediates megakaryocyte survival and function. Rap1b has been associated with integrin activation, allowing for adhesion and migration, as well as activation of the transcription factor ERK, which leads to proliferation and differentiation. The location of Rap1b within a megakaryocyte is mediated by its phosphorylation state. Specifically, unphosphorylated Rap1b associates with membranes, while the negative charge of phosphorylation results in membrane detachment and diffusion throughout the cytosol. Phosphorylation specifically occurs at two Serine amino acids between the protein and lipid anchor. We hypothesize that the phosphorylation state, and therefore location of Rap1b, is the determinate to the proteins function in the cell. Our goal is to further investigate the signaling pathways that lead to activation of Rap1b and preferential activation based on cellular location. To do this, we utilized the Rap1b – Fluorescent Activity REporter (Rap1b-FLARE) in the HEK 293 megakaryocytic cell line. The Rap1b-FLARE plasmid was mutated using Site-Directed Mutagenesis (SDM) to manipulate phosphorylation. These mutated cells were treated with Sulprostone, a chemical agent that will activate a specific G-protein coupled receptor that is suspected to interact with Rap1b in megakaryocytes. The extent of Rap1b in both mutated cell lines was monitored by confocal microscopy. Determining extent and preferential activation will help further establish signaling of Rap1b.

B.U.56 Drug Efficacy of Genipin for Treatment of Chemotherapy Resistant Glioblastomas

Anna Horn and Nora Cerroni
Co-author: Mary Zimmerman
Mentor: Mary Zimmerman, Biology

Glioblastomas are an aggressive form of brain and spinal cord cancer with a 7.2% 5-year survival rate and an incidence rate of 7 out of 100,000 U.S. individuals each year. Primary glioblastoma treatments include radiation therapy, surgery, and aggressive chemotherapy that kills healthy proliferative cells in addition to the cancer cells. However, the fruit extract of *Gardenia jasminoids* is utilized in Chinese alternative medicine as the drug genipin, and studies of genipin suggest this drug triggers apoptosis in cancer cells. This project sought to determine if genipin could be an effective drug treatment therapy for glioblastomas. Methods: We utilized two different human glioblastoma cell lines: U87-MG, a less aggressive line more sensitive to standard chemotherapy, and T98G, an aggressive cell line resistant to standard chemotherapy. MTT assays were utilized to determine cell viability after exposure to different concentrations of genipin. Results: We found that genipin reduced cell viability in a dose-dependent manner in both U87-MG and T98G cell lines and identified the IC50 value (200uM) to use in future experiments. Conclusions: Given the preliminary results, we believe genipin may be proven to be an effective treatment against glioblastoma. In our future work, we will examine the molecular mechanisms underlying its efficacy.

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

C.U.1 Being a Woman in Anthropology: Experiences Past and Present

Maddy Stegeman
Mentors: Elizabeth Peacock and Amy Nicodemus, Archaeology & Anthropology

Women working in male-dominated fields face many challenges, including a higher chance of being sexually harassed and discriminated against. This project examines the experiences of women in the fields of archaeology and anthropology, providing a qualitative perspective to better understand the challenges that women face, in the past and present, to make a successful career in these fields. The material collected for this research includes five semi-structured interviews and over 300 surveys about the experiences of women in archaeology and anthropology, from university students through retirees. This research suggests that sexual harassment and discrimination in the fields of archaeology and anthropology has hindered and continues to hinder women in these disciplines. From the unjust power hierarchy with men being at the top, to having to prove themselves as exemplary workers, to then combat the stereotypes of archaeology and anthropology being male only fields, therefore women must strive to overcome the obstacles that they are faced with. From this research we can also learn that sexual harassment and discrimination affect other disciplines and further research is needed to examine those other disciplines to try and find ways to prevent sexual harassment and discrimination based on gender in the workplace.

C.U.2 Measuring the Level of Microplastic Pollution in the Black River

Jeremiah Sesvold
Co-author: Eric Strauss
Mentor: Eric Strauss, Biology

Microplastics are a form of pollutant that can release toxic chemicals and can be harmful to aquatic life. Particles can runoff into small rivers, then accumulate further downstream. There has been much research involved in detecting and characterizing the microplastics found within fish and within the water column of the Mississippi River. However, research conducted within smaller rivers is scarce. This study focuses on a 20-kilometer stretch of the Black River. The main goal was to determine the amount and type of microplastics found within the water column. The reach was split into 22 sites where approximately ten liters of water were sieved into p-cups. The samples were density separated with calcium chloride twice, then filtered. Each filter was examined and the number, size, shape, and color of each microplastic was recorded. Purple cotton shirts were worn, and control filters were counted to account for contamination. A total of 251 particles were found ranging from 250-12000 micrometers in size. There was an average of 11 particles per site with a range of 0-33 particles and a standard deviation of 9.7. The average size of microplastics across all sites was 1,366 micrometers. Blue, black, clear, and purple fibers were most common. Microplastics come from many consumer products

that are not well managed. Understanding where microplastics accumulate and where they come from is vital for prevention of microplastic pollution.

C.U.3 Ectomycorrhizae Community Associations of Eastern Hemlock in the Kickapoo Valley Region

Zion Wallace

Mentors: Anita Davelos and Todd Osmundson, Biology

Eastern Hemlock (*Tsuga canadensis*) is a slow-growing conifer, native to the Eastern United States. These trees are keystone and foundational species, making them incredibly important in the ecosystems they inhabit. Due to the Hemlock Woolly Adelgid (an invasive insect pest) and climate change, their numbers are decreasing rapidly, and they are classified as near threatened. Like most other land plants, these trees have a symbiotic relationship with ectomycorrhizae (fungi associated with their roots), which help them gain nutrients they otherwise would be unable to absorb. The focus of this study is to identify population sizes of Eastern Hemlock groves, record evidence of the Hemlock Woolly Adelgid, and identify ectomycorrhizae of Eastern Hemlocks in the Kickapoo Valley region. The relict stand of Hemlocks in this region of Southwestern Wisconsin occupies a unique ecological environment, making this an informative and valuable study site. Through field observations, I have quantified the various stands of Hemlocks associated with the Kickapoo Valley. Additionally, upon close examination, I found no evidence of the Hemlock Woolly Adelgid in these stands. The next step in this study will be to take root samples from these stands and identify the ectomycorrhizae associated with the Eastern Hemlocks.

C.U.4 The Effects of a 12-Hour Feed Shift on Angus Crossbred Steers' Circadian Rhythm and Fat Production

Laurae Beaudrie

Mentor: Cord Brundage, Biology

Shifts in feeding time result in metabolic changes that influence weight gain and body composition in humans and rodents. The influence of shifting feed times in domestic animals is less understood but may offer benefits in animal production industries. The objective was to determine if there was a difference in performance characteristics in growing crossbred Angus steer cattle (*Bos taurus taurus*) that were subjected to a 12-hour shift in the feeding period. It was hypothesized that eating at night would cause an increase in cattle growth and fat deposition, improving production and feed efficiency relative to morning-fed cattle. After the conclusion of data collection, changes in fat deposition (depth and marbling) were notable, however, with increases following 12-hour time-shifted feeding. A statistical analysis will be performed with graphical interpretations to determine the significance of the data collected.

C.U.6 Chronicles in Clay: Analyzing 19th Century Ceramics from the Old Pageant Grounds in Red Cliff, WI to Investigate the Indian Agency Era

Hannah Eggert

Mentor: Heather Walder, Archaeology & Anthropology

This poster focuses on a mid-late nineteenth-century ceramic assemblage discovered at the Old Pageant Grounds on the north shore of Red Cliff Bay, within the Red Cliff Band of Lake Superior Chippewa. Unearthed from a midden context during the 2023 Geté Anishinaabeg Izichigéwin Community Archaeology Project (GAICAP) summer field school, these diagnostic ceramic artifacts offer valuable insights into the late nineteenth-century Red Cliff community. The study contextualizes the findings within local history, exploring Ojibwe migration, treaties, and the repercussions of assimilation efforts during the Indian agency period. The site's topography subsequently underwent alterations during the 1924 Apostle Islands Indian Pageant. Working together with the Red Cliff Nation's Tribal Historic Preservation Office and considering environmental factors, the ceramic assemblage from GAICAP's 2023 Unit 3 excavation was analyzed to investigate stratigraphic sequencing and type frequency. The primary objectives were determining the midden deposit's age and potentially connecting the artifact assemblage to a historically documented Indian agency structure. Accentuating collaboration, this study demonstrates the significance of community-based archaeology for understanding and preserving Indigenous heritage sites.

C.U.7 Preventing Plant Parasites: Determining the Source of California's *P. ramosa* Outbreak Through DNA Analysis

Ellie Euler

Mentor: Adam Schneider, Biology

The crop pathogen, *Phelipanche ramosa*, is of top concern to the billion-dollar processing tomato industry in California. It was likely introduced to California from its native range outside the United States via contaminated seed stock, but determining the patterns of its spread would allow for the best treatment and/or containment methods with minimal economic damage. Previous research has provided limited evidence that previous outbreaks throughout the 20th century all represent a single introduction, which was then spread around through farm machinery. In this research, we tested the identity and genetic diversity of parasite populations found in farm fields in Yolo Co, California, during 2023. We extracted DNA, amplified and characterized allele length of 13 microsatellite gene regions. Finally, we will use a variety of analytical tools, including principal components and STRUCTURE analyses to show if the 2023 populations are genetically similar enough to the historic samples that they can be considered from the same introduction. If so, containment and eradication efforts towards *P. ramosa* should focus on existing outbreaks. Or, alternatively, the populations could be distinct enough that repeated introductions are most likely, in which case containment may need to focus on the quality of imported seed.

C.U.8 Investigating Nanoplastic Induced Clumping in Single Celled Green Algae Grown in Light and Dark Environments

Samuel Flaig

Mentor: Anton Sanderfoot, Biology

Chlamydomonas reinhardtii is a single-celled green algae that survives almost anywhere on Earth where moist soil or water are present, making it the foundation of countless food webs. Previous work by Ben Kossman, a past student in Dr. Sanderfoot's lab, found that *Chlamydomonas* cells tend to clump together when exposed to nanoplastics while suspended in liquid media. This work also found reason to believe that clumping patterns may be altered by light exposure, suggesting that cells kept in darkness produce less intense clumping phenotypes compared to those kept in a typical day and night cycle. This research project was focused upon advancing the understanding of the underlying mechanisms that cause different clumping phenotypes of *Chlamydomonas* cells altered by light conditions. *Chlamydomonas* cells were cultured in 24 and 96 well plates and treated with varying concentrations of nanoplastics and exposed to either a typical day and night cycle or complete darkness. Differences in cell proliferation were monitored via absorbance over time and characteristics of clumps were monitored via confocal and fluorescence microscopy. Preliminary results suggest that clumps include both dead and alive cells, exposure to high concentrations of nanoplastics may limit wildtype proliferation more than cell wall-less variants, and that cultures kept in a typical day and night cycle may produce larger and more abundant clumps than those kept in total darkness.

C.U.9 Deletion of *Staphylococcus aureus* Bacteriophage Z01 cI Repressor Gene by CRISPR/Cas9

Emma Thurner and Kristen Wendtland

Co-author: Darby Oldenburg, Ph.D. (Gundersen Medical Foundation)

Mentor: Darby Oldenburg, Ph.D. (Gundersen Medical Foundation)

Antibiotic resistance in *Staphylococcus aureus* is becoming increasingly prevalent today. With fewer new antimicrobial drugs available, bacteriophage therapy is a highly promising alternative. While bacteriophage therapy has promising results due to its targeted specificity of bacteria, there are still improvements that need to be made. Lysogenic bacteriophages are more complicated for therapeutic use due to their ability to integrate into the host genome. Regulation of lysogeny is done by the cI repressor gene (cI), which can be targeted for a gene knockout. The use of CRISPR-Cas9 technology is promising for editing the bacteriophage genome to knock out the cI repressor along with the use of repair arms to repair the double-stranded DNA break. Ultimately, in the absence of the cI repressor, a strictly virulent (lytic) phage is created.

C.U.10 Determining Factors Responsible for Photobiont Preference in Driftless Area Lichens

Ben Graham

Mentor: Todd Osmundson, Biology

Lichens arise from a symbiosis between a photobiont – an alga or cyanobacterium that provides carbohydrates via photosynthesis – and a mycobiont – a fungus that provides a structural body, or thallus, that houses and protects the photobiont. This mutualistically beneficial interaction allows for both organisms to live in harsh environments or gain other abilities that would be impossible for them to achieve otherwise. Lichens are an important indicator for environmental pollution and climate change which are increasingly affecting biomes across the planet. The importance of lichens to ecosystems makes the research and conservation of lichens vital for the future of our rapidly changing biosphere. While the biodiversity of lichens in Wisconsin has been studied and rare species have been catalogued, an important element has been overlooked: a given species of lichen may contain different photobionts. In my research, I will obtain samples from multiple sites and identify photobionts and mycobionts using DNA metabarcoding. This will lead to a better understanding of lichen biodiversity in the Driftless Area, and a greater understanding of what factors influence lichen association, two areas of knowledge that are important for conservation of lichen diversity and the ecosystem functions that they help to maintain.

C.U.11 Walking the Dog: Applying Fourth Amendment Search Extensions between Border States with Differing Marijuana Laws

Paige Hagemann

Mentor: James Szymalak, Political Science & Public Administration

This research paper examines the use of drug sniffing dogs within in officer's efforts to combat drug trafficking across state borders at checkpoints within the jurisdiction of the 7th Circuit. The use of drug trained dogs is traditionally applied within law enforcement within criminal investigations. The purpose of checkpoints is to ensure public safety and welfare through sobriety tests, and these legal stops have the potential to be extended in use when addressing drug trafficking through drug sniffing dogs. This paper employs a comprehensive legal analysis that utilizes relevant cases throughout the United States as applied to the 7th Circuit legal precedents. Through this analysis, the study aims to clarify legal standards applied under the 4th amendment to be applied to vehicle stops and drug discovery through dogs. Varying jurisdictions are wrestling with legalization of marijuana, for example the smell of marijuana alone is not probable cause for vehicle searches in states where the substance is legal. The findings of this research contribute to a deeper understanding of the role that checkpoints and extended stops plays in law enforcement efforts to ensure public safety and welfare intersected with the issue of drug trafficking across state borders. The University of Wisconsin-La Crosse is uniquely positioned in a metropolitan area that encompasses two states with differing approaches to the legalization of marijuana, from legal recreational use to the prohibition of

C.U.12 “Our Friends and How We Make Them”: How Eating Disorders Contribute to Friendships Based Either on Mutual Success or Competition

Abigale Hartwig

Mentor: Ryan McKelley, Psychology

Previous research has found that higher levels of disordered eating tendencies are correlated with friendship struggles. The purpose of this study was to investigate the nature of friendships in college students with disordered eating tendencies and/or body dissatisfaction. Participants were recruited by responding to an online survey that measures their levels of body dissatisfaction and disordered eating tendencies. Approximately half with the highest scores were invited to a follow-up study where they were asked to bring a close friend. Then, these individuals completed questionnaires that measured disordered eating tendencies, friendship quality, competitiveness, and codependency. I hypothesize a relationship between disordered eating tendencies and different types of dysfunctional friendships. Findings from this research can help us understand the role of platonic relationships in the development of and recovery from disordered eating. Specifically, the results can help friends identify problematic relationship dynamics to support eating disorder recovery and improve their friendships.

C.U.14 Cross-Validation of Resting Metabolic Rate Prediction Equations in Firefighters

Olivia Iausly

Mentor: Andrew Jagim, Ph.D. (Mayo Clinic Health System)

Predictive resting metabolic rate (RMR) equations are widely used to estimate total daily energy expenditure. The purpose of this study was to examine the accuracy of 6 RMR prediction equations in firefighters compared to measured values. Twenty-eight career structural firefighters participated in the study (female, n=2; male, n=26 [mean \pm SD] age: 38.2 ± 8.3 y; height: 180.2 ± 7.5 cm; body mass: 86.7 ± 20.8 kg; BMI: 25.8 ± 7.8 kg·m⁻²). Resting metabolic rate was assessed using indirect calorimetry. A repeated measures ANOVA with Bonferroni post hoc analyses was selected to determine mean differences between measured and predicted RMR ($p < 0.05$). All prediction equations significantly underestimated RMR ($p < 0.001$), except the Jagim equation, which overestimated RMR. The Harris-Benedict equation had the closest agreement to measured RMR ($R^2 = 0.729$, RMSE = 316 kcals, %RMSE = 14.3%), along with the DeLorenzo equation ($R^2 = 0.662$, RMSE = 244 kcals, %RMSE = 11.0%), whereas the Nelson equation yielded the highest RMSE (431 kcals, %RMSE = 19.5%). The variance in predicted RMR values from the equations ranged from an SEE = 172 kcal·d⁻¹ (Harris-Benedict) to an SEE = 208 kcal·d⁻¹ (Cunningham), accounting for 73% and 59% of the variance in RMR. RMR equations may underestimate the actual energy requirements of tactical athletes and thus, practitioners should interpret such values with caution.

C.U.15 Cognitive and Physical Effects of Video Games vs. Aerobic Exercise

Claudia Lampat, Brady Wagner, Kaia Elstad, Cole Letter, Majin Yang, and Sienna Hirt

Mentor: Salvador Jaime, Exercise & Sport Science

Video games are played amongst all age groups and are associated with an increase in obesity rates and living a more sedentary lifestyle. Purpose: To research the cognitive and physical effects of video games, or exercise video games specifically, and aerobic exercise. Method: A group of 8-10 adults ages 18-35 will meet twice. The first meeting will be familiarizing participants with the sedentary game (Call of Duty Zombies), exergame (Just Dance 3), and treadmill running at a similar perceptual intensity as the exergame. Additionally, they will perform a maximal oxygen consumption (VO₂max) incremental treadmill test to determine treadmill speed for the active component. On the second meeting day, participants will do all three activities in a row. The order of activities for each participant will be randomized. Each activity will be performed for 15 minutes. Participants may move on to the next activity after a minimum of 15 minutes, or once their heart rate falls within 10% of their resting heart rate. Cognitive tests, the Stroop Color, Word test, and the Digit Span Backwards test will be given before each activity and 30 seconds after each activity. A heart rate monitor will be used throughout all activities. 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.

C.U.16 Perceived Rate of Exertion, Heart Rate, and Distance Performance in Response to Genre and Tempo of Music Preferences in Young Adults

Miah Lemanski, Austin Redfearn, Lauren Koss, Jessica Taylor, Ian Mueller, and Sam Dickerson

Mentor: Salvador Jaime, Exercise & Sport Science

When exercising to music, the brain creates dissociative effects on the afferent nervous system. Although much data suggests that music has significant positive effects in enhanced physical performance of reduced perceived exertion, there is conflicting data on how low-to-moderate intensity exercise in accompaniment of music causes dissociative effects leading to an increase in the time before higher rates of perceived exertion. Purpose: This study aims to observe how genre of music choice and tempo of music affects distance performance and physical exertion based on dissociation throughout exercise. Methods: This study will include 6-8 participants (18-24 years old, equal male and female subjects) and consist of 6 visits. Prior to testing sessions, a survey will be sent and completed before the familiarization session. Participants will then complete the familiarization visit for baseline data. For the remainder of the 5 sessions, participants will complete a 20-minute treadmill run listening to either a control (no music), fast preferred, fast non-preferred, slow preferred, or slow non-preferred playlist. Heart rate and distance will be recorded every minute of the trial and RPE and speed will be recorded every 5 minutes. The order of sessions will be randomized and at least 48 hours apart. Results and discussion: Data collection and analysis is ongoing. This abstract is submitted as a work in progress and will be ready for discrimination prior to the symposium.

C.U.17 Ensuring the Precision of Orbital Simulation Tools After Prolonged Study

Xander Kleinke
Mentor: Shauna Sallmen, Physics

Extraterrestrial life and technological civilizations are quite possible within our galaxy. Many options have been proposed to detect signs of technological civilization. Korpela, Sallmen, & Leystra Greene (2015; KSG) suggest looking for evidence of fleets of mirrors orbiting around planets which only ever show one face to their star. The paper did not address the question of whether these mirrors could have stable orbits, since their large size and small mass would allow them to be pushed by light from the nearby star. This force is known as radiation pressure. To identify the parameters of stable mirror orbits around such planets, our team has run thousands of orbital simulations, and we are analyzing the results. The current single machine we use will soon be replaced. The new computer will utilize up-to-date versions of the python and REBOUND packages. Significant differences in simulation results aren't expected, but consistency with previous work is important for the purposes of continued research. We will present comparisons between simulations using the old and new machines and versions of software.

C.U.18 Color-Blindness Racial Attitudes and White Fragility Influenced White Individuals' Racial Justice Commitment in Predominantly White Campus

Spark Lim
Co-authors: Katherine Kortenkamp and Jason Sumontha
Mentors: Katherine Kortenkamp and Jason Sumontha, Psychology

It is crucial to discuss topics like social justice in classes because the setting will empower historically marginalized people, and further challenge institutional inequality. However, we know that white students in particular are less likely to want to seek out and engage with those discussions inside or outside of class about racial disparities due to experiencing intolerable discomfort. Two factors that predict this are White Fragility and Racial Colorblind Attitudes. However, we don't know if these factors also predict their willingness to discuss other difficult topics around Diversity, Equity and Inclusion (DEI) such as trans* rights or disability justice. Therefore, this research aims to investigate whether racial color blindness attitudes and White Fragility is associated with white individuals' willingness to discuss social justice topics at Predominantly White Institutions. We hypothesize that higher color-blind racial attitudes and higher white fragility will result in less willingness to have conversations about race. Participants will respond to a series of Likert scale measures and willingness to participate in various focus groups. We also hypothesize that both variables will be associated with less willingness to have conversation about other social justice topics such as trans* rights and disability rights. The results of this research may also provide insight regarding potential methods to encourage individuals to discuss social justice topics.

C.U.19 Effects of Silk Road Trade on the Kushan Empire: A Numismatic Study

Kaley Lutker
Mentors: Timothy McAndrews (Archaeology & Anthropology) and Sierra Rooney (Art)

This project is a numismatic analysis of the Kushan Empire from 200 CE to 400 CE, reviewing evidence for and impact of Silk Road Trade on the Indo-Pakistani subcontinent. The goal is to understand if a major trade system impacts the towns and cities it passes through, either through cultural diffusion, or through actual artifactual remains of the interaction. This is be done by comparing currencies found at the Kushan sites of Shaikhan Dheri, Hastinapura, and Bala Hisar (also known as Charsada) with those from the main trade powers at the time: the Roman Empire and the Han Dynasty, China. Comparisons in iconography and scripts on coins are done through typological analysis and in consideration is size, weight, and material. The coins display little to no foreign origins nor stylistic influence on local currencies. This suggests that either these settlements were not strongly integrated into Silk Road trade during this time, or that these communities maintained their local cultural identity in the face of foreign influence. Other studies in the future should study other sources, such as terracotta figurines, places of worship, and city layout in order to see if the pattern holds.

C.U.20 Analyzing the Spatial Distribution of Lithics at Frog Bay Tribal National Park

Madeline Meltesen

Mentor: Heather Walder, Archaeology & Anthropology

This research focuses on the Frog Bay archaeological site (47BA60), located within Frog Bay Tribal National Park (FBTNP) in Red Cliff, WI as part of Geté Anishinaabe Izhichigéwin Community Archaeology Project (GAICAP). This project is directed by the Red Cliff Band of Lake Superior Chippewa's Tribal Historic Preservation Office (THPO) and academic archaeologists. As such, this work is done collaboratively with Red Cliff community members. Frog Bay is a multicomponent site, meaning there were several different past human occupations of the site. The oldest material dates to cal. 3327-2931 BCE, during the Middle Archaic period. This study examines shovel test pits (n = 469) excavated from 2018 to 2022 that cover an area of approximately 1.96 hectares (4.84 acres). Using maps created using ArcGIS Pro and a lithic (stone toolmaking debris) attribute analysis, this research defines artifact accumulation areas to better understand how Indigenous people used the area of Frog Bay in the past and to identify high-potential areas for future excavations. Furthermore, spatial statistics are used to determine whether distributions of different size classes of lithics and raw materials are randomly distributed, clustered, or dispersed across the site. Overall, this analysis provides key information about cultural patterns in northern Wisconsin, particularly pertaining to lithic tool-making activities in which Geté Anishinaabe people have participated for more than 5,000 years.

C.U.22 The “Anti-American Liberal Elite” Conspiracy Theory and the Reproduction of Hegemonic Narratives

Sam Richardson

Mentor: Bryan Kopp, English

In recent history, countless falsifiable conspiracy theories have spread throughout the United States. One such theory asserts that there is a conspiracy of anti-American liberal elites attempting to undermine American values and take control of the United States which, in 2021, culminated in the January 6th attack on the US capitol. Many of the participants were acting on information from a narrative provided by an anonymous poster on the messaging board 4chan known as QAnon who detailed the plotting of an evil cabal entrenched in the US government. Since then, the conspiracy theory has continued to grow and change, though its effect has stayed consistent: the perpetuation of a hegemonic ideology that preserves wealth and power. In his essay Encoding/Decoding, Birmingham school theorist Stuart Hall describes the process in which information is encoded, distributed, and decoded which, in a hierarchical social structure, ultimately results in the perpetuation of that social structure. Conspiracy narratives, like any other story, use narrative elements to sway an audience (for example: villain/hero dichotomy). The purpose of this research is to investigate, through Stuart Hall's Encoding/Decoding framework, how conspiracy theory narrative, in his words, “reproduces a pattern of domination.”

C.U.23 The Life and Mathematics Research of Gloria Ford Gilmer

Megan Scott

Co-author: Susan Kelly

Mentor: Susan Kelly, Mathematics & Statistics

The goal of this research project is to study the life and work of Dr. Gloria Ford Gilmer, the first African American woman to have her mathematics papers in the Library of Congress. Gilmer was the first Black math teacher in the Milwaukee public school and, in addition to teaching, contributed significantly to mathematics related research. She died in 2021, and the Library of Congress reached out to the family the following year to request her papers. Over spring break, March 2024, we were fortunate enough to see this collection in person, being some of the first to do so. When there, we could take photos of the archives, some of which you may see today, to continue to read over for the rest of the semester. Along with this presentation, my advisor, Dr. Kelly, has a contract with the Oxford University Press to write a biography on Gilmer for their Oxford African American Studies Center, of which I will be a joint author.

C.U.24 The Effects of SK-03-92 Treatment on Copper Homeostasis Genes in Yeast Cells

Gabrielle Shedlov

Mentor: Anne Galbraith, Biology

Scientists at UWL have extracted a stilbene compound from *Comptonia peregrina* (sweet fern) that was developed into a patented antimicrobial compound called SK-03-92. By utilizing *Saccharomyces cerevisiae* genetics, we have been

studying the compound's mechanism of action and determining its effectiveness as a potential antifungal. An RNA-seq analysis indicated that a long list of genes are dysregulated in response to SK-03-92 treatment in yeast, some of which are involved in copper homeostasis. RT-qPCR confirmed that two specific genes involved in copper homeostasis (*CYS3* and *CUP2*) are upregulated in response to 60 minutes of SK-03-92 treatment, suggesting that SK-03-92 is targeting copper homeostasis to kill yeast cells. To extend this work, I conducted RT-qPCR on additional treatment times to further examine the effect of SK-03-92 on *CYS3* and *CUP2* gene expression. Additionally, spot assays were conducted to determine the effects of SK-03-92 on mutant *cys3* and *cup2* strains. The proliferation and survivability of each mutant was analyzed and compared to a wild-type strain for both treated and untreated conditions.

C.U.25 Comparing Perceived Fatigue with Neuromuscular Fatigue Using Velocity-Based Measures

Trinity Roberts, Michael Bruni, Sam Connelly, Joey Feudner, Will Rothmeier, and Kougar Wagner
Mentor: Salvador Jaime, Exercise & Sport Science

Estimating reps in reserve is a common method used to quantify fatigue during barbell bench pressing. However, the concentric bar velocity at which this method is accurate is unknown. Perceived fatigue is the sense of exhaustion during a physical activity. Neuromuscular fatigue is both the inability to maximally generate muscle force and the loss of control during contraction at sub-maximal levels of force. It is important to acknowledge that to strength train optimally, you need to accurately perceive fatigue, because there is an optimal amount of neuromuscular fatigue that will drive adaptations without diminishing returns. In previous literature, researchers have found that once barbell velocity decreases to 0.50 m/s, the weight is perceived as heavy. In this study, we aim to investigate whether subjects know their reps in reserve during a barbell bench press set to failure once the bar velocity reaches 0.50 m/s. We will do this by asking male college students reps in reserve once the concentric bar velocity reaches 0.50 m/s.

C.U.26 The Effects of the Creatine Monohydrate Loading Phase on Cognitive Function Post-Exercise

Andrea Schleeper, Grace Vigil, Spencer Evers, Camryn Garriety, and Lindsey Evenson
Co-author: Tyler Gilson
Mentor: Salvador Jaime, Exercise & Sport Science

Combined with exercise, creatine supplementation can cause an increase in muscle mass in individuals of all ages. Creatine supplementation increases phosphocreatine stores in the muscles and brain. Purpose: This study aims to investigate how creatine supplementation impacts cognition before and after high-intensity exercise. Methods: This study will include college students who have not taken creatine for more than six weeks. The first day will be an introduction. The next day, participants will complete two cognition games twice for an average score. Then do a dynamic warm-up before a HIIT workout. After the workout, the participant will retest the same games twice for an average score. The participants will randomly be divided into two groups, the placebo being maltodextrin. We will distribute seven days of creatine or maltodextrin to the participant with instructions for consumption. After the seventh day, we will have the participants return to the lab to run the procedure again. 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.

C.U.27 Type 1 Pili Expression in UPEC Under Different Osmotic Pressures

Bradley Stephens
Co-author: William Schwan
Mentor: William Schwan, Microbiology

Uropathogenic *Escherichia coli* (UPEC) is the number one cause of human urinary tract infections. Type 1 pili encoded by *fim* genes allows UPEC binding to bladder epithelial cells. FimB protein encoded by the *fimB* gene regulates type 1 pilus expression. A group of *fimB* point mutants in UPEC strain NU149 were tested when the strains were grown in Luria broth (LB) pH 5.5 with and without 400 mM NaCl. A hemagglutination assay was used to measure the level of type 1 pili expression in the UPEC grown under those growth conditions. Type 1 pilus expression was lower in a *fimB* deletion mutant grown in pH 5.5 LB compared to the wild-type strain. Two *fimB* mutants had slightly lower hemagglutination titers as well. When grown in pH 5.5 LB with 400 mM NaCl, the *fimB* promoter two TATA box mutant and the second AC OmpR binding box mutant had significantly lower type 1 pili expression versus the wild-type strain. Together, the results suggest the second *fimB* promoter is important for type 1 pilus expression when UPEC is grown in an acidic pH/high osmolarity environment.

C.U.28 The Development of ZnO, Ultraviolet, All-Optical Switches

Justin Stevenson and Braeden Weix
Co-authors: Eric Gansen and Seth King
Mentor: Eric Gansen, Physics

The pursuit of high-speed communication has driven the development of new optoelectronic components, such as all-optical, surface-normal, switches constructed of semiconductor thin-film heterostructures. ZnO is a promising material for switches that operate in the ultraviolet (UV) region. It has a bandgap of ~3.4 eV and is less toxic than other materials with similar bandgaps, such as GaN. The structures we are studying are composed of alternating layers of polycrystalline ZnO and Zn_{0.9}Mg_{0.1}O, where the ZnO serves as the active semiconductor layer. In these experiments, we measure the absorption changes as a function of the energy, polarization, repetition rate, and time delay of the control and signal pulses. Our experiments indicate that the switching action is produced when the conduction-band electrons and valence-band holes excited by the control separate due to a built-in electric field in the ZnO layers. The resulting space-charge field screens the built-in field, blue shifting the band edge by reducing the excitonic red shift associated with the quantum-confined Stark effect. In our presentation, we will discuss how the carrier dynamics impact the switch's speed.

C.U.29 Photoluminescence Enhancement of Fluorophores Assisted by Ion Implanted Gold Nanoparticles

Vivek Tara
Mentor: Shahid Iqbal, Physics

A fluorophore is a molecule which emits light upon light excitation. Photoluminescence (PL) fluorophore has great attention in the research communities because of its applications in bioimaging and biosensing for the detection of disease. The problems facing the PL fluorophore are the weak and low light intensities. The motivation of this research project is to enhance the PL light intensities of different fluorophores through a process called Metal Enhanced Photoluminescence (MEP). In this work, we will use ion implanted gold nanoparticles fabricated by low energy ion implantation technique to achieve MEP. Ion Implantation of 70 keV gold ions in glass substrate at different ion doses (fluence) will be carried out to synthesize gold nanoparticles of different size distributions. The formation of gold nanoparticles will be characterized by optical absorption measurements. Rutherford Backscattering Spectrometry (RBS) measurement will be used to obtain the concentration, composition, and depth profile of gold nanoparticles within the glass substrate. MEP will be investigated using steady-state emission and excitation spectroscopy. Both the atomic force microscopy and scanning electron microscopy will be used to study the substrate roughness of gold samples and to obtain average size distributions of gold nanoparticles. This work is valuable for potential applications in clinical diagnosis such as bio-imaging.

C.U.30 Role of Temperature in the Distribution of Non-Native Brown Trout and Native Brook Trout in the Driftless Area

Madison Wall
Mentor: Jason Freund, Biology

Warming temperatures have contributed to the changing of distribution between native brook trout and non-native brown trout populations in the Driftless Area streams. Here we are using temperature data collected during the summer of 2023 from 6 different streams in the Driftless Area. The 6 streams are separated into 2 different geology types, sandstone and dolostone, each differing in size. The small, medium, and large sandstone streams are Rathbone Creek, Spencer Creek, and Big Creek, respectfully. The small, medium, and large dolostone streams are Berge Creek, Timber Coulee Creek, and Coon Creek, respectfully. Both trout species were found in dolostone streams, leading to competition decreasing brook trout population. Brown trout's resistance to warmer temperatures also allows for easier brook trout displacement as stream temperatures grow warmer throughout the summer. We ran the Fish Bioenergetics 4.0 model with a 150g initial trout weight using the water temperatures collected from the 6 streams and manipulating the C_{max} value (theoretical maximum food consumption). Final summer weight as p-value (proportion of C_{max}) decreased was compared between the trout to show how brook trout's decreased bioenergetic efficiency affects their distribution. This study will help us predict how brook trout populations will decline as climate change increases, thus allowing more displacement by brown trout.

Poster Session D
11:00 pm-11:55 pm

D.U.1 Chronic Exposure to Thiamethoxam Amplifies the Respiratory Burst Response in Zebrafish Larvae

Nicole Kooij
Co-authors: Allie Fowle and Tisha King-Heiden
Mentor: Tisha King-Heiden, Biology

Thiamethoxam is a second-generation neonicotinoid pesticide designed to alter neural transmission in invertebrate pests with minimal toxicity to vertebrates. Due to its high use, thiamethoxam is now found to be ubiquitous in the environment, causing emerging concern in Wisconsin regarding its potential to cause adverse health effects in both wildlife and humans. While limited, research suggests that some neonicotinoid pesticides may impair the innate immune response. Here, we tested the hypothesis that chronic exposure to sublethal concentrations of thiamethoxam would suppress the respiratory burst response of neutrophils, an important part of the innate immune response. We used zebrafish as a model to bridge the gap between toxicity to aquatic organisms and human health. Zebrafish embryos were exposed to various concentrations of thiamethoxam for 5 days, after which we measured their ability to produce reactive oxygen species (ROS) in response to a proxy immunogenic challenge. Our data indicates that thiamethoxam interferes with the normal innate immune response by increasing the amount of ROS produced, but the effects were not dose dependent. Overproduction of ROS could be an underlying factor associated with observed adverse health effects in vertebrates, and our results suggest that its potential to alter the immune response should be studied further. Our data can be used to better understand the potential immunological risk that chronic exposure to thiamethoxam poses.

D.U.3 Using Bullfrogs to Understand Brainstem Serotonin Networks and the Role of Nicotine in Sudden Infant Death

Kelsi Bellisle
Co-author: Tyler Billman
Mentor: Cord Brundage, Biology

Our research is focused on better understanding vulnerability to brainstem respiratory centers in the pathology of sudden infant death syndrome (SIDS). We propose that a link between nicotine exposure during development leads to changes in the serotonergic signaling cascades of respiratory coordinating neurons. We use the developing bullfrog (*Lithobates catesbeiana*) as our model organism. Late metamorphic tadpoles demonstrate an increase in lung breathing activity with exposure to low concentrations of serotonin ($\leq 0.5\mu\text{M}$ 5-hydroxytryptamine; 5-HT) this is mediated in part by 5-HT_{1a} receptor (5HT_{1a}R) activation. This developmental change in activity (similar to humans) may be due to changes in the number of serotonergic fibers and/or 5-HT_{1a} receptor density. This system is damaged in SIDS infants. Using the NIH Basic Local Alignment Search Tool (BLAST) we compared human and bullfrog 5HT_{1a}R and tryptophan hydroxylase 2 (TH2) protein sequences and found a 34 and 65 percent identity match respectively. Quantitative polymerase chain reaction (qPCR) analysis of both proteins indicates developmental shifts in the serotonergic network during metamorphosis. Impairments in the maturation of this serotonergic network may underlie the toxidrome associated with developmental nicotine exposure and further support the increased risk of SIDS following that exposure.

D.U.4 Gender Stereotypes and Perspectives of Anger Expression

Josie Biermaier
Mentor: Bianca Basten, Psychology

Physical aggression is a direct form of anger that is more statistically prevalent among men, whereas indirect or verbal forms of anger expressions practiced predominantly by women are considered weaker expressions of anger. This might contribute to the stereotypical belief that men are more aggressive than women. Previous research addresses such misconceptions but lacks introspective responses of individuals regarding their perceptions of anger expressions. This project intends to measure this aspect. First, participants will complete the Buss-Perry Aggression Questionnaire (BPAQ), which measures general aggression, physical aggression, and verbal aggression. Then, participants will receive one of two randomized sets of scenarios where they will evaluate angry responses performed by either women or men. In the final two sets of questions, participants will report introspections regarding their own expressions of anger and assess whether certain aggressive behaviors are more appropriate for men or women. Data examination will determine whether participants' responses align with gender stereotypes and how these responses correlate with the ways in which expressions of anger are perceived.

D.U.5 Sex Difference in Stress-Induced Increase in Epithelial Permeability in the Mouse Colon

Lauren Broman

Co-authors: Lexi Valeri, Abby Klecker, and Matthew Wright

Mentor: Sumei Liu, Biology

The intestinal inner lining is made of epithelial cells held together by tight junctions that prevent harmful material from getting into the body. Stress increases intestinal permeability, which may contribute to irritable bowel syndrome (IBS) and other diseases. IBS is more common in females, but prior studies have been inconclusive on finding a link between increased intestinal permeability and biological sex. This research explored the role sex has in increased intestinal epithelial permeability. Mice were divided into four groups: control male, control female, IBS male, IBS female. IBS mice were restrained for 1h/day for 5 days. Control mice were kept in their home cages with no restraint. Following the final restraint/control session, the proximal and distal colon were removed. The mucosa/submucosa layer was mounted to an Ussing Chamber to measure paracellular and transcellular permeability across the colonic epithelium. The results showed stress caused a greater increase in paracellular permeability in female mice, especially in the proximal colon. Stress increased transcellular permeability in the distal colon but not the proximal colon in both male and female mice. These results suggest female mice are more susceptible to increased paracellular intestinal permeability than male mice. Understanding how stress affects intestinal permeability may lead to the development of sex-specific treatments for gastrointestinal distress.

D.U.6 The Mechanism of Oxidized LDL in Activating Human and Thirteen-Lined Ground Squirrel Platelets

MacKenzie Caya, Rene Faun, and Nicole Inoue

Mentor: Scott Cooper, Biology

Platelets are small blood cells involved in forming clots and used clinically in transfusions. Humans and ground squirrels both contain oxidized LDL which leads to the aggregation of platelets. Oxidized LDL binds to a scavenger receptor called CD36 on human platelets, but ground squirrels lack the receptor. Once bound to the receptor in humans, the oxidized LDL activates the platelets through a cascade pathway involving ERK, a protein kinase. While ground squirrels lack the CD36 receptor, the squirrels have still shown activation of platelets, which is the turning on of platelets for specific outcomes. We have used ERK, PI3K, and PLC inhibitors in both room temperature and cold storage to determine what pathway is causing oxidized LDL to aggregate in ground squirrels. Determining what is causing activation in squirrel platelets when introduced to oxidized LDL could help prolong the life of platelets in cold storage for transfusions.

D.U.7 The Circadian Rhythm in Alzheimer's Disease

Olivia Christensen

Co-author: Gavin Hutchison

Mentor: Alder Yu, Biology

Alzheimer's Disease (AD) is a neurodegenerative disease with elusive pathology. Individuals with AD have been noted to have disturbances in their sleep wake cycling, which has been reported as a primary cause for institutionalization for AD patients. Alleviating sleep cycle disturbances in individuals with AD could result in improved quality of life and avoid institutionalization. A potential cause for these sleep disturbances is disruption of the circadian clock, a molecular clock regulating several bodily functions including sleep wake cycling. We explored the functionality of the circadian clock in a *Drosophila melanogaster* model of AD. Locomotor behavioral patterns of AD flies were assessed using the *Drosophila* activity monitoring systems. Assessment of AD fly locomotor patterns show loss of circadian behavior without environmental cues, even after entrainment to a regular schedule. qRT-PCR was then used to assess functionality of the core circadian clock by measuring expression fold change of the gene period, a core clock gene. qRT-PCR of period in AD flies in constant darkness showed that the core circadian clock was functional despite the loss of circadian behavior noted in the activity monitoring experiment. Current investigations are exploring whether presence of the circadian clock has a protective effect against neurodegeneration. Surprisingly, preliminary results suggest that genetic ablation of the circadian clock may protect against cell death.

D.U.8 The Deese-Roediger-McDermott (DRM) Paradigm: Remember vs. Know

Mackenzie Chvatal
Mentor: Bianca Basten, Psychology

Memory is an imperfect process of information, which has been studied and tested using the DRM paradigm of false memory (Deese-Roediger-McDermott). Previous research showcased that the brain has caveats when processing associated terms, creating errors in recall. The purpose of this study is to replicate the DRM paradigm and determine the extent false memory can be primed. Participants will be shown a list of sixteen related terms, half of the participants will be shown the target term (lure) the other half will not. Next, we provide participants with a distraction task to prevent rehearsal. Once complete, participants are asked to recall as many terms as they can confidently remember. In addition, participants will be asked to differentiate between if they remember seeing the term or if they know they saw the term, within the larger list. By remembering they can express an experience in which the subject can mentally relive. Whereas knowing is a judgment made when subjects are confident that the item occurred on the list but are unable to reexperience (remember) its occurrence. Data analysis will examine the extent of error occurring within recall and the confidence level of memory.

D.U.9 Analysis of Lake Sediments to Understand Indigenous Settlement at a Site in Wisconsin

Kyle Dregney
Co-author: Jaydin Romalia
Mentor: Joan Bunbury, Geography & Environmental Science

During the Middle Mississippian period (ca. 1050 CE) a settlement of indigenous people was formed in southern Wisconsin, near what today is Aztalan State Park. The site was abandoned about 150 years later, yet it is not clear why. In June 2019, a sediment core was taken from Mud Lake in Jefferson County, Wisconsin for the purpose of developing a climate record for the region. Information stored in the core contains evidence about the past climate and can be used to determine if changing climate was a factor in the settlement, occupation, and abandonment of the Aztalan site. Charcoal records from lake sediments can be used to reconstruct the fire history in an area, with more charcoal suggesting hot, dry conditions, and less charcoal indicating cooler and, or wetter conditions. Preliminary results show lower charcoal accumulation rates prior to the settlement of the site, and slightly higher rates during occupation. Additional data will aid in the interpretation of these results.

D.U.10 Community Food Resource Mapping

Emma Everett and Courtney Osmek
Mentor: Gargi Chaudhuri, Geography & Environmental Science

Since the COVID-19 pandemic, food insecurity rates have been on the rise in the United States and food accessibility has become an issue of concern, especially for underserved communities. In La Crosse county alone, figures suggest 3,000 children are food insecure. Food insecurity can be addressed in several ways including offering free or reduced cost meals and foods. La Crosse County has several public and private organizations that strive to meet these needs for vulnerable populations like children, the unhoused, and people who are HIV positive. However, lack of physical or structural—lack of ID or proof of address—access to or knowledge of these resources results in beneficial programs becoming underutilized. In partnership with La Crosse County Health Department, the goal of this project is compiling information about organizations that provide these services and turning the existing swath of qualitative data into a spatial representation of the data that employes a user-friendly, easily accessible interface to communicate both spatial and nonspatial data of food resources within the county to the vulnerable and wider population. This interface will be the first of its kind for the county that transforms existing written data, websites, and individual resources into a spatially integrated all-in-one platform available to anyone with internet access.

D.U.11 Mapping Commuting Flows: Geospatial Analysis of Workplace Travel Behavior in La Crosse County

Ryan Fell and Jacob Kampf
Mentors: Gargi Chaudhuri (Geography & Environmental Science) and Samantha Foley (Computer Science & Computer Engineering)

The goal of this project is to develop commuting flow maps for 16 workplaces within La Crosse County. Flow maps are a type of cartographic product that shows the movements of people, products, or goods from their origin and destination.

The flow maps are based on a travel behavior survey conducted by Fenelon et al (2020) where they surveyed around 1200 employees about their travel behavior and mode of transportation for everyday commuting to their respective workplaces within La Crosse County. To develop the flow maps, open-source geospatial python packages will be used to explore the survey data and develop statistical and geospatial visualization to understand the overall trend. This research aims to identify areas where transportation networks are most heavily utilized. I expect the results of this research to assist in the optimization of urban planning and transportation infrastructure. The final output of the project will be an interactive map which will show all 16 employment organizations within the county that were surveyed, and their respective flow maps.

D.U.12 Chronic Exposure to Imidacloprid Modulates the Respiratory Burst Response in Zebrafish Larvae

Allie Fowle

Mentor: Tisha King-Heiden, Biology

Imidacloprid (IM) is an emerging contaminant of concern due to its frequent use in both urban and agricultural settings leading to exposure risks to wildlife and humans. Growing evidence suggests that while less susceptible, chronic exposure to sublethal concentrations can cause adverse health effects in vertebrates, including the potential to impair immune function. Here we use zebrafish as a model to determine the potential effects of chronic exposure to IM on the respiratory burst response, which is the primary line of defense against invading pathogens during early stages of development. Zebrafish were exposed to various concentrations of IM (0.02 $\mu\text{g/L}$ - 2000 $\mu\text{g/L}$) beginning just after fertilization for 5 days and we assessed their ability to produce reactive oxygen species (ROS) in response to a proxy immunologic challenge. Interestingly, exposure to 0.02-20 $\mu\text{g IM/L}$ caused an over-production of ROS, while exposure to $> 200 \mu\text{g IM/L}$ suppressed ROS production. While over-production of ROS could lead to generalized oxidative stress, suppression of the innate immune response could impact the ability to fight disease. Since outbreaks of infectious disease in wildlife have coincided with the increased use of neonicotinoid and other pesticides, our work suggests that further studies should evaluate the potential for neonicotinoid pesticides to alter the immune response in vertebrates.

D.U.13 Belonging in General Chemistry

Amelia Fortner

Mentor: Eugenia Turov, Chemistry & Biochemistry

It is well documented in the literature that a key feature of inclusive teaching is student belonging. We are measuring students' perception of their belonging within the General Chemistry course and how that affects their performance in the course. Within that, we are exploring how students perceive their sense of belonging in the General Chemistry I course, do specific belonging interventions particularly work, and do feelings of belonging affect student performance in the General Chemistry I course. To do so, we have compiled surveys that have been given to students in which students rank and explain their sense of belonging within the course, as well as the different methods that are used to encourage belonging within the course. Along with that, students are also encouraged to offer suggestions of new and different ways belonging could be encouraged within the classroom. We are also interviewing students who are currently repeating the General Chemistry I course, and measuring how their sense of belonging in the current course is different than in their first course, and how that is affecting their academic performance, if at all. According to preliminary data, the class overall had a strong sense of belonging, as well as a high overall class GPA, demonstrating the connection between belonging and academic performance.

D.U.14 Music to Reels: Investigating the Effects of Distractions on Information Retention

Mackenzie Frankland

Mentor: Bianca Basten, Psychology

Multitasking impacts attention, which is essential for encoding and retrieval of information. The current study investigated whether retention of information was affected by distractions and whether passive distractions, such as music, had a different effect than active distractions, such as watching reels and interacting with social media. 120 college students between the ages of 18 and 23 participated in the study. Participants were randomly assigned to watch a reel, listen to music, or do nothing else while they read an ACT reading comprehension passage. Afterward, they completed a 10-item multiple-choice test to measure retention. Data were analyzed using a one-way between-subjects ANOVA test to determine how the three conditions of reels, music, and no distractions affected retention. Results showed that those in the music group had better retention than those in the reel and control group. Those in the reel-watching group had the lowest retention score out of the three conditions. A manipulation check showed that participants paid more attention to the reels than to the music, thus likely experiencing greater distraction from social media than from music. The findings

of this research provide a better framework for understanding the relationship between distractors and retention and how watching reels specifically hinders the ability to stay attentive when performing a task that calls for full attention.

D.U.15 Lower Extremity Stiffness in Terms of Maximum Vertical GRF in Healthy Young Adults

Carly Galbraith and Riley Nordberg
Mentor: Haneol Kim, Exercise & Sport Science

Landing movements in sports are often associated with knee injuries, with landing stiffness affecting lower extremity joint kinetics, particularly the relationship between knee flexion and vertical ground reaction force (vGRF), impacting ACL injury risk [1]. Soft landing achieved by increasing the hip and knee flexion angle prevents injuries in the lower extremities. This study aimed to explore the influence of landing stiffness on maximum vGRF in young adults. The maximum vGRF was collected from students in the Biomechanics lab session of ESS 303 using a force plate with sampling frequency of 1000 Hz. 39 students participated in data collection (11M/28F). We used the unitless normalized vGRF, normalized by body weight. Participants showed more knee flexion for soft landing indicating that the knee muscles absorbed more energy in the soft landing and reduced the impact stressors on other body tissues. Notably, there was no significant gender difference while a significant difference was found ($p < 0.001$) between soft landing (3.33 ± 0.69) and stiff landing (6.10 ± 1.49) in the maximum vGRF. Further research is needed to explore the broader application of these insights and their integration into training programs.

D.U.16 Parental Perception and Mental Health

Emma Garrettson
Mentor: Bianca Basten, Psychology

Generalized anxiety disorder currently affects 6.8 million Americans, or roughly 3% of the U.S. population. This means that anxiety is a very prevalent issue in society. One potential precursor of this anxiety might be perceptions of parental pressure. For this project, participants will complete an online survey that asks them questions about their parents and their mental health. Participants will answer questions about their parents' style of parenting, the amount of pressure they feel to succeed and achieve from their parents, and general questions about their anxiety levels. I hypothesize that people with high amounts of perceived parental pressure will have higher levels of generalized anxiety. It is important to examine the correlation between perceived parental pressure and general anxiety levels because it will give us an understanding of one of the ways anxiety develops in people's lives. The project has received IRB approval and data collection with be completed in March.

D.U.17 Big Dog, Little Dog: *Canis familiaris* Morphology in the Carpathian Basin and the European Bronze Age

Anna Hackett
Mentors: Amy Nicodemus and Constance Arzigian, Archaeology & Anthropology

This project is an archaeological analysis of domestic dog (*Canis familiaris*) morphology during the European Bronze Age and within the Maros culture that resided in the Carpathian Basin in southeastern Europe during this time. They lived here from c. 2700 BC- 1500 BC. Much is currently unknown about prehistoric dogs, as there is a dearth of research because scholars tend to focus on the study of livestock domesticates, especially during the Bronze Age. The research goal of this project is to investigate if the body size and proportions of the dogs living during the Bronze Age differed based on the region of Europe in which they lived, as well as if there are size variations of dogs within the Maros culture and greater Carpathian Basin. This will be done by comparing the bone measurements from dogs in various regions in Europe during this time and analyzing overall size distribution. The research and analysis performed during this project will add to the broader knowledge of Bronze Age dogs, and ultimately the many unstudied aspects of prehistoric dogs.

D.U.18 The Relationship between Social Comparison, Social Media, and Physical Activity

Matthew Jelinski
Mentor: Bianca Basten, Psychology

As social media becomes more prevalent in our everyday life, research has found that there is a correlation between social media use and social comparisons made (upward vs. downward). This study will expand upon previous studies done on social media use and social comparison by studying the relationship between social media use, social comparison, and physical activity. Participants will answer questions in a survey format through Qualtrics. Such questions will include the

time spent on certain social media apps such as Snapchat, Instagram, Facebook, etc. Participants will then answer survey questions on the type of influencers they follow and how they feel when viewing these influencers. In addition, they also will be asked how they feel when viewing their peers on social media. Additionally, participants are asked about the type of comparison (upward vs. downward) they prefer to make. Finally, participants are asked the amount of time they spent doing a certain amount of physical activity (moderate vs. vigorous). Understanding the relationship between these variables may help us understand more about potential positive or negative outcomes associated with social media use. IRB approval has been granted and data collection will be completed by April 2nd.

D.U.19 The Relationship between Athletic Identity, Leadership Experience, and Adaptation to College for First-Year College Students

Matthew Jelinski
Mentor: Alessandro Quartiroli, Psychology

One of the biggest challenges for incoming college students is how well they can adapt to college. Research has found that those who were former athletes with strong athletic identity struggle more to adapt to college. Research also states that leadership experience could help those adapt to college. This study will expand upon previous studies done on first year college adaptation and leadership experience by studying the relationship between leadership experience, athletic identity, and first-year college students' adaptation to college. The study design is a cross-sectional design as participants will be asked questions from when they were in high school and then asked questions about their first year of college. Participants were asked if they held any leadership positions when participating in sports or in clubs. In addition, they will then be asked about past and current athletic identity using the AIMS scale, academics through an Academic Self-Confidence Scale, and then participants are asked about their self-esteem using Rosenberg's Self Esteem Scale. We also asked them about demographics like age, ethnicity, and gender. Finally, participants are asked about their adaptation to college through an adaptation scale. Understanding the relationship between these variables could aid students and colleges in how to help first year college students adapt to college better. IRB approval has been granted and data collection will be completed by April 5th.

D.U.20 Experimental Platelet/Plasma Cross Using Thirteen-Lined Ground Squirrel and Human Samples to Investigate Cold Temperature Resistance of Platelets

Abram Jackson, Bethany Miller, Lakeyshi Xiong, Brooke Bergeron, and Emily BonoAnno
Mentor: Scott Cooper, Biology

Human platelets must be stored at room temperature in order to be utilized for medical purposes, limiting their shelf life to less than a week. Thirteen-lined ground squirrels have adapted to cold weather hibernation and their platelets have unique cold temperature resistance. In order to determine potential components of platelets or plasma that aid in cold resistance of squirrel platelets, squirrel and human plasma samples were separated into platelet rich plasma (PRP) and plasma alone. We conducted a series of crosses combining squirrel PRP in human plasma and vice versa. These crosses were stored at either room temperature or 4 degrees Celsius. Apoptotic platelets were labeled using an Annexin binding assay and observed using flow cytometry.

D.U.21 Political Alignment as a Result of Childhood Home Life

Zachary Kratt
Mentor: Bianca Basten, Psychology

There has been well documented research showing the correlation between early childhood experiences and certain personality markers or attitudes developing down the line. For this survey college student participants completed an online study that included questions on common hot button issues to determine political alignment, as well as questions about their SES, parents' political alignment, number of parents present in early childhood, and parental involvement in childhood. These will all be multiple choice questions. I hypothesize that children from lower SES households will tend to lean liberal in their political beliefs. I predict that 80% of students surveyed will lean more liberally in their political beliefs but come from well-off households, as they are university students. This research could be important for political campaigns as well as policy makers as they can receive insight into which issues college students care about the most.

D.U.22 Climate Change Content Impact on Participation in Activism

Morgan Larson
Mentor: Bianca Basten, Psychology

The purpose of this study is to understand which types of marketing media influence stronger climate change behaviors. This research study will gather a random sample of University of Wisconsin–La Crosse students (obtained through mass email or social media advertising) and ask them to look at climate change content presented online in a Qualtrics survey. This content is either factual (IV) or emotional (IV). By examining different marketing strategies, we will get a better grasp on how the younger generation is influenced to participate in climate friendly behaviors (DV). The emotional content will include art installations created from trash, a clip from the 2016 documentary *Before the Flood*, and emotional messages regarding red meat consumption. The factual content will include facts about reducing energy consumption, methods to reducing red meat consumption, and a list of benefits of recycling. Following the content exposure, participants will be asked to reflect on their own habits and if they are likely to change them via a Self-Report Habit Index (SRHI). I am hypothesizing that the participants who are exposed to more emotionally driven climate change content will be more apt to change their behaviors. Results will help us learn more about what convinces individuals to engage in more climate-friendly behaviors.

D.U.23 Comparison of the Reactive Strength Index and the Modified Reactive Strength Index in Division III Athletes

Cole Letter
Co-authors: Ward Dobbs, Glenn Wright, and Andrew Jagim, Ph.D. (Mayo Clinic Health System)
Mentors: Ward Dobbs and Glenn Wright, Exercise & Sport Science

The reactive strength index (RSI) is the ratio between jump height or flight time, and ground contact time while performing a maximal effort drop jump. Meanwhile, the modified RSI (mRSI) provides the ratio between jump height or flight time, and time-to-takeoff when performing a maximal countermovement vertical jump (CMJ). Both the RSI and mRSI provide metrics that represent “explosiveness” in athletes. However, there is minimal data representing how these values can be interpreted among Division III athletes. **PURPOSE:** The purpose of this study was to compare calculation methods, as well as gather descriptive statistics on RSI and mRSI values in Division III athletes. **METHODS:** Participants performed a standardized warmup followed by a series of jumps (CMJ and drop jumps off a 30cm box). All jumps were performed on a set of force plates and vertical ground reaction force was collected. **RESULTS:** The strength of the relationship between RSI and mRSI, as well as RSI and mRSI, was $r = 0.78$, and $r = 0.87$, respectively. Descriptive statistics of RSI performances were collected additionally. **CONCLUSION:** Different methods of calculating RSI and mRSI are not equivalent and the use of jump height or flight time should not be used interchangeably.

D.U.24 Tolerance for Ambiguity in an Eyewitness Memory Study

Elizabeth Meyer
Mentor: Bianca Basten, Psychology

The purpose of this study was to examine if an individual’s tolerance for ambiguity is associated with increased suggestibility to the misinformation effect after witnessing an ambiguous crime. We hypothesized that after exposure to situations of higher (relative to lower) ambiguity, eyewitnesses with low ambiguity tolerance will be more susceptible to impaired memory recall after exposure to misinformation. Participants consisted of 98 undergraduate students from a Midwestern university. Participants were randomly assigned to view either a high visual ambiguity version (dark and grainy), a high auditory ambiguity version (very loud), or a low-ambiguity version of a video depicting a mock robbery. After viewing the video, participants completed an online quiz about the events they witnessed. Half of the questions included misinformation. Participants then completed an ambiguity tolerance questionnaire and suggestibility questionnaire. Finally, a second quiz with neutral (i.e. not misleading) questions about the video was administered. Responses to the second quiz were scored for accuracy. Preliminary results indicate that there is no significant evidence that individuals with low tolerance for ambiguity will be more susceptible to impaired memory recall after exposure to misinformation. However, there was a significant negative correlation found between tolerance for ambiguity and suggestibility, which supports previous research findings.

D.U.25 Effects of Listening to Preferred Music vs. No Music on Running Performance by Measuring Heart Rate and Perceived Exertion

Noelle Mallinger, Kinzie Reischl, Paige Bergquist, Annika Brown, Noah Ziperski, and Amanda Nelson
Mentor: Salvador Jaime, Exercise & Sport Science

With the worldwide inclusion of music in daily life, music and its effects on performance are often misunderstood and unclear. We are intending to uncover the effect of music on running performance. Purpose: To investigate the effects of preferred music versus no music on performance variables during a 1.5-mile trial run on an indoor track. Methods: This study will include 20 healthy (18-24 yrs.) female and males. Subjects' performance time, average heart rate, estimated maximal oxygen consumption (VO₂max) and rating of perceived exertion (RPE) on a 1.5-mile running time trial when listening to selected music vs. no music will be recorded. All participants will participate in a familiarization trial prior to experimental trials. For the music trial, participants will be asked to select their own motivational music which will be scored using the Brunel Music Rating Inventory. 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.U.26 Prevalence of Low Energy Availability in Collegiate Wrestlers

Micah Missall
Co-authors: Andrew Jagim, Ph.D. (Mayo Clinic Health System), Daniel Freidenreich, and Ward Dobbs
Mentor: Ward Dobbs, Exercise & Sport Science

PURPOSE: The purpose of this study was to investigate the presence of low energy availability through changes in body composition and resting metabolic rate (RMR) throughout the collegiate wrestling season. METHODS: Male Division III wrestlers (n=24; Age: 19.5 ± 1.4yr.; Body Mass: 78.4 ± 14.3 kg; Height: 176.6 ± 6.1 cm) participated in this ongoing study. On four occasions (pre-fall camp, post-fall camp, and mid-season, and post-season) RMR was assessed using indirect calorimetry and body fat percentage (BF%), along with fat-free mass (FFM), was derived using the three-site skinfold technique. Repeated measures analysis of variance with polynomial planned contrast was used to examine changes across time. RESULTS: Preliminary results suggest there was a significant time effect, and quadratic trend, for body mass (p < .001) and FFM (p < .001) as post-fall camp values were lower compared to pre-fall camp and mid-season values, but BF% and RMR did not significantly change across timepoints. CONCLUSIONS: Changes in body weight were likely attributed to a decline in FFM due to the preparation of minimal weight certifications for the upcoming season and not a change in metabolism.

D.U.27 The Toxicity of Nicotine and Imidacloprid on Chick Embryo Development

Dylan Motschenbacher
Mentor: Cord Brundage, Biology

Nicotine targets nicotinic acetylcholine receptors. Persistent nicotine exposure is toxic and alters embryologic development and growth. Imidacloprid is an insecticide that targets nicotinic acetylcholine receptors within insects and is similar to nicotine but was formulated to not target vertebrates. There is some evidence to suggest that some vertebrates may be affected. Level of imidacloprid and similar insecticide agents persist and accumulate in the environment. In this study we are quantifying and characterizing the morphological developmental effects of nicotine exposure in developing chicken embryos (embryotic day 0-14). We will then compare those effects with embryos exposed to increasing doses of imidacloprid. Our aim is to determine what if any developmental consequences exist to developmental imidacloprid exposure and if present, how similar are those to the effects of nicotine. The goal is to determine if Imidacloprid is a safe insecticide or if it poses a hazard to vertebrate health development.

D.U.28 Assessment of Trace Metal Exposure from Ingestion of Play Surface Materials

William Murphy, Abigail Jahn, and Katie Peterson
Co-author: Kristofer Rolfhus
Mentor: Kristofer Rolfhus, Chemistry & Biochemistry

Playground fill material is widely used for safety purposes but presents a potential pathway for the exposure of children to toxic trace metals through dermal contact, inhalation, and ingestion. We assessed ingestion as a route of trace metal exposure to La Crosse area children by collecting 32 fill samples from local playgrounds and parks, representing wood chip, rubber chip, soil, and sand fills. To simulate ingestion, samples were added to solutions of pH 1.5 hydrochloric acid

(simulated gastric solution) and extracted at body temperature under gentle agitation. Extracts were then filtered and analyzed for Pb, Mn, Zn, Cu, As, Cr, and Cd by ICP spectroscopy. Results revealed that Pb from rubber chip extracts averaged 66.4+/-24 ppb (mean+/-sd), while wood chips were only 5.6+/-4.2 ppb, a nearly 12-fold enrichment. While these results do not accurately represent actual ingestion by children, it provides a framework for assessment of the relative risk of the fill materials. The enrichment of Pb in rubber chip extracts is of particular importance, as there is no safe lower exposure limit. Our results suggest that the City of La Crosse may want to consider replacement of rubber chip surfaces with natural alternatives that would lower the relative exposure of Pb to children.

D.U.29 Determining the Effects of Poly-A Tracts and Monovalent Cations on Nucleosome Equilibrium and Dynamics

Morgan Priem
Mentor: Daniel Grilley, Chemistry & Biochemistry

The placement of nucleosomes along strands of DNA is determined, in part, by the presence of poly-A tracts of DNA. These poly-A tracts exclude nucleosomes in a length and purity dependent manner. We have previously shown that A-tracts adopt unique structures that are preferentially stabilized by specific monovalent cations. The exclusion of nucleosomes by long A-tracts, greater than 15 base pairs, impacts the accessibility of nearby DNA. The equilibrium accessibility of DNA within the nucleosomes, determined by unwrapping and rewinding rates, is also an important factor in regulating DNA dependent processes. The impact of short A-tracts, 6-8 base pairs, on nucleosome dynamics is poorly understood. Using competitive reconstitution in the presence of different monovalent cations, we have investigated how the length and placement of short A-tracts within the nucleosome affects the ability of nucleosomes to form. We demonstrate that the same cations that stabilize the unique A-tract structure exacerbate the effects of A-tracts on nucleosome stability. We further demonstrate that the effect depends on A-tract location within the nucleosome. We hypothesize that the A-tracts will also impact the equilibrium accessibility by slowing down the rewinding rate in a metal ion dependent manner. Using equilibrium and stopped-flow FRET measurements we are studying how the A-tract and monovalent cation dependent changes in nucleosome stability impact nucleosome dynamics.

D.U.30 Structure and Stability of a *Salmonella* Copper Resistance Protein with Changes in a Functional Region

Ellie Schneider
Mentor: John May, Chemistry & Biochemistry

Salmonella enterica is responsible for 1.35 million infections per year in the United States alone. We use copper in a variety of ways for its antimicrobial properties. However, *S. enterica* can resist copper's antimicrobial properties by using specialized proteins. *S. enterica* uses a protein named DcrB to aid in copper resistance. Previous research indicates that mutating a part of DcrB with no obvious connection to its core structure causes function to decrease. Because function can correspond with stability or an altered structure, I hypothesized that this mutant variant of DcrB has either decreased stability, or an altered structure compared to wild type. To test this hypothesis, I'm conducting one experiment to determine the mutant's structure by forming crystals out of it, and one experiment to test the stability of the mutant protein by measuring the temperature at which the protein unfolds, using an assay known as ThermoFluor. So far, I have discovered the mutant protein has decreased stability. I now hypothesize that new ionic interactions may be causing this decrease in stability. To test this, I am investigating the impacts of added salt and detergent on the stability of the mutant. These experiments will provide evidence about how the copper resistance protein works. If we can identify these regions as factors in destabilizing DcrB, they can become targets to hinder copper resistance in *S. enterica* by targeting this region with inhibitors in the future.

D.U.31 Creative Research for Folklore Inspired Play

Bao Xiong
Mentor: Nic Barilar, Theatre & Dance

I'm a Theatre Performance major, and for my senior capstone, I needed to create and perform my own show. I decided to write a play about a Hmong girl who journeys to the Rocky Mountains and meets a mythical creature from her heritage. It's a story of bravery, culture, and self-discovery. To really make it come alive, I traveled to Banff in Canada for my research and creative activity. Banff is a city in the Rocky Mountains. This place is special—it's high up in the mountains of Banff National Park, Alberta, and it feels like a living piece of those old stories—much like the enchanted forests from our Hmong tales. I wanted to capture everything: the feel of the morning dew, the crunch of the forest floor under my shoes, the smell of the pines, the sounds of wild creatures. Being surrounded by nature was the best research and creative

process for my project. I needed to experience it firsthand to write about it honestly, and Banff was the ideal stage for my adventure into storytelling.

D.U.32 The Effect of Anxiety on Facial Cues and Interpretation in a Social Setting

Shelby Styer

Mentor: Bianca Basten, Psychology

At the core of many theories of social interactions is the ability to interpret facial expressions. Social anxiety has been shown to change how we interpret social cues, such as facial expressions. The purpose of this study is to explore whether anxiety induction affects our reaction time to recognize facial cues and correctly interpret them within social settings. For this project, participants will fill out a Qualtrics survey while hearing either anxiety-inducing music or neutral music. In the Qualtrics survey, participants will be presented with pictures selected from the Karolinska Directed Emotional Faces, arranged into thirty trials of 2x3 grids of faces. Facial expressions will range from happy to angry and participants will be prompted to identify different emotions within the grid. Accuracy and response time will be recorded. Participants will then answer basic demographic questions and a short trait anxiety questionnaire. I hypothesize that people exposed to anxiety-inducing music will have different response times and will be more attuned to negative facial expressions. The project has received IRB approval and data collection will be completed in March.

D.U.33 The Connection Between Social Media Use and Feelings about Romantic Relationships

Morgan Suelflow

Mentor: Bianca Basten, Psychology

With evolving advances in technology, how does social media use correlate with relationship satisfaction? Social media plays a role in allowing people to communicate with their partner. Social media can be a good outlet for partners to communicate but can also be a distraction and can take away attention from each other. I want to understand if there is a connection between social media use and the satisfaction between partners in a romantic relationship. This study will use convenience sampling to recruit participants that are in a romantic relationship. One includes 13 items that measure relationship satisfaction (Fraley et al., 2011). The other questionnaire with 17 items pertains to active and reactive behavior on social media (Ozimek et al., 2023). The remaining questions are open-ended, asking about demographics and questions about average social media use. I predict that the more an individual uses social media in their proximal relationship, the less satisfied they will be. However, the more an individual uses social media in their long-distance relationship, the more satisfied they will be in their relationship. IRB approval was secured, and data collection for this research will be completed by the end of April 2024.

D.U.34 A History of Fire and Climate in the Upper Midwest

Cade Szymanski and Billy Vaichinger

Mentor: Joan Bunbury, Geography & Environmental Science

Charcoal is a naturally occurring substance created when grass or other vegetation burns. It is widely used as a climate proxy to reconstruct a fire history indicating timing and abundance of fires in an area. A sediment core taken from Mud Lake in Jefferson County, Wisconsin in the summer of 2019 was studied to determine temporal rates of charcoal accumulation to indicate local fire history. The chronology of the core was determined using 17 lead-210 dates and 3 radiocarbon dates spanning the first 200 centimeters of the core. This study will analyze quantities of macroscopic charcoal (>125µm) over time that will be compared to existing records of sediment organic, carbonate, and silicate content. These records will be compared to other paleoclimate data from the Upper Midwest to determine any correlation between climatic variables and fire occurrence. The preliminary results suggest that periods with higher rates of fire correspond with warmer and drier climates.

D.U.35 Developing a Purification Method to Isolate a Nonfunctional Variant of the Copper Resistant Protein DcrB

Maxamilian True

Mentor: John May, Chemistry & Biochemistry

Salmonella enterica is a species of bacteria that is a common cause of food borne illnesses, infecting 1.35 million people in the United States each year. *Salmonella enterica* can resist toxic amounts of copper, which the immune system uses to fight bacteria, and which is used on surfaces in healthcare settings to prevent the spread of infectious diseases. Our project

focuses on DcrB, which is a protein required for copper resistance in *Salmonella*. We are interested in a variant called DrcB $\Delta 55$, which lacks a region required for function. Our goal of this research is to purify and isolate high amounts of DrcB $\Delta 55$ and study how this removed region provides resistance to copper ions. We have worked to isolate DrcB $\Delta 55$ using liquid column chromatography, a method used to separate and extract DrcB $\Delta 55$ from the rest of the cellular components. We have tried various strategies to optimize yield (amount) and purity. Successful completion of this research will allow us to run more biochemical and structural experiments on DcrB to see how DcrB changes in the presence of copper, which will lead to deeper understanding of how bacteria that contain proteins like DcrB cause infections, and possibly new ways to prevent copper resistance by developing antibiotics.

D.U.36 Undergraduate Students' Gender Preferences for Professors

Ellie Unferth

Mentor: Bianca Basten, Psychology

The study investigates whether undergraduate students' professor preferences are affected by gender bias. Participants will be asked to answer 2 open-ended opinion questions about their best and worst professors they have had in their college career. Following, they will be asked to describe why they chose these two professors. Then, they are asked to provide information about the gender, approximate age, and height of the professors chosen. Participants will then answer 20 questions on each of the professors' traits using the Bem-Sex-Role Inventory and rate them on a Likert scale. The traits on the inventory being assessed are some of the following: defends their beliefs, affectionate, assertive, and independent. Answers from these 20 questions will be coded to assign scores for both masculine and feminine traits for each professor. The participants will be asked basic demographic questions such as their gender, age, and year of school. Qualitative data analysis will explore whether professor ratings are influenced by the gender preferences of students and the presence of strong masculine and feminine traits. I hypothesize that female students rate female professors higher and male professors comparatively slightly lower, while male students might have a preference to male professors. I also predict that a match between the professor's gender and their sex role score will be rated as more likeable than a mismatch.

D.U.37 Building Mesocosms for Invertebrate Experimentation/Mesocosm Design for Sustained Invertebrate Populations

Steven Verhaalen and Matthew Waite

Mentor: Ross Vander Vorste, Biology

Aquatic mesocosms are artificial habitats used to conduct experiments or culture populations of organisms. Studies done using mesocosms offer advantages over field studies because they allow control over environmental variables and replication of experimental units. We built a novel laboratory mesocosm system for use in aquatic invertebrate research. Our system consists of three units that hold 6-12 mesocosm each. 6 tanks are in each rack and can hold 2 smaller containers each. There are lights across each rack that mimic the day cycle. Water temperature and dissolved oxygen are measured and adjusted per tank. Water flow is controlled by the water pump and individual valves. A filtration system maintains water quality. The water leaving each tank goes to the bulk tank, where it runs through two mesh layers. This water flows through the middle section, containing plastic spheres with high surface area to capture microbes. A water quality system monitors temperature, pH, dissolved oxygen, and conductivity for each tank in each unit. Our mesocosm system can be either a flow-through system or a recirculating system allowing for water conservation. We plan to use this system to develop a sustainable bloodworm culture and experiment using freshwater amphipods. One advantage of our system is the ability to modify mesocosms and environmental conditions to fit its applications.

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

E.U.1 Analysis of the Dance: Acoustic, Thermal and Behavior of Sleep-Deprived Honey Bee Waggle Dance

Evelyn Johnson and Erin Roup

Mentor: Barrett Klein, Biology

This research is to investigate the impact of sleep deprivation on honey bee communication. Honey bee workers perform waggle dances to advertise the location of food sources. Depriving them of sleep can cause disruptions in their dance

performance, along with the responses of dance followers. This past summer, we joined Dr. Barrett Klein (UWL Biology) to experimentally deprive a subset of worker honey bees of sleep, and recorded dances and dance follower behavior before, during, and after sleep deprivation. We used a low-light sensitive camera and a thermal camera to record the body temperature of bees, and a directional microphone to record sounds they produced. We propose to transcribe and analyze our recordings of waggle dance direction, and distance, along with dance followers' responses, thermal data, and acoustic data. The results are expected to reveal the importance of sound or heat in signal reception and the consequences of sleep loss on signal precision in this species. The analysis of the research will help us better understand the implications of imprecise communication and its effects on colony-level behavior. The specific objectives are to assess how sleep-deprived bees' dances affect dance follower behavior and what mechanisms followers use when following dances. Anticipated findings are alterations in the acoustic signals of the waggle dance, decreased body temperatures of sleep-deprived dancers, and decreased recruitment to food sources due to sleep loss.

E.U.2 Microplastics Cause a Model Alga to Clump: Is It the Cell Wall, Growth Phase, or the Plastic?

Mariah Wagner
Mentor: Anton Sanderfoot, Biology

Chlamydomonas reinhardtii (Chlamy) is a unicellular algae species that is abundant in aquatic ecosystems and soil. Its basic structure and resilient properties make it an ideal species for laboratory use. In this experiment, approximately 500 mg/mL of polystyrene nanobeads are added to Chlamy cultures with the intent of observing the impacts of microplastics on living cells. It was found that microplastics decrease the viability of Chlamy, slowing growth and reproduction. The microplastics also make Chlamy appear clumped in cultures. Microscopic observation with the Stellaris 5 Confocal System shows that the clumping involves cells suspended in extracellular matrix or debris, cutting off key nutrients and light. Microplastics are known to cause growth and physiological effects on many kinds of life, including humans. To continue this research, I will be using different types of microplastics to determine if the chemical composition plays a role in the breakdown of cells. This will be done by using several types of microplastics with wild-type Chlamy, as well as testing one type of microplastic on several strains of Chlamy.

E.U.3 Searching For a Second Line of Evidence to Support Whole Larvae Respiratory Burst Responses in Larval Fish

Anika Oplanic
Co-authors: Audrey Quackenbush, Emily Erickson, Nicole Kooij, Tisha King-Heiden, and Scott Cooper
Mentor: Tisha King-Heiden, Biology

Whole fish respiratory burst assays have been developed in zebrafish and fathead minnow larvae to screen various environmental contaminants for their immunotoxic potential. These assays use PMA as proxy to stimulate neutrophils to produce reactive oxygen species (ROS) as a part of the innate immune response, while Bis-1 can be used to inhibit the PMA-induced response. Most studies indicate that pesticides suppress or do not impact the innate immune response. Our recent work with neonicotinoid pesticides indicates that instead of suppressing the innate immune response, they increase ROS production by neutrophils. Given this unusual finding, we are seeking a second line of evidence to support our whole-fish larvae assays by evaluating the expression of several genes associated with neutrophil-induced ROS response. Following stimulation of ROS through the respiratory burst (by a pathogen or PMA), phagocytes are recruited to the area. ROS production stimulates NK-KB to initiate the expression of inflammatory cytokines such as IL1b and TNF α . To see if these genes would be good indicators for the activation or suppression of the respiratory burst in whole fish, we have exposed 5-day zebrafish larvae to either PMA or PMA + Bis1 and are using qRT-PCR to measure the expression of NK-KB, IL1b, and TNF α normalized to beta actin. We hypothesize that expression of these genes will be induced in PMA-exposed fish compared to control fish, and that induction of those genes will be lower or suppressed in PMA+Bis1 exposed fish. Our preliminary findings will be presented, and hopefully on-going analyses will show that these genes are good markers to support findings from whole fish respiratory burst assays.

E.U.4 Resource Competition in Flammulated Owls (*Psiloscopus flammulous*) in Fluctuating Mountain Habitats

Aubrey Schwonek
Co-author: Markus Mika
Mentor: Markus Mika, Biology

The Flammulated Owl (*Psiloscopus flammeolus*) is an insectivorous and nocturnal bird of prey with a breeding range in western North America. The primary diet for the species mostly consists of moths and insect larvae during the breeding

season. Areas with high nocturnal insect prey abundance tend to correlate with an increase in the quality of breeding locations. Preliminary data confirmed that individuals who obtain high quality sites will encounter a higher amount of mating opportunities as well as a higher chance of successfully raising offspring. In recent years, we observed that high quality locations appeared to have more territorial males competing for the available resources. In order to quantify this correlation, we tested the abundance of active male Flammulated Owls by conducting nocturnal call-playback surveys in potential territories covering multiple 16-hectare sites across northern Utah. In all surveyed territories, we deployed Malaise insect traps to estimate prey abundance and biomass. Preliminary results suggest an increase of intraspecific territorial owls at sites where insect abundance and well-developed nest location numbers are high. The differences in large moth biomass between sites are correlated to site productivity and play a role in higher territory occupancy and competition.

E.U.5 Manipulation of Outer Membrane Biogenesis Factor GOX1969 to Improve *Gluconobacter oxydans* Strain Design

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

Acetic acid bacteria are used in a wide variety of industrial processes such as the production of vinegar, vitamin C, bacterial cellulose, and a plethora of other products of interest. The reactions that contribute to the synthesis of these materials are primarily done by a diverse set of membrane-bound proteins called dehydrogenases that incompletely oxidize their substrates and shuttle electrons directly into the respiratory chain. Because *Gluconobacter oxydans* exhibits high levels of metabolic activity within their periplasm, the translocation of nutrients and waste products across the outer membrane is of particular importance. This transport is facilitated by numerous β -barrel porins that are folded into the outer membrane by the β -barrel assembly machinery (BAM) complex. Characterization of *G. oxydans* BAM complex subunit GOX1969 revealed that overexpression of *gox1969* in *E. coli* increases growth rates. This data strongly suggests that excess levels of BAM complex subunits carry the potential to increase bacterial viability. Here we seek to replicate this improved growth rate in *G. oxydans* through the production of *gox1969* overexpression strains. Improving *G. oxydans* growth rates and metabolite export rates by improving translocation efficiency through the outer membrane via outer membrane porins will provide insights needed for more rational strain design, thus shedding light on new ways to reduce production costs and improve yields at an industrial level.

E.U.6 Correlations between Sand, Silt, and Clay Sized Particles and Macroscopic Charcoal from a Lake Sediment Core

Ryan Ballard and Jordan Carvenough
Mentor: Joan Bunbury, Geography & Environmental Science

A sediment core was collected from Mud Lake in Jefferson County, Wisconsin in June 2019. The top 200 cm spanning the last 3,000 years will be used to develop a fire history record using charcoal preserved in the sediment core. A chronology was developed using 17 lead-210 and 3 AMS radiocarbon dates. The processing of lake sediments for charcoal involves subsampling sediment at 1 cm increments and the treatment of a 1.0 cm³ sample to bleach organic matter using hydrogen peroxide and disaggregate the sediment using sodium hexametaphosphate. The sample is then sieved and dried for 48 hours after which it is ready to be counted under a stereomicroscope at up to 50x magnification for the presence of grass and non-grass charcoal. Charcoal counts will be converted to accumulation rates and compared to existing records of the sand, silt, and clay-sized particle fractions. The relationship between the particle sizes and the charcoal accumulation rates will help explain the deposition patterns of charcoal in Mud Lake. Preliminary results show a correlation between sand-sized particles (>63 μ m) and the raw counts of charcoal in the sediment core.

E.U.7 The Role of Parenting Style in First-Generation College Students' Motivational Orientation toward Pursuing a Future Advanced Degree

Kelsi Bellisle
Mentor: Kevin Zabel, Psychology

My research addresses the research gap pertaining to the interaction between parenting styles and motivation among first-generation students' in pursuing graduate-level education, as both influence the future attainment of higher degrees for first-generation students. Authoritarian parents emphasize obedience and strict standards with limited warmth, while authoritative parents prioritize independence and set high achievement expectations combined with warmth. Intrinsic

motivation is motivation stemming from curiosity, personal fulfillment, or growth, whereas extrinsic motivation stems from future job requirements, family pressures, or social status. This correlational study will include 100 UWL first-generation students who will respond to various questionnaires, including measures of intrinsic and extrinsic motivation, parenting styles and dimensions, and a measure of first-generation college student status. I expect multivariate regression analyses will reveal that authoritarian parenting style will positively predict extrinsic motivation to pursue higher education and authoritative parenting style will positively predict intrinsic motivation to pursue higher education at a more pronounced level among first-generation than non-first-generation students. These insights would in turn guide tailored educational efforts to support first-generation college students in pursuing graduate-level education.

E.U.8 Fear Responses after Seeing Behind the Scenes of Scary Movies

Shakira Brockhaus
Mentor: Bianca Basten, Psychology

Individuals display varying levels of thrill-seeking and comfort with fear inducing media, such as horror movies. Some people gravitate towards the allure of horror movies and can be affected by the terrifying stimuli despite their often-unrealistic qualities. The purpose of this study was to investigate the effects of viewing a behind-the-scenes video on a participant's fear response when watching a part of a scary movie. Participants were randomly assigned to two different groups. One viewed the behind-the-scenes video before the scary movie and the other viewed a neutral clip in the form of an interview with one of the actors. A self-report questionnaire and heart rate monitors were used to gather data about participants' responses to the movie clip. I was interested in if the behind-the-scenes video would allow participants to shift their perspective and be reminded of the movie's fictitious nature, thus reducing fear responses. The questionnaire was also used to identify connections between the participants' reported level of fear, enjoyment of the movie, previous exposure to horror media, thrill-seeking traits, and demographics.

E.U.10 Do Parenting Styles Moderate the Relationship between Childhood Trauma and Adult Anxiety?

Hailey Clark
Mentor: Tesia Marshik, Psychology

Both trauma and parenting style influence psychosocial functioning in children (Chapman et al., 2007; Pelcovitz et al., 1994), but the interaction among those factors is unclear. Past research has shown connections between parenting styles and anxiety after certain life stressors (Campana et al., 2008), but trauma conceptualized more broadly has been insufficiently researched. Participants included 100 UWL students who responded to multiple questionnaires that measured childhood trauma, parenting styles, and symptoms of adult anxiety. Based on past research, I hypothesized that parenting style and childhood trauma would interact to predict adult anxiety, such that the relationship between childhood trauma and adult anxiety will be significantly positive for participants who report permissive or authoritarian parents, and non-significant for participants who report authoritative parents. The hypotheses were partially supported. Findings may be beneficial to caregivers of children with trauma to inform parental educational efforts that will help protect children from negative psychological outcomes.

E.U.11 Improving Oxygen Utilization of *Gluconobacter oxydans* by Genetic Modification

Alexa Fleegal
Co-authors: Daniel Bretl and Paul Schweiger
Mentors: Daniel Bretl and Paul Schweiger, Microbiology

Myxococcus xanthus is a ubiquitous soil bacterium and is an obligate aerobe. *M. xanthus* encodes at least two protein families that are known to bind oxygen and are predicted to help *M. xanthus* survive oxygen limitation: hemerythrins and truncated globin proteins. Given this role in *M. xanthus*, we hypothesize that the expression of hemerythrins and/or truncated globins from *M. xanthus* will also improve oxygen utilization of a second bacterial species, *Gluconobacter oxydans*. This bacterial species is used industrially to incompletely oxidize sugars to produce desired products. However, *G. oxydans* has a relatively slow growth rate under industrial scale conditions due to its incredibly high oxygen demand. Therefore, genetic modification of *G. oxydans* to enhance oxygen-dependent growth is desirable for industry. In this study, we have successfully amplified six distinct *M. xanthus* hemerythrin genes and transferred them into *G. oxydans* via a plasmid vector. The same processes will be applied to the two *M. xanthus* truncated globin genes. The modified *G. oxydans* will be assessed for improved growth under aerobic conditions with different levels of oxygen saturation. If the addition of these genes to *G. oxydans* yields increased growth, we will also assay the production of industry-relevant molecules from this organism to determine if improved growth also improves production rates and yields.

E.U.12 Auricular Location as an Alternative to Rectal for Feline Thermometry

Chelsea Gale
Co-authors: Lilly Milliren and Alyssa Kislewski
Mentor: Cord Brundage, Biology

Estimating body temperature is an important step in veterinary practices to assess the health of an animal and in the clinical setting, rectal thermometry is the standard method to do so. This process tends to be invasive and extremely stress-inducing for the animals and the clinic staff involved. Different locations on a feline body have been tested as viable replacements to rectal for temperature readings close to the core temperature. A previous study was done by a UWL student on a small sample size of felines ($n = 30$) to test the accuracy of an auricular tool called Pet-Temp Instant Ear Thermometer. The results found a statistically significant difference between the rectal and ear thermometer readings ($p = 0.017$). However, a moderate positive correlation ($r = 0.52$) was found between the rectal and auricular temperatures ($p = 0.003$). The purpose of our study was to further investigate this auricular thermometer and the correlation between the auricular and rectal temperatures by having a larger sample size of 50 felines. We continued to use felines from the Coulee Region Humane Society and visited the shelter for temperatures once a week. Once again, we found a statistically significant difference between the rectal and auricular temperature readings. As for the correlation, we did not find a consistent significant correlation that would say that using the Pet-Temp Instant Ear Thermometer is a trustworthy enough replacement for rectal in a clinical setting.

E.U.13 Accuracy of Ultra-Short-Term Measures of Heart Rate Variability Following Resistance Exercise

Alex Gergen
Co-authors: Daniel Freidenreich, Salvador Jaime, and Ward Dobbs
Mentors: Ward Dobbs, Salvador Jaime, and Daniel Freidenreich, Exercise & Sport Science

The use of heart rate variability (HRV) has grown in popularity as an assessment of autonomic function, including recovery from exercise. Traditionally, a 10-min electrocardiogram recording has been used as the criterion method for determining HRV. However, recent research indicates reliability of HRV using an ultra-short-term (US) recording consisting of a 1-minute heart rate monitor recording. Purpose: This study examined the accuracy of US HRV following high-volume back squat protocols. Methods: This study included recreationally active men (18-35 years). Participants completed two separate testing days consisting of 6 sets of 10 repetitions of back squats, at either 55% or 75% of their one-repetition max. Participants wore a heart rate monitor to record HRV immediately post and 24-hrs post-resistance exercise in the supine position. A three-way repeated measures analysis of variance was used to see if US measures of HRV were different than criterion measurements across time points following different exercise intensities. Results: There was a significant effect for measurement type ($p=.049$) as US measurements of HRV were approximately 30ms higher than criterion measurements 24-hours post-stimulus regardless of intensity. Conclusion: Findings indicate US measurements may overestimate HRV 24-hours following a lower body resistance exercise protocol. The overestimation of HRV falsely indicates greater autonomic recovery from exercise.

E.U.14 Diverse Nation, Dying Language Enrollment: Exploring Why (and Why Not) First-Year University Students Study Foreign Languages

Noelle Hackenmueller and Kimberly Morris
Mentor: Kimberly Morris, Global Cultures & Languages

Throughout the nation, there has been a steady decline in foreign language enrollment across the educational system. (Pufahl & Rhodes, 2011). Although many high schools in the United States offer foreign languages courses, very few of them require those courses as graduation requirements (O'Rourke, Zhou, & Rottman, 2016). The students who do enroll in these high school language courses do not always choose to continue studying language at the university level. As a result, many universities have experienced a decline in foreign language enrollment. (Looney & Lusin, 2016). Some universities are using this as a motive to reduce or even eliminate language programs due to budget cuts, such as at West Virginia University. The goal of this project is to understand what factors impact students' decision to study (or not) a language at the university level. To answer this question, a Qualtrics survey was sent out via email to all first-year students at the University of Wisconsin-La Crosse to collect information on what influenced their decision to take (or not) a foreign language class, along with their foreign language learning experience at the K-12 level. The results will then be analyzed and shared with UWL's Department of Global Cultures and Languages for recruitment and retention purposes, as well as presented at the annual undergraduate research and creativity symposium.

E.U.15 “The Toxicity of ‘Wokeness’”: The Validation of a Performative Activism Scale

Abigale Hartwig
Mentor: Kevin Zabel, Psychology

Performative activism characterizes the behavior of some White liberals, impeding their critical reflections regarding racism and subverting the true intentions of social justice movements. Performative activism occurs when White people, who experience extreme levels of White disgust as well as a motivation to prove that they are egalitarian and fair-minded, engage in disingenuous allyship. Previously, I developed a set of survey items to assess two factors of performative activism: Opinionation and Moral Superiority. Opinionation is the behavioral expression of an attitude from a subjective point of view about social justice issues whereas moral superiority is the belief that an individual has higher morals than others including elements of disgust for the White identity and a desire to protect Black people. The purpose of this study is to assess the validity of the items developed for each factor. Approximately 150 participants responded to an online survey that measured their levels of performative activism, White guilt, political engagement, and political leaning. I hypothesize that a positive correlation will emerge between the opinionation and moral superiority factors of the performative activism questionnaire and measures of political engagement and White guilt, respectively. Moreover, I hypothesize that White liberals will score higher in performative activism than White conservatives. This research carries implications for prejudice studies and counseling practice.

E.U.16 Varied Central Breathing Responses to Carbon Dioxide (CO₂) in Tadpoles with and without Nicotine Exposure

Karin Hayford
Co-author: Cord Brundage
Mentor: Cord Brundage, Biology

When breathing control centers in the human brain sense heightened levels of CO₂, they signal for lung breaths. This response could be affected by nicotine exposure on the development of these brain regions. For this project we evaluated nerve signals from the brainstems of bullfrog tadpoles that innervate breathing muscles. Tadpoles, like humans, should increase their breathing rate in response to high CO₂ (hypercapnic) environments. We are testing whether control tadpoles and tadpoles exposed to a moderate amount of nicotine (30 mg/L) for 10 weeks have the expected response to CO₂. Two extracellular suction electrodes are placed on cranial nerves (V & VII) in the excised brainstem from control and nicotine exposed tadpoles to measure the lung burst activity between normal (1.5% CO₂) and hypercapnic (5% CO₂) conditions. The expected response for control tadpoles would be an increase in the breathing rate when exposed to hypercapnic environments. We hypothesize that chronic nicotine during development will blunt the response to hypercapnic conditions, diminishing the capacity of the body to offload CO₂ and creating a toxic state (respiratory acidosis). We are exploring the factors that could affect the expected response in the control and nicotine groups to determine whether tadpoles are a good model organism to study human breathing responses. Abnormal breathing control center responses to increased CO₂ could have a role to play in sudden infant death syndrome (SIDS).

E.U.17 Differences In Lithic Raw Materials and Reduction among Oneota Sites

Lucas Meyer
Mentors: Constance Arzigian and Heather Walder, Archaeology & Anthropology

This project is an archaeological analysis of lithic reduction in relation to the quality of stone in the La Crosse, Wisconsin, locality from AD 1300 to 1625. The goal of this research is to investigate how the people of the Oneota culture group of the La Crosse locality were working with local versus exotic lithic raw materials at the Don Pertzsch Site and those among the Tremaine Complex nearby. This will be done by examining the lithic reduction stages of both local and exotic raw materials as well as investigating the relationship between the tools and debris found at the Tremaine Complex sites and the Don Pertzsch Site. The lithic debris from Feature 7 of the Don Pertzsch is the primary focus in determining the reduction sequence. It will also be analyzed independently based on several analytical nodule types to determine variability in quality and usage among Prairie du Chien chert. Understanding the reduction practices and debris between Oneota sites will help add to the knowledge of tool creation and usage of various raw material types and qualities.

E.U.18 Place-Based Archaeology at the Old Pageant Grounds in Miskwaabikaang (Red Cliff, Wisconsin)

Sabrina Neurock

Mentor: Heather Walder, Archaeology & Anthropology

In northern Wisconsin, the Red Cliff Band of Lake Superior Chippewa (Ojibwe) and settler-scholars participate in a collaborative archaeology program called Geté Anishinaabe Izhichigéwin Community Archaeology Project (GAICAP). This project is co-directed by Red Cliff's Tribal Historic Preservation Officer (THPO) and academic archaeologists. The Red Cliff community emphasizes the importance of the "Old Pageant Grounds (OPG)" located at Red Cliff Bay, which has evidence of Indigenous occupation dating back at least 5,000 years. Ojibwe people are a part of the broader Anishinaabe Native American culture in the Great Lakes region. This research uses an interpretive framework of place-based archaeology to investigate how the OPG represents the longstanding activities of Anishinaabe communities through time. Spatial and attribute analysis of stone artifacts and Euro-American made objects excavated from three 2x1 meter test units demonstrate the continuity of lithic technology into the 19th century Ojibwe village component. The identification of diagnostic glass and metal artifacts that came from the same context as the stone artifacts emphasize the endurance of Ojibwe traditions at this multi-component site. As part of GAICAP's broader goals, these analyses support an interpretation of the cultural continuity of Indigenous practices throughout colonial occupations, while facilitating local stewardship of this historic site.

E.U.19 A Median Estimator for Three-Dimensional Rotations

Kacie O'Hearn

Mentor: Melissa Bingham, Mathematics & Statistics

The median is a way of measuring the center of a data set that is robust to outlying values. While the median has been studied extensively for traditional one-dimensional data sets, it has received less attention for three-dimensional rotation data. Bingham and Fischer (2014) developed a median estimator for 3-D rotation data through minimization, but this process relies on optimization search algorithms and does not have a closed form solution. As such, this minimization technique does not always compute the same result for the median rotation when applied to the same data set. In this poster, a different approach for computing a median rotation that does not depend on minimization techniques is explored. This newly developed median rotation is compared to the pre-existing notation of the mean rotation under various conditions through a simulation study to investigate whether the median rotation outperforms the mean rotation. The newly established median is also compared to the approach of Bingham and Fischer (2014) to verify that the new approach keeps the desirable properties of the median but is computed in a more efficient manner.

E.U.20 Math Identity of Pre-Service Teachers

Sara Oppermann

Co-author: Rosalie DeFino

Mentor: Rosalie DeFino, Educational Studies

I will be conducting qualitative research to explore the impact of pre-service teachers' own math identities on their approach to math teaching. Math identity, or an individual's attitude towards their own ability of doing math, is a concept that is taught throughout mathematics education courses. For instance, pre-service teachers in EDS 422 Math Methods are asked to reflect on their own experience as math learners. Since students are heavily impacted by their own ideas of how they think they are performing in math, it should be evident that these prior experiences will potentially change the impact that they want to have on their own math students. My interest in this topic stems from my own plan to become an educator, as well as my passion for math throughout my educational journey. I will use various discussion responses of pre-service teachers in EDS 422 regarding their personal past with math identity and the messages that they plan to emphasize going forward as a math educator. Through analyzing these responses, I will look for patterns and themes.

E.U.21 Gone Phishing: A Critical Analysis of UWL's Cybersecurity Awareness Policies and Practices

Anatalia Radoc

Mentor: Bryan Kopp, English

Higher education institutions (HEI) have become the latest target for phishing scams due to their decentralized nature, complacent attitude toward data security, and possession of hundreds, if not thousands, of individuals' personal information. This project seeks to identify the extent of the University of Wisconsin's data security policies to promote

digital safety and identify ways the university can improve this policy to better protect student information. I argue that UWL is not taking appropriate measures to create a culture of cybersecurity by implementing an ineffective security awareness policy that wholly leaves out one of the university's largest stakeholders: students. I will conduct a textual analysis of UWL information security policy, UW System network security policy, and messages from the school regarding phishing scams to understand how policy language and rhetoric shapes information security awareness practices at the university. I will then analyze the language of real phishing emails received by UWL students to see if the school's guidance and policies are sufficient to protect individuals from harm. The most important weapon HEIs have against potential data breaches that would cost the university hundreds of thousands of dollars is a confident, properly educated school population aware of the importance of online safety.

E.U.22 Mapping Ubiquitin Sites on the HPIV3 Matrix Protein with a Focus on the Nuclear Localization Region

Sarah Remiker

Mentor: Michael Hoffman, Microbiology

Ubiquitin is a cellular protein that can be attached to other proteins and is added to lysine amino acids within a target protein. When a protein is ubiquitinated, the stability and function of that protein can be altered. This project will seek to determine the location of ubiquitination sites on the Human Parainfluenza Virus 3 (HPIV 3) matrix protein, with a focus on the nuclear localization region (NLS). Determining these sites will help us to better understand the virus and how the matrix protein functions to promote the assembly and release of HPIV3 particles. We know that the matrix protein of HPIV 3 is multi ubiquitinated meaning that ubiquitin is added to multiple lysine residues of the matrix protein. Previous research on the matrix proteins of related paramyxoviruses has shown that those matrix proteins can be ubiquitinated in amino acid segments termed NLS. We suspect the HPIV3 matrix protein may be ubiquitinated within its NLS. There are five lysine residues in and around the HPIV3 matrix protein NLS. To determine whether these lysines are sites for ubiquitination we constructed M plasmids containing mutations in the first two, the last three, and all five lysine residues. In a preliminary experiment, all three altered M proteins expressed well in cells. Next, we will assay the ubiquitination status of the M proteins, and then assay the ability of the M proteins to direct release of virus-like particles from cells, as the wild-type M protein does.

E.U.23 The Social Capital Project and What It Tells Us about Wisconsin

Scott Rosendahl

Mentors: Nicholas McFaden (Finance) and Israt Jahan (Economics)

Using data from the Social Capital Project (created by the Joint Economic Committee), I unearth correlations between different economic and social capital factors between the U.S. states and between the counties in the Driftless region of Wisconsin and Minnesota. I find that social capital and inequality are especially correlated, on both the county level and the state level. I also find that the Midwest, and especially Wisconsin, performs exceptionally high on several social capital metrics. After making these observations, I speculate on the causality of these correlations and make suggestions for further research on the topic.

E.U.24 Effects of Oral Vitamin D Supplements on Plasma Calciol, Hecpidin, and Ferritin in College Females

Lydia Schult, William Murphy, and Melanie Weis

Co-authors: Cheyenne Banasik and Sara Scala

Mentor: Margaret Maher, Biology

Active vitamin D (vitD) decreases the levels of hepcidin, a hormone that decreases iron absorption in the body. Decreased iron absorption can lead to iron deficiency and anemia, which has negative effects on long-term and daily functioning of the body. Seventeen females (18-23 years) consumed one 400 IU capsule daily of cholecalciferol (vitD3) while following a vegetarian diet. Blood was drawn in the fasted state before and after two weeks of supplementation. Collected plasma was assayed for calciol, hepcidin, and ferritin with enzyme-linked immunoassay kits and a Spectramax plate reader. Participant height and weight were measured for body mass index calculations. Medical and diet histories; diet records during the study period; and changes in appetite, bowel movements, and flatulence were reported. Pre- and post-supplementation calciol levels were 21.0 ± 1.7 ng/ml and 21.4 ± 1.6 ng/ml, respectively ($n=12$, $p=0.19$). Pre- and post-supplementation hepcidin levels were 6.4 ± 1.5 ng/ml and 6.8 ± 1.5 ng/ml, respectively ($n=10$, $p=0.39$). Kit-recommended ferritin dilutions yielded values below the lowest standard. Thus, the ferritin assay will be repeated and reported at a later date. Participants' calciol and hepcidin levels were within the expected ranges found in published literature. However, by various standards, 29-88% of participants had inadequate or suboptimal calciol levels associated with insufficient

vitD and two had vitD deficiency.

E.U.25 Impacts of Study Room Environment on Frustration Tolerance

Blake Sieckowski
Mentor: Bianca Basten, Psychology

This study's purpose is to evaluate the effects of academic study room environment on frustration tolerance in college-aged students. This research study will gather participants from the University of Wisconsin-La Crosse attending the Psychology-100 course via SONA, as well as Reuter Hall residents who responded to a flier invitation. Participants will be assigned to either study room one, containing live houseplants, or study room two, with no houseplants. The plants represent the IV. Once inside, participants are tasked with identifying as many Waldos as they can (where they think there are two to five) hidden in a "Where's Waldo" beach scene. The caveat is that the scene contains only one Waldo, and I am measuring how long participants continue looking until they give up. This process is timed, and the amount of time it takes for the participant to enter the room, discover as many Waldos as they can, and then exit the room represents the DV. Examining the time it takes for the participant to complete the study based on the study room will expose the effects that the study room environment has on frustration tolerance. Once these data are collected, participants will be asked to reflect on their experience and complete a self-assessment of their affective behaviors via the Positive and Negative Affect Schedule (PANAS) via QR code. I hypothesize that if a participant is in a study room with live plants they will be in the room for longer, raising frustration tolerance, and eliciting a positive mood. Results will expose if environment makes an impact on student study performance.

E.U.26 Assessment of Seasonal Changes in Cell Number in the Hibernating Ground Squirrel Brain

Angelique Vega and Abbey Peterson
Mentor: Christine Schwartz, Biology

During hibernation, ground squirrels undergo drastic changes in physiology. They alternate between torpor, where body temperature is just above freezing and their heart rate slows to 3 beats a minute, and interbout arousal (IBA), where body temperature and heart rate return to normal. Outside of hibernation, ground squirrel physiology is similar to a typical mammal. Accompanying the changes in physiology seen in hibernation, we also see changes in brain structure and function, where areas that are not as important for hibernation, like the cerebral cortex, show different changes than areas of the brain that are presumably very important, like hypothalamus and brainstem. Previous studies have looked at structural changes and neuronal damage during hibernation, but no work has quantified whether numbers of neurons have changed during this time or seasonally. Neuron number could vary because of damage to existing neurons but could also be related to a change in the seasonal importance of a particular brain region. Here, we quantified neuron number in the anterior cingulate cortex in ground squirrels from torpor, IBA, and summer to determine any seasonal differences. We found no difference in neuron number across the three time points ($P=0.58$). Current work is focusing on quantifying neuron number in a region of the hypothalamus, an important brain area in hibernation, as a comparison.

E.U.27 Fabrication of Porous Multi-Metallic Thin Films for the Catalytic Conversion of Carbon Dioxide (CO₂)

Meredith Zannacker and Reilly Eiyneck
Mentor: Sujat Sen, Chemistry & Biochemistry

Carbon Dioxide (CO₂) is abundant in our atmosphere, and its conversion to value added chemicals (such as methane, ethylene, ethane, formate, carbon monoxide, and propane) using renewable electricity is an active area of investigation. Previous research has shown that copper-based catalysts can aid in producing a wide range of hydrocarbons through the electrochemical reduction of CO₂. Herein, we report on the synthesis of copper-based thin films on PTFE substrates that can be used as gas-diffusion electrodes. We begin by making the PTFE surface suitable for electroplating through deposition of conductive carbon nano-sized particles, followed by deposition of copper-based alloys via pulsed current electroplating. By carefully controlling the synthesis parameters, we have created thin films with small voids that will help promote the catalytic process. We also report on the use of various analytical techniques such as x-ray diffraction (XRD), reflectivity (XRR), scanning electron microscopy (SEM), energy dispersive x-ray analysis, and a four-point-probe to characterize these thin film catalysts with respect to size, composition and electrical conductivity as well as preliminary tests on their performance as a catalyst for CO₂ conversion.

E.U.28 Abundance of Microplastics in Silver Carp (*Hypophthalmichthys molitrix*) in the Upper Mississippi River

Kassie Zimmer

Mentor: Eric Strauss, Biology

Microplastic pollution has shown an increasing accumulation of particles smaller than 5mm in numerous aquatic and terrestrial systems. Little is known about the ingestion of microplastics of fish in the Upper Mississippi River. This project studied the abundance and characterization of microplastics found in the invasive filter feeding Silver Carp (*Hypophthalmichthys molitrix*). All fish analyzed (n=110) were collected via electrofishing in 2019 from Pool 26 located near St. Louis, MO. Digestive tracts from each fish were removed and tissues were digested using KOH to break down organic matter and density separated from remaining heavier materials in a CaCl solution. Microplastics were isolated on a filter for enumeration and measured via microscopy. Further plastic verification and polymer identification was completed through Fourier Transform Infrared (FTIR) Spectroscopy. In total, 758 microplastic particles were found in the 110 Silver Carp digestive tracts (mean=6.9 particles/fish) and ranging from 0-60 particles/fish. The size of the microplastic particles ranged in length from 250 μ m-5mm. These results confirm that Silver Carp are consuming microplastics from the river, however the effects of microplastics on Silver Carp are unknown. Regardless, the prevalence of microplastics in fish highlights the importance of reducing plastic pollution and need for monitoring microplastic abundances and consumption in the Upper Mississippi River.

UNDERGRADUATE ORAL PRESENTATION ABSTRACTS

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

O.U.1 Large Orbiting Mirrors Experiencing Radiation Pressure: Analyzing the Impact of Changing Planet Location

Kelvin Scheurer
Mentor: Shauna Sallmen, Physics

Scientists have considered using large, lightweight mirrors to heat Mars' surface to make it more habitable (e.g. Birch 1992). However, an extraterrestrial civilization may already have applied this idea to direct starlight onto a planet, either because one side is permanently dark, or they wish to alter the climate. One side of a tidally locked planet is permanently dark because it has an orbit in which the same side of the planet is always facing the host star. For some types of stars, this can happen for planets in the habitable zone—i.e., planets that could have liquid water on the surface. Extraterrestrials on a tidally locked planet could use large, lightweight mirrors to provide starlight to the dark side of such a planet. The effects of radiation pressure on the orbit stability of large, lightweight mirrors are not well studied, but our research group is working to change that and gain insight into exactly how stable or unstable mirror orbits become. We have run and are analyzing many different simulations of mirrors orbiting potentially habitable planets around different stars. It is clear that radiation pressure (RP) plays a significant role in the mirror's orbit shape and survivability. I will present an analysis of how mirror orbit stability changes for planets at different distances from the star.

O.U.2 Internship Experiences: Using Behavioral Management with Children of All Abilities

Ashley Everson, Maysa Lang, Yasmine Van De Water, and Maggie Andrews
Mentor: Casey Tobin, Psychology

This presentation showcases the experiences of a small group of Psychology majors who are interning in various community service roles aimed at supporting children's development. At Aptiv, the student intern's focus has been placed on assisting children with disabilities in behavior management, verbal, and non-verbal communication skills, and fostering community integration. The student intern's involvement with the Boys and Girls Club has revolved around behavioral management and providing support to at-risk youth, particularly in managing high-stress scenarios. Within the Chileda In-Home Support Services, the student intern has focused on increasing socially significant behaviors and effectively de-escalating crisis situations. She has also worked on writing Daily Living Skills treatment plans and has taken the lead at organizing group services. At Chileda Residential Services, the intern will address how her efforts have been directed towards refining communication skills, crisis management, activities of daily living, and facilitating community integration. This presentation emphasizes the importance of community services in fostering the overall development of children in various environments. The four interns will each give concise elevator pitches about their experiences, followed by an opportunity for questions and discussions.

O.U.3 Advocacy and Awareness: Crucial Contributions of Communication Efforts to Environmental Organizing

Sophie Byrne and Cassandra Gersbach
Mentor: Alysa Remsburg, Sustainability & Environmental Studies

We set out to learn how consistent communications efforts are necessary for building and maintaining community networks and raising awareness about local issues and organizational goals. The Sierra Club and Mississippi Valley Conservancy (MVC) have legacies of conservation on national and regional scales, illustrating how sustainability efforts can operate at multiple levels and functions. The Coulee Region Sierra Club is a local branch of the oldest and largest grassroot environmental organization. By using journalistic style reporting to address the infrastructure and socioeconomic dilemmas within the community, the newsletter is a bridge between development and the community. This monthly newsletter touches on local environmental activism issues. As a land trust, MVC is dedicated to legally protecting private and public Wisconsin lands through the implementation of conservation easements. Operating in nine Wisconsin counties, MVC builds networks between landowners and donors who are passionate about land stewardship and biodiversity. MVC's communications branch is integral to fostering local engagement and garnering support for safe and healthy land use practices, but primarily exercises technical writing: ethos and logos. This project aims to use storytelling to fill the gap in MVC's current communications practice, implementing pathos instead.

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

O.U.5 Enhancing the Overall Wellbeing of Children as an Intern within Public Schools

Rayeann Jones, Brianna Varsho, and Mikaela Russell
Mentor: Casey Tobin, Psychology

Three psychology majors completing their internships will share their experiences in working in three local school districts: West Salem High School, Onalaska High School, and La Crescent-Hokah Elementary School. Each intern will offer insights into their experiences with targeted interventions aimed at behavior management, academic advancement, and developing essential social skills among the students. Two interns will share how they have participated in guiding students through academic advising and shaping future career plans. One intern will share how they have been helping students overcome bullying and how they have used certain techniques to improve friendships. Collaborative efforts within interdisciplinary teams have been helpful for the interns in navigating the landscape of mental health support within three different educational settings. The trio of interns will deliver brief elevator speeches and will be available for questions and discussions regarding their respective experiences.

O.U.7 Mussel Conservation in Wisconsin Aquatic Ecosystems with the Genoa National Fish Hatchery and the U.S. Geological Survey

Benjamin Muhr and Josie Gulyash
Mentors: Alysa Remsburg (Sustainability & Environmental Studies), Michelle Bartsch (United States Geological Survey), and Erica Rasmussen (Genoa National Fish Hatchery)

The purpose of our projects is to help restore endangered aquatic life in the Midwest. The Genoa National Fish Hatchery and USGS work on restoring federally endangered aquatic species. This includes freshwater mussels, lake sturgeon and lake trout. Their goal is to recover the amount and diversity of aquatic organisms within the Mississippi river and Wisconsin lakes. The Genoa National Fish Hatchery works on 15 species of fish and 14 species of mussels. The fish hatchery's community goals include raising walleye, bass, rainbow trout, etc. for sport fishing, whereas the USGS' goals are primarily to preserve and increase the biodiversity of aquatic benthic habitats. At the hatchery Josie is working to identify species and learned the steps of raising endangered species. At the USGS, Ben works with propagating the endangered mussel species, the Zebra Mussel, *Dreissena polymorpha*, in which he is studying optimal habitat conditions, feeding cycles, and how to reintroduce them into freshwater ecosystems. Our work focuses on assisting biologists and researchers in figuring out the best way to preserve our ecosystems.

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

O.U.8 Physics-Informed Neural Networks for Modeling Mathematical Ecology

Nathan Schacherl
Mentor: Chad Vidden, Mathematics & Statistics

Biological systems are frequently modeled using systems of ordinary differential equations (ODEs). This approach involves estimating many unknown parameters using data that is often incomplete and noisy. While there are many methods for parameter estimation, a new and promising approach utilizes physics-informed neural networks (PINNs). PINNs combine neural networks with ODE systems to approximate ODE solutions while also estimating the parameters. In this talk, I will introduce PINNs and demonstrate their efficacy on a basic Lotka-Volterra predator-prey population model. Next, I apply this approach to a more complex model for mosquito populations in the US, a problem of great importance to public health.

O.U.9 Bringing Broadway-Caliber Sound Engineering to UWL

Leo Chavolla

Mentor: Laurie Kinckman, Theatre & Dance

For this research project, I plan to observe and interview Broadway sound professionals to examine their technique for mixing complex musicals. This research is partly in preparation for my work on UWL's own production of the complex musical *James and the Giant Peach*, and partly for the benefit of sound engineering at UWL for the upcoming theatre technology and design students in the Theatre and Dance department. My research will consist of in-person experiential learning and interviews of sound professionals about not only their mixing strategy, but also about everything else that ensures their performance is consistently excellent. These methods will be supplemented with notes, voice memos and photography that I will later use to disseminate my findings to the Sound Engineering and Recording class in the spring of 2024. The nature of this research will require me to travel to Broadway in New York City to observe the sound professionals in their place of employment. Broadway is widely regarded as the most prestigious and competitive environment for musical theatre, thus the need to travel there to research their practices and how they can be applied to our productions at UWL. I have secured the agreement of four professional Broadway engineers to come to their workplace and shadow them for the purpose of my research. This presentation will include a practical demonstration of professional mixing techniques and advanced console programming and automation.

O.U.11 Wisconsin Challenges: Cheese Factory Indoor Air Quality and Illegal Large Bird Injuries

Richard Noble and Cameron Willcox

Mentors: Alysa Remsburg (Sustainability & Environmental Studies) and Gary Breidel (K&K Cheese, LLC)

A recent scientific study was carried out to evaluate the air quality inside a cheese factory to ensure workers' safety and well-being. The study focused on the particulate matter moved throughout the plant by exhaust fans and released into the environment. An AirBeam monitored particulate matter over four weeks to identify potential air quality issues in different factory rooms. Too much particulate matter can cause respiratory problems, eye irritation, and other health issues. The study highlights the need for regular indoor air quality monitoring in industrial settings to maintain employees' safe and healthy workplaces. The second project aimed to identify the causes of illegally injured and killed large wild birds in Wisconsin. Wisconsin's Green Fire advocates for science-informed natural resource policy at the state level. In recent years, wildlife rehabilitators have noticed an increase in anthropogenic-caused casualties against non-hunted wild birds. Various wildlife rehabilitation centers have provided data and information on causes of injury to birds they have received at their centers. Compiling this information from rehabilitation centers into one database is the focus of this plan phase. Once the data is collected and placed into a single source, it will become easier to see the causes of injury and death concerning the wild bird species.

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

O.U.12 Equine Life and Labor: Analysis of Bronze Age Horse Exploitation Practices within the Carpathian Basin

Simon Fichter

Mentor: Amy Nicodemus, Archaeology & Anthropology

Horses are unique among domestic animals due to their multitude of uses. What uses drove their rapid dispersal and widespread adoption during the Bronze Age in Eurasia is still not completely understood. One site with such early and large-scale adoption of horses is the Pecica Șanțul Mare site in Romania. The settlement belongs to the Bronze Age Maros culture (c. 2500-1500 BC). This study investigates the exploitation of horses within the site over time, offering insights into the development of early horse exploitation. By examining their relative abundance in the archaeological record, demography, and use-related pathologies, this research identifies patterns of horse exploitation over time, both in terms of intensification and specialization. Statistical analyses are expected to reveal a correlation between the economic complexity of the site and the degree of horse exploitation. This study contributes to our understanding of the pivotal role horses played in shaping economic and social structures during the Bronze Age in Europe.

O.U.13 Biased but Well-Behaved: Can Implicit Associations Detected by the IAT Predict Measurable Behaviors?

Katherine Osborne and Maggie Kaiser
Mentor: Alexander O'Brien, Psychology

The IAT's results are weakly correlated with behavior. Through training, we created implicit associations in participants between neutral stimuli (shapes) and positive/negative words. After completing an IAT to verify implicit associations, participants rated the aesthetic appeal of pictures with shapes embedded to determine if implicit associations translate to measurable behavior.

O.U.15 Public Engagement for Supporting Sustainability

Josh Hood and Travis Key
Mentor: Alysa Remsburg, Sustainability & Environmental Studies

Community engagement lies at the foundation of many sustainability efforts from data collection to advocating for local services and individual change. Encouraging the public to care about sustainability, and to participate in earnest, is a challenge that can be overcome by both offering incentives and reducing the barriers to participation. Within these experiences, La Crosse residents are incentivized to engage in sustainability through prizes and fun activities with the Green Goose Chase in addition to engaging individuals through the 2024 UWL Transportation and Commuting Survey that will be used to influence their local community in a way that will directly impact them. The Survey results will be mapped within ArcGIS Pro to inform the public about others' commuting habits and alternative commuting options available to them. Local businesses will be involved with the Green Goose Chase by donating prizes and incentivizing people to participate. The Green Goose Chase has seen an increasing number of participants in previous years, showcasing the positive benefit of incorporating fun and memorable experiences into education. Through these experiences we expect a greater awareness of sustainable transportation options and greater engagement from members within the La Crosse community.

Oral Session C1 11:00 am – 11:25am

O.U.16 Causes, Consequences, and Correlates of Intimate Partner Violence among College Students

Anna Fisher
Co-author: Shanna Felix
Mentor: Shanna Felix, Sociology & Criminal Justice

Intimate partner violence (IPV) is violence that is committed by a current or former partner in an intimate relationship against the other partner. IPV can include psychological, physical, sexual, and economic abuse. It has a detrimental effect on the wellbeing of the victim and affects millions of people across the globe, but college students are uniquely at risk. College students can be more susceptible to intimate partner violence due to a combination of factors related to their unique stage of life, social environment, and stressors. The objective of this research is to study the causes, consequences, and correlates of intimate partner violence among college students using the National College Health Assessment III data collected in 2022 by the American College Health Association (ACHA-NCHA III data). Variables included in this study are risky behavior, mental health, substance abuse, including alcohol and drug abuse, intimate partner violence experiences, experiences of violence, and more. It also includes demographic variables such as year in school, age, sex, and race. The data will be analyzed using IBM's Statistical Package for the Social Sciences (SPSS) using regression analysis.

O.U.17 The Effect of Expectations on Performance and Satisfaction

Jada Graham
Mentor: Alexander O'Brien, Psychology

Our expectations of the world influence the way we think about different situations. My study aimed to assess if expectations influence performance and satisfaction throughout different tasks. This study had two independent variables with two levels of each. Independent variable one was giving instructions in a way that put an expectation on the task.

This had two levels- negative expectations, or positive expectations. Independent variable two was difficulty of the task, with two levels- easy and hard. To begin, participants were asked to complete two tasks, one cognitive and one physical. The cognitive task consisted of math problems, and the physical task was a wall sit. The participants completed both tasks at one level or the other of each independent variable (e.g. completing both tasks with a negative expectation at the easy task level). Lastly, I gave a survey assessing relationship expectations vs. relationship satisfaction. This portion was separate from the others. For this, I created a survey assessing participants expectations of their own romantic relationships, and then assessed their relationship satisfaction. I was looking to see if there were any trends indicating whether or not personal expectations played a role in relationship satisfaction.

O.U.19 Restoring Biodiversity through Community and Environment Connections

Aubrey Schwonek and Blythe Pollard

Mentors: Alysa Remsburg, Sustainability & Environmental Studies, Siena Muehfeld (Franciscan Sisters of Perpetual Adoration), Melinda Knutson, Ph.D. (The Prairie Enthusiasts), Jonathan Rigden, M.D. (Friends of the Blufflands)

When managing land, it is essential to control invasive species and support native biodiversity. Without current human intervention, invasive species outcompete native plants for space and resources, reducing biodiversity and genetic diversity. Increased biodiversity ensures the resilience of the ecosystem by supporting native pollinators, reducing soil erosion, storing carbon, providing homes for native species, and creating a space for natural medicine and cultural connection for humans. Organizations such as Friends of the Blufflands, The Prairie Enthusiasts, and the Franciscan Sisters of Perpetual Adoration have contributed greatly to biodiversity efforts. Blythe Pollard has worked with the Friends of the Blufflands and The Prairie Enthusiasts to learn about and restore native spaces both on private land and on the native prairies in the Bluffs. Aubrey Schwonek partnered with the Franciscan Sisters of Perpetual Adoration to remove harmful invasive species at the Villa on St. Joseph Ridge and to restore the natural state of the ecosystem. This work has also given us experience in plant identification skills, restoration techniques, and has allowed us to deepen our connection to the environment. This restoration work will create a long-lasting positive impact on humans and all who interact with the land.

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

O.U.20 Perceived Barriers to Mental Health Help-Seeking for Older Adults

Noah Buck

Mentors: Dawn Norris and Nicholas Bakken, Sociology & Criminal Justice

This study explores the factors unique to older adults that act as barriers to seeking treatment for mental health concerns. Research shows that older adults with mental illnesses underutilize treatment services compared to younger adults with mental illnesses. There are some similarities in barriers between older and younger adults, such as race-related barriers, perceived usefulness of treatment, and perceived need for care. However, the literature indicates that some general differences between older and younger people likely translate to unique barriers for older adults. In-depth interviews of older adults 65+ with a history of mental health concerns will be used to provide greater detail about what prevents older adults with mental illnesses from seeking help. Having a better understanding of the perceived barriers to mental health care will allow changes to be made within mental health services and the providers to increase willingness to seek help for mental illnesses in older populations.

O.U.21 Facial Polar Plunge: Activating the Mammalian Divers Reflex

Nicholas Bruder

Mentor: Alexander O'Brien, Psychology

This experiment focuses on the Mammalian Divers Reflex (MDR), an involuntary physiological response to preserve energy and oxygen when mammals' faces are subject to cold water submersion. The MDR's mechanism of action is activating the parasympathetic and sympathetic nervous system, which has a lot of effects on the body, but the most important are bradycardia, slowed breathing, and peripheral vasoconstriction. The MDR specifically starts with activating the chemoreceptors around the nasal area of the face, these chemoreceptors transmit a signal to the brainstem using the

trigeminal nerve in the brain. This sets in motion a neuronal response through the vagus nerve, which ultimately activates the autonomic nervous system and sends signals to the target organs (Godek & Freeman, 2022). The existing body of literature has already established some of the various effects that can strengthen the MDR response, such as holding one's breath (Jerath et al., 2006) and degree of cold water (Nicol, 2022). However, no current research has examined how activating the MDR affects cognitive and physical abilities in humans.

O.U.23 Addressing Climate Justice through Communication and Sustainable Community Efforts

Bailey Boyer and Grace Lopez Johnson

Mentors: Alysa Remsburg, Sustainability & Environmental Studies, Beth Piggush (Franciscan Sisters of Perpetual Adoration), and Larry Slezniak (La Crosse Citizens' Climate Lobby)

The two projects described here explore the relationship communities have with the environment. Both of these projects aim to improve the community through an environmental justice lens. Environmental justice is a movement that seeks fair treatment and sustainability for all by addressing inequalities and fostering inclusive decision-making to create a balanced, healthy environment. Community needs were recognized by connecting a religious organization with environmental justice partners as well as building public momentum for climate policy at local and national scales. Many advocacy groups address similar problems but for different populations. One of our projects works to connect the La Crosse Franciscan Sisters of Perpetual Adoration (FSPA) with organizations serving disadvantaged populations as well as connecting them to each other. The benefit of connecting these organizations can be seen in the promotion of environmental justice policy or community cooperation. Similarly, the project with Citizens' Climate Lobby lobbies for renewable energy policies that benefit both the environment and the health of underserved communities. This advocacy includes reaching out to local community members, government representatives, and climate activists to communicate the need for social and environmental change. Project outcomes include a list of groups that could benefit from FSPA collaboration and op-ed pieces for the local newspaper highlighting environmental effort of communities.

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

O.U.24 Identifying Treponemal Disease, “The Great Mimicker”, in Medieval English Burials

Megan Moeller

Mentors: Timothy McAndrews and Constance Arzigian, Archaeology & Anthropology

The presence of syphilis and other forms of treponemal disease (*Treponema pallidum*) in Europe before contact with the New World was fiercely debated for decades. Now that it is definitively proven that it was present, there are other questions and aspects of the disease to be explored. This thesis gathers the descriptions of eleven reported cases of treponemal disease in Medieval English skeletons and analyzes them against a singular list of macroscopic (visible to the human eye) diagnostic criteria compiled by Brenda Baker, one of the leading researchers in pre-Columbian syphilis in Europe, and a multidisciplinary team. By doing so, it allows for easier comparison and the recognition of patterns of how the disease both presented and progressed in the bones across the case studies. By standardizing the analysis, this paper advances the understanding of the manifestations and effects of treponemal disease in medieval England by making similarities more readily apparent.

O.U.26 The Circadian Clock in Alzheimer's Disease

Gavin Hutchison

Co-author: Olivia Christensen

Mentor: Alder Yu, Biology

Alzheimer's Disease (AD) is a neurodegenerative disease with elusive pathology. Individuals with AD have been noted to have disturbances in their sleep wake cycling, which has been reported as a primary cause for institutionalization for AD patients. Alleviating sleep cycle disturbances in individuals with AD could result in improved quality of life and avoid institutionalization. A potential cause for these sleep disturbances is disruption of the circadian clock, a molecular clock regulating several bodily functions including sleep wake cycling. We explored the functionality of the circadian clock in a *Drosophila melanogaster* model of AD. Locomotor behavioral patterns of AD flies were assessed using the *Drosophila* activity monitoring systems. Assessment of AD fly locomotor patterns show loss of circadian behavior without

environmental cues, even after entrainment to a regular schedule. qRT-PCR was then used to assess functionality of the core circadian clock by measuring expression fold change of the gene period, a core clock gene. qRT-PCR of period in AD flies in constant darkness showed that the core circadian clock was functional despite the loss of circadian behavior noted in the activity monitoring experiment. Current investigations are exploring whether presence of the circadian clock has a protective effect against neurodegeneration. Surprisingly, preliminary results suggest that genetic ablation of the circadian clock may protect against cell death.

O.U.27 Let it Grow (LIG): Local Greenhouse Education & Community Outreach

Kelley Reed and Erika Holen
Mentor: Alysa Remsburg, Sustainability & Environmental Studies

Our projects aim to educate and advocate for healthy and sustainable food systems through learning and working in a greenhouse setting. Our results will be presented through a full food safety manual and the impacts on children within different educational levels. For Holen's contribution to LIG, the goals are to provide a comprehensive guide to growing and consuming microgreens for Franciscan Sisters of Perpetual Adoration. To measure this progress, Holen will be observing and analyzing the steps to produce microgreens safely and effectively to finalize a notable process. For Reed's contribution to LIG, Reed aims to expand knowledge on sustainable greenhouse practices by working directly in GROW's greenhouse to evaluate different plant species and hydroponic systems. This will involve prepping and interacting with field trips to further connect the La Crosse community to healthier foods. Our projects contribute to Let it Grow (LIG) works to influence gardening practices and encourage a connection between people and their food.

Oral Session D2 12:35 pm-1:00 pm

O.U.28 Accessibility of Diverse Children's Books in the Alice Hagar Curriculum Center

Sarah Hendrix
Mentor: Teri Holford, Library

Using data collected from a diversity audit done in the library, a web-searchable database was created with the help of Venue Communications. Education undergraduate students were surveyed to determine if they found the new diversity focused search system to be more effective and useful for their needs than the original Alma search system. The diversity of the content of the picture books and relevant non-fiction books of Alice Hagar Curriculum Center at UWL was found to be highly valued by the education undergraduate majors.

O.U.29 One Nation Controlled by The Media: Theatre Journalism and Its Influence on the Evolution of the American Musical

Val Fish
Mentor: Gregory Parmeter, Theatre & Dance

So long as there has been theatre in America, there has been criticism and theatre journalism. Whether it's newspapers, television, or even the internet, the media has been keen on critiquing and documenting the American musical. But do these critiques dictate which shows get remembered and which do not? And what is there to be said for less professional, amateur journalism and its influence? This project is predominantly focused on examining the influence of journalism on the whole to the musicals that do and don't stay in the public's memory, but also looking at how musicals have developed as a medium and a staple of American pop culture and have grown and changed alongside the mediums that present on it.

O.U.31 Midwest Fisheries Center Efforts to Combat Invasive Species and Monitor Fish Health

Logan Mechler and Sebastian Bishop

Mentors: Alysa Remsburg, Sustainability & Environmental Studies, Christina Dahl (U.S. Fish and Wildlife Service), Ross Ruehmann (U.S. Fish and Wildlife Service), and Cory Puzach (U.S. Fish and Wildlife Service)

This presentation includes projects conducted by the US Fish and Wildlife Service (FWS) Midwest Fisheries Center to improve fish populations and aquatic biodiversity. The goal of this work is to show two different perspectives on how the FWS is contributing to ecosystem health. One project is focused on mapping radio telemetry data of invasive carp travelling between pools in the Upper Mississippi River System. The map/maps are intended to inform the public about the increasing number of invasive carp in the waters used for recreation. Anticipating the density of invasive species suggests to wildlife refuge managers how they might affect the river ecosystem. Another project is observing fish health by monitoring pathogens present in the national, state, and tribal fish hatcheries across the Midwest. By watching these populations for harmful diseases and parasites, they can prevent their continued spread.

GRADUATE STUDENT ABSTRACTS

GRADUATE POSTER PRESENTATION ABSTRACTS

Poster Session A 7:45 am – 8:50 am

A.G.19 Ideal Crystalloid Solution for Fluid Resuscitation in Diabetic Ketoacidosis Management

Julianne Brandes and Courtney Funk
Mentor: Karen Hayter, Health Professions

Diabetic ketoacidosis (DKA) is a medical emergency consisting of a triad of metabolic acidosis, ketosis, and hyperglycemia. Patients in DKA have severe electrolyte disruptions and symptoms that include altered mental status, nausea, vomiting, and, without proper treatment, can result in death. Fluid resuscitation is a hallmark of treatment, with isotonic saline (IS) as the current standard. Some studies suggest using balanced electrolyte solution (BES) due to its composition more closely matching human plasma, which could lead to a shorter time to resolution of DKA. Medical literature was searched for systematic reviews/meta-analyses comparing the outcomes of treating with IS versus BES, to guide treatment in a case involving a 36-year-old woman with a history of Type 2 diabetes who is admitted to the hospital with a diagnosis of DKA. Studies had mixed results regarding the statistical significance of improved outcomes with BES, but there is a potential for reduced time to DKA resolution without adverse effects, suggesting clinical importance. One study found a difference of 3.9 hours ($p=0.002$) between the treatment groups. Due to the potential clinical benefit and lack of complications, implementation of BES in standard DKA treatment protocols is recommended.

A.G.20 Low-Intensity Aerobic Exercise: A Promising Intervention in Young Adults with Sport-Related Concussions for Quicker Return to Play

Samuel Brill and Jack Hoaby
Mentor: Karen Hayter, Health Professions

Sports-Related concussions (SRCs) are common in young athletes across any sport. Symptoms include physical and mental manifestations like headache, mood disturbances and trouble concentrating. Many providers recommended strict physical and cognitive rest until a patient is symptom free for 24 hours. However, recent data supports the use of low-intensity aerobic exercise as soon as tolerable for more effective concussion recovery. The patient is a 20-year-old male who suffered a SRC looking to return to play as soon as possible. To find this information and apply it to the patient, a literature search was performed using PubMed and MEDLINE databases. Six peer-reviewed articles were found. Overall, early administration of low-intensity aerobic exercise in the recovery process resulted in a shorter return to play as well as reduced post-concussion symptoms more rapidly. One study even found an average of a 22-day reduction in return-to-play time in a control group that underwent low-intensity aerobic exercise. Additionally, no adverse effects were noted when administering this intervention. Given that all reviewed articles provided the same consensus, early administration of low-intensity aerobic exercise 24-48 hours post-concussion was recommended in a young adult with an SRC.

A.G.21 Impact of External Load on Patellofemoral Joint Stress during Squatting in Healthy Adults

Weston Bartsch, Mason Kauffman, Josh Desorcy, Carly Coulthart, Mike Kowitz, and Casey Breunig
Mentors: Steni Sackiriyas and Thomas Kernozek, Health Professions

Introduction: Squats have the potential to heighten Patellofemoral Joint Stress (PFJS). Yet, the influence of gradual increased external loads on the PFJS during squats remains relatively unexplored. This study aims to contrast PFJS levels during squatting with gradually increased external loads among healthy adults. Methods: Thirty-three healthy adults (18 to 30 years) participated in this research study. We collected kinematic and kinetic data using a three-dimensional motion capture system and force platform at a frequency of 180 Hz and 1800 Hz, respectively. Using a musculoskeletal model, we assessed muscle forces through static optimization. We used a patellofemoral model to estimate PFJS. Discussion: Our analysis will focus on assessing the impact of external load variation on PFJS during squatting in healthy adults and we will also compare the findings among both males and females. The findings from this study can provide valuable insights for clinicians and athletes, aiding in the selection of an optimal level of knee stress during squat training.

A.G.22 Comparison of Lower Extremity Joint Torques and Muscle Forces under Weighted Vest Added Loads during Dynamic Activities

CJ Charniak and Emily Stern
Mentor: Drew Rutherford, Health Professions

Motion capture devices are commonly paired with force platforms to collect data used to estimate joint torques and muscle forces during dynamic activities. The purpose of this study is to examine how joint torques, muscle forces, and coordination strategies may differ with additional body loads from an equally distributed weighted vest during the dynamic tasks of squats, drop jumps, and countermovement jumps. It is hypothesized that joint torques, and muscle forces will increase linearly as the load of the weighted vest increases up to 15% of the participant's body weight. Data were collected from 20 healthy males and females (18–30-year-olds) using a 3-D motion capture system (Motion Analysis Corp., Rohnert Park, CA). Participants performed 5 repetitions of each task at normal body weight, 10% body weight, and 15% body weight for a total of 45 trials during the session. Future analysis will compare joint torques of the hip, knee, and ankle, and various muscle forces within the lower extremities during the three dynamic activities at the different weighted conditions. This information will help to understand if the addition of load from a vest negatively alters coordination strategies and the loads experienced by lower extremity joints and muscles.

A.G.23 TEAM UP: An Evidence-Based Recreational Therapy Curriculum for Adolescents with Intellectual Disabilities to Improve Social Skills through Team Sports

Paige Coleman
Mentors: Namyun Kil and Katherine Evans, Recreation Management & Recreational Therapy

Recently, a large emphasis has been placed on promoting social skills in adolescents with intellectual disabilities. The main social skills are conversation skills, facial expression and body language, social cues, social rules, sharing, and problem solving. Team sports is a specific intervention that has been proven to have positive effects on adolescents with intellectual disabilities. Team sports can increase an individual's social skills and build connections. TEAM-UP is an eight-week evidence-based curriculum grounded in The Social Learning Theory. Using the four components of The Social Learning Theory, this curriculum focuses on attention, retention, motor reproduction, and motivation. This program will occur once a week for eight weeks. The sessions will encourage participants to learn social skills, build connections, and how to maintain those connections through playing team sports. Each session will be 60 minutes long and will consist of a warm-up exercise, learning activity, team sport intervention, and a debrief. Each session, participants will learn a new social skill to work on for that session. Using team sports as an intervention will not only improve social skills but teach participants how to play sports and work as a team. Throughout this graduate project, I will be utilizing previous and future research to build a framework for the development of an evidence-based curriculum.

A.G.24 Splash Zone: Skills to Promote Lasting Awareness of Safety and Health

Mya Ellis
Mentor: Lindsey Kirschbaum, Recreation Management & Recreational Therapy

Aquatic therapy has been shown to be an effective intervention for individuals during occupational and physical therapy programs. Current research shows that after engaging in aquatic interventions, there is an overall improvement among skills across various domains including swim skills, social skills, control skills, and motor skills.^{1,2} Although there are studies that indicate improvements, there is limited research within the field of recreational therapy for aquatic therapy interventions. To assist in bridging the gap, Splash Zone was created. This evidence-based adapted aquatic curriculum, intended for children aged 3-12 with intellectual and developmental disabilities (IDD), utilizes Albert Bandura's Social Learning Theory. Each session is designed to implement evidence-based aquatic interventions to increase water safety skills and independence. This curriculum will be facilitated by a Certified Therapeutic Recreation Specialist (CTRS) over an eight-week period, with each session lasting 60 minutes. The group will meet one time a week in-person at a community-based facility. The Water Orientation Test Alyn 1 (WOTA-1) will be administered pre- and post-program to measure an individual's progress regarding mental adjustment and function within the water.³ Program goals include increasing adjustment in the water, breath control, independence with functional skills, and positive peer and staff relationships.

A.G.25 Purposeful Paws Recreational Therapy Curriculum

Abigail Fleischmann

Mentor: Tara Delong, Recreation Management & Recreational Therapy

Neurocognitive diagnoses is an umbrella term that encompasses a significant decline in at least one of the domains of cognition which include executive function, complex attention, language, learning, memory, perceptual-motor, or social cognition. This can result in an individual with a neurocognitive diagnosis being very reliant on caregivers or direct support professionals. Because of this, it is common for individuals with neurocognitive diagnoses to have high levels of anxiety and depression and social isolation. The Purposeful Paws Recreational Therapy Program is an evidence-based curriculum utilizing socially assistive robot animals that is designed for individuals with neurocognitive diagnoses. By utilizing the theoretical framework of Robert J. Havighurst's Activity Theory of Aging, this eight-week program will provide one-hour sessions that focus on increasing social interaction, expanding decision-making abilities, and enhancing awareness of personal values. The ultimate goal is to increase each participant's overall quality of life. The General Happiness Scale and the Engagement in Meaningful Activities Survey will be used to track effectiveness of the program using a pre-posttest design.

A.G.26 Feasibility Study: Make Something G.R.E.A.T. Therapeutic Cooking Program for Youth with Intellectual and Developmental Disabilities (IDD)

Abigail Fleischmann and Mikayla Guldan

Mentor: Jennifer Taylor, Recreation Management & Recreational Therapy

Individuals with intellectual or developmental disabilities (IDD) experience lower levels of self-determination compared to their peers without IDD.¹ Self-determination, or the ability to make choices and have control over one's life, is crucial for navigating the challenges of daily life for this population.² Recognizing this need, there is a growing call for evidence-based programs tailored to enhance self-determination among adults with IDD (e.g. therapeutic cooking programs).² Make Something G.R.E.A.T. cooking program is an evidence-based recreational therapy curriculum informed by the Adapted Active Engagement Model (AAEM) and Self-Determination Theory.^{3,4} Make Something G.R.E.A.T. was originally developed for ages 18-24, due to community partner constraints, we adapted the program for ages 12-17. Due to these adaptations, we conducted a feasibility study in fall 2023 to evaluate the program with eight participants, facilitated by recreational therapy graduate students, and funded by a UWL RSEL Mini Grant. Data collection included field notes and post-session debriefs with facilitators, documenting lessons learned and identifying implementation challenges and strengths. Community partner staff provided additional feedback, contributing to ongoing program refinement. Results indicated positive perceptions including session format, recipes, and discussion questions. Recommendations included dividing the participants into smaller groups and a different assessment.

A.G.27 The Effect of Exercise Choice on Bladder Base Displacement in Healthy Females

Brooke Leone, Mary Johnson, and Claire Mettler

Co-authors: Maddie Graefe, Lauryn Greenfield, Carly Gifferson, Salvador Jaime, and Daniel Sweetman

Mentor: Patrick Grabowski, Health Professions

Introduction: Pelvic floor muscles (PFM) support many organs including the bladder. Decreased activation of the PFM is associated with increased risk of bladder or fecal incontinence and pelvic organ prolapse. PFM activation can be assessed by the magnitude of bladder base displacement measured with transabdominal ultrasound (TAUS). The purpose of this study was to find which exercise produced the greatest bladder base displacement. **Methods:** 20 healthy females were instructed to do each of the three exercises (kegel, hip abduction, hip adduction) randomly to see which exercise would produce the strongest PFM contraction. Each exercise had three trials with 30s rest between each trial and 2 mins rest between each exercise. A TAUS transducer was placed suprapubically, and images were taken at rest and peak contraction for each trial. These were post-processed to determine bladder base displacement. A one-way repeated measures ANOVA with post-hoc tests were conducted to examine differences. **Results:** Of the three exercises, the kegel showed the greatest bladder displacement with 0.34 cm compared to hip abduction (0.00 cm, $p < 0.05$) and hip adduction (0.03cm, $p < 0.05$). Hip abduction and hip adduction showed no significant difference in displacement. **Conclusion:** Kegel exercise elicits the most bladder displacement with activation of the PFM. In physical therapy practice, this will guide effective treatment in the best exercises to activate and strengthen the PFM for function.

A.G.28 Blood Flow Restriction Effects on Pain Pressure Thresholds and Beta Endorphin

Brooke Leone and Alex Turner
Mentor: Patrick Grabowski, Health Professions

Introduction: Recent research suggests that isometric exercise with blood flow restriction (BFR) has a post-exercise analgesic effect on the ipsilateral and contralateral Achilles tendon. This is clinically useful for the treatment of individuals limited by pain due to physiological changes to the tendon caused by Achilles tendinopathy, however the mechanism for this effect remains unclear. The impact of isometric exercise with BFR on circulating beta endorphin has not been researched and may provide further insight on clinical relevance for individuals with tendinopathy. Methods: Participants performed a unilateral isometric calf exercise on their dominant leg under conditions with and without BFR on two separate occasions. To assess the analgesic effect of this exercise, venous blood draws (VBD) and pain pressure threshold (PPT) were measured prior to, immediately after, and 15 minutes after exercise. BFR was completed using the Delfi tourniquet system (Delfi Medical Innovations, Inc., Vancouver, BC) on the proximal calf of the dominant leg inflated to 65% occlusion. The non-BFR condition was completed with the tourniquet placed on the proximal calf without occlusion. Results: Currently results are pending. However, based on previous research in other body regions we expect outcomes to include increases in PPT and biomarkers that may explain why.

A.G.29 STRIDE Toward Success: An Evidence-Based Recreational Therapy Community Walking Program for Individuals Who have Experienced a Stroke

Katy Jennings
Mentor: Jennifer Taylor, Recreation Management & Recreational Therapy

Individuals who have experienced a cerebrovascular accident (CVA), commonly known as a stroke, have had a blood vessel within their brain become blocked or ruptured. This can result in brain cell damage or death, leading to various symptoms depending on the affected area of the brain. Strokes may impact physical, cognitive, emotional, and social well-being, thus creating a need for innovative approaches to address these health factors. STRIDE Toward Success is an evidence-based curriculum designed to increase independence and well-being for individuals who have experienced a stroke. This will be implemented in person during 60-minute sessions, once a week for 8 weeks. After programming concludes, participants are provided with a toolkit to encourage the continuation of walking. The curriculum utilizes the Self-Determination Theory as the theoretical framework to increase overall well-being for the participant. The Psychological Need Satisfaction in Walking Scale (PNSWS) measures the levels of autonomy, competence, and relatedness within the participants and will be used in a pre-posttest design. Program outcomes include increased autonomy, increased competence in walking ability, and increased relatedness with others. STRIDE Toward Success aims to advance recreational therapy through the development of an evidence-based community walking program for individuals who have experienced a stroke.

A.G.30 Making W.A.V.E.S.: An Evidence-Based Recreational Therapy Curriculum for Adults with Spinal Cord Injury

McKenna Jens
Mentor: Lindsey Kirschbaum, Recreation Management & Recreational Therapy

Each year, between 250,000 and 500,000 people experience a spinal cord injury (SCI) around the world. SCI is defined by the National Institutes of Health (NIH) as damage to the nerves and nerve fibers that send and receive signals from the brain, causing temporary or permanent changes in feeling, movement, strength, and body functions below the site of injury.² Individuals who have obtained a traumatic injury to their spinal cord often experience a plethora of physical and psychosocial issues including impairments in range of motion, muscle strength, sensation, muscle tone, balance, and endurance.³ Making W.A.V.E.S. is an evidence-based recreational therapy curriculum intended for adults with SCI to assist in reaching goals related to balance, gait, and ambulatory function. Each session of this program utilizes the framework of the Self-Determination Theory (SDT). Supported by the 3 conditions of autonomy, competence, and relatedness, SDT broadly frames the study of human motivation and personality and focuses on the effect of social and cultural factors on human initiative.⁴ Participants who complete this program will have their skills measured by the Functional Gait Assessment (FGA) and the Berg Balance Scale (BBS) in a pre-test/post-test design. This curriculum will be implemented in an outpatient clinical setting by a Certified Therapeutic Recreation Specialist (CTRS) during 60-minute sessions, once a week, for 8 consecutive weeks.

A.G.31 Family-School Partnerships: Perceptions of School Satisfaction and Family Involvement

Megan Feist
Co-author: Ruth Schumacher-Martinez
Mentor: Ruth Schumacher-Martinez, Psychology

A positive collaborative relationship between home and school has been found to have a strong influence on student achievement (Henderson & Mapp, 2002). Although there continues to be a mismatch between family and school perspectives on what it means for parents to be involved, families often report general satisfaction with their child's schooling (Hanson & Pugliese, 2020). The present study is aimed to explore the relationship between family involvement behaviors and their perceived level of school satisfaction. Families from a Midwestern School District will be asked to complete the Elementary ($\alpha = .84-.91$) or High school ($\alpha=.76-.90$) version of the Family Involvement Questionnaire (Grover et al., 2016; Manz et al., 2004) and a School Satisfaction Survey ($\alpha = .88$) (Jackson et al., 2021). Pearson correlations will be run to examine the bi-directional relationship between types of family involvement behaviors and school satisfaction as previous research has yet to identify whether family involvement leads to greater satisfaction or vice versa. A content theme analysis will also be utilized to examine qualitative, open-ended question data regarding important aspects families value in their family-school partnership as well as ways schools can support families in meeting their involvement needs.

A.G.32 Hypothyroidism Treatment with Monotherapy vs. Combination Therapy

Micah Link and Alana Gilles
Mentor: Karen Hayter, Health Professions

Hypothyroidism is a disease characterized by a dysfunction in the thyroid gland and therefore inadequate production of thyroid hormones. Hypothyroidism can manifest as fatigue, weight gain, constipation, cool and dry skin, coarse hair, and bradycardia. Current guidelines have overwhelmingly recognized levothyroxine (LT4) monotherapy as the standard treatment because it has proved effective in normalizing thyroid hormones and stabilizing symptoms. However, combination therapy (LT4/LT3) has gained academic interest as an alternative method of treating hypothyroidism. The focus of this applied research study was to compare the newly recognized combination therapy to the current standard treatment. PubMed was utilized to obtain the literature for this study. Upon analysis of efficacy of the two treatments, the outcomes of thyroid hormone levels, patient reported symptoms, and psychological evaluation were investigated. Comparing combination therapy to monotherapy illustrated minimal differences in all three outcomes which did not result in a meaningful difference [$p=0.12$, 95% CI (-0.52-0.06)]. For young adult females without comorbidities recently diagnosed with primary hypothyroidism, the recommendation is that the patient initially be treated with monotherapy and consider combination therapy as an alternative treatment option.

A.G.33 Move Together: Evidence-Based Physical Recreational Therapy Curriculum for Children with Spina Bifida and Cerebral Palsy

JenniMae Mook
Mentor: W. Thomas Means, Recreation Management & Recreational Therapy

Cerebral palsy (CP) is caused from injury to the developing brain, typically occurring before, during, or shortly after birth resulting in difficulties with movement and posture. Spina Bifida (SB) is the most frequently seen congenital deformity of the neural tube. Children with CP and SB have limitations when it comes to physical activity. Through the Move Together curriculum, children with SB and CP can learn different leisure activities to increase their perception of their physical well-being and participation in physical activities. By utilizing the Self-Determination Theory as the framework with support from The Health Protection/Health Promotion Model, each session is designed to utilize evidence-based strategies to meet the goals of the curriculum. The goals are for participants to increase autonomy, competence, and relatedness related to perceived physical well-being as well as contribute to the lack of evidence-based practice in the field of recreational therapy. The curriculum will be implemented in-person during 75-minute sessions, once a week for eight weeks, at an outpatient children's hospital program, by a Certified Therapeutic Recreation Specialist (CTRS). The Psychological Need Satisfaction in Exercise Scale and Perceived Competence Scale- Maintaining Leisure Involvement will be used to evaluate if the program addressed the needs of these populations.

A.G.34 Perceived Sense of School Connectedness: The Mixed-Race Student Experience

Andrea O'Bryon
Mentor: Jocelyn Newton, Psychology

School connectedness is essential for all students in the school environment, particularly for students of color. During adolescence, the need to feel seen in others and in the surrounding environment is prevalent, highlighting the need to explore the experiential reality of high school students' perception of school connectedness. This study intends to compare the experiential realities of Mixed-Race and White students' perceived sense of school connectedness in a Midwestern high school environment.

A.G.35 Bleeding Risk Associated with Warfarin and DOACs in the Treatment of Pulmonary Embolism

Lauren Perry and Lauryn Hamernik
Mentor: Karen Hayter, Health Professions

A pulmonary embolism (PE) is a serious and life-threatening diagnosis that occurs due to a blood clot in a pulmonary vessel. Historically, a PE has been treated using traditional anticoagulation medications, including Warfarin. Recently, Direct Oral Anticoagulants (DOACs) have been gaining popularity for anticoagulation treatment due to their ease of use and less drug-drug interactions. When prescribing anticoagulation medication, the adverse effect of bleeding needs to be considered. This case focused on a 75-year-old male who has been diagnosed with a PE and concurrent pneumonia. Applied research was conducted and multiple types of studies, including systematic reviews and meta-analyses were reviewed, that assessed bleeding risk with the anticoagulation treatments discussed above. Overall, there was inconclusive evidence throughout the studies pertaining to which treatment is superior. An earlier study from 2016 concluded statistical significance in the difference in bleeding risk between Warfarin and a DOAC [HR 0.70 (0.61-0.79)], while the most recent Cochrane Review (2023) found no statistical significance [OR 0.50 (0.15-1.68); OR 0.71 (0.36-1.41)]. Due to conflicting evidence supporting the use of one anticoagulant over the other, this patient should be placed on a DOAC due to ease of use and no evidence showing increased bleeding risk.

A.G.36 The Superiority of EVAR Compared to Open Repair in Patients with AAA And CAP

Ahna Stelter and Rachel Passow
Mentor: Karen Hayter, Health Professions

An abdominal aortic aneurysm (AAA) is an abnormal dilation of the abdominal aorta diagnosed by a diameter ≥ 3 cm on imaging. Ruptured AAAs are fatal if not immediately repaired. Surgical options for repair include endovascular aortic repair (EVAR) and open surgical repair (OSR). This applied research study compared the mortality rates of EVAR and OSR. A literature review was performed using articles obtained through PubMed. Systematic reviews (SR), meta-analyses (MA), and retrospective cohorts were the study designs investigated. Odds ratios, hazard ratios, and NNT were explored. A decrease in 30-day mortality with EVAR repair was observed (OR 0.5; 95% CI 0.34-0.74; $p < 0.001$, $I^2 = 0\%$) with a subsequent NNT of 34 patients. The relative risk of OSR compared to EVAR was 3.22 (95% CI 2.95 - 3.51; $p < 0.001$). Additionally, one MA found that patients with increased comorbidities had a lower mortality rate when treated with EVAR compared to OSR. In this case, the patient presented to the emergency room with pneumonia and an AAA developed. According to the literature review, in patients 65 and older with pneumonia and an AAA, EVAR repair is the most beneficial intervention to reduce postoperative mortality.

A.G.37 Comparing Lower Extremity Biomechanics and Muscle Forces in Overground vs. Treadmill Running in Community Runners

Shelby Thicke, Christonna Shafranski, McKenzie Vanyek, and Mia Schmidtke
Mentor: Drew Rutherford, Health Professions

The purpose of this study was to compare overground running versus treadmill running to identify potential differences in muscle forces and lower extremity biomechanics. This study aims to verify that an individual's biomechanics are similar between overground running and treadmill running to assist with efficiency of future gait studies. Participants were examined using a Treadmetrix instrumented treadmill (Park City, UT) and timing gates during overground running. Both used a 3-D motion capture system (Motion Analysis Corp., Rohnert Park, CA). This study is a continuation of a previous study done with an expansion in the age range from 18-35 to 18-65 that examined healthy males and females.

Participants must have run at least 10 miles per week. Analysis will be investigating joint angles and torques at the hip, knee, and ankle to better understand the similarities between overground and treadmill running.

A.G.38 Comparison of Achilles Tendon Cross Sectional Area Between Dominant and Non-Dominant Lower Extremities in Female College-Aged Recreational Runners

Kaelyn Wagner, Maria Turco, and Meghan Fraser

Co-author: Thomas Kernozek

Mentor: Thomas Kernozek, Health Professions

Increased loading to the Achilles tendon occurs in runners due to the repetitive action of single leg bounding. While running is a bilateral activity, Achilles tendon injuries often occur unilaterally. The purpose of this study was to compare the Achilles tendon loading and cross-sectional area (CSA) between dominant and non-dominant lower extremities (LE) in female runners. It was hypothesized that the non-dominant LE would show an increased CSA. Participants include 16 healthy, college-aged females. The protocol requires the participant to run on an instrumented treadmill with marker tracking and receive an ultrasound of the Achilles tendon bilaterally. There was no significant difference in loading or CSA between dominant and non-dominant LE. However, there was a significant difference in foot strike angle. This supports the idea that female runners strike the ground differently with their foot between the dominant and non-dominant LE, which may contribute to unilateral Achilles tendon injuries. However further research must be conducted to further specify clinical relevance.

A.G.39 Power of Pickleball: An Evidence-Based Therapeutic Recreation Curriculum

Emma Zibble

Mentor: Lisa Savarese, Recreation Management & Recreational Therapy

Individuals with disabilities, in general, are excluded or experience barriers to social and physical activities which creates negative impacts on their physical and psychosocial health.¹ Participating in community based recreational sport programs that are adapted and modified appropriately for the specific physical disability may contribute to optimal development, increased social and psychological outcomes, and increased self-efficacy. Pickleball is a sport intervention that is inclusive to all ages and abilities. It is a lifelong sport that can enhance an individual's quality of life, social support, coping skills, and autonomy. Power of Pickleball is an eight-week evidence-based curriculum that is grounded in Self-Efficacy Theory. Self-efficacy focuses on mastering skills, social role models, positive feedback, and support, and managing emotional and physiological states which correlates with the leisure involvement and psychological dimensions. By utilizing a skill building framework for each session, individuals will be able to master each pickleball skill and grow their self-efficacy throughout the process. The framework of the sessions will provide role model support, encouraging feedback, goal setting, and skill development which targets each area of the Self-Efficacy Theory. This curriculum is intended for adults with physical disabilities and for practitioners within the field to utilize for evidence-based practice.

A.G.40 Open Doors: An Evidence-Based Recreational Therapy Communication Program for Youth in a Correctional Facility

Anna Alvey

Mentor: Jennifer Taylor, Recreation Management & Recreational Therapy

Every day, roughly 60,000 youth are incarcerated in correctional facilities in the United States. Youth in correctional facilities are more likely than their nonoffending peers to have a mental health diagnosis. Mental health encompasses behavior disorders that are internalized like anxiety and depression or externalized such as aggression and conduct behaviors.² These mental health conditions then negatively impact communication skills, connection with others, and self-efficacy. Importantly, research indicates that youth offenders have communication challenges that hinder their ability to navigate the juvenile justice system and reentry into society.² This creates a need to provide youth with the skills to address these challenges. Open Doors: Communication is Key, is an evidence-based Recreational Therapy curriculum that aims to teach communication skills while increasing self-efficacy for youth in correctional facilities. This is crucial because communicating well allows for individuals to ask for what they need, leading to increased self-efficacy. As a result, higher self-efficacy lowers instances of violence and self-destructive behaviors. By utilizing Bandura's Self-Efficacy Theory, each Open Doors session is designed to foster a sense of self-efficacy. Program outcomes measured with the General Self-Efficacy Scale. The curriculum is implemented for 60 minutes, once a week for 8 weeks, by a Certified

Therapeutic Recreation Specialist (CTRS). Moreover, the goal of this program is to further develop evidence-based practice within the therapeutic recreation field.

Poster Session B
8:50 am – 9:45 am

B.G.35 Interleukin-1 Receptor Antagonists in Treatment of Acute Pericarditis

Lucas Andersen and Lynzi Stauder
Mentor: Karen Hayter, Health Professions

Acute pericarditis is the inflammation of the pericardium, most commonly caused by viral infections. A common complication of pericarditis is recurrence, occurring in 15 to 50% of patients. The first line therapy for pericarditis is NSAIDs plus colchicine to reduce inflammation, with corticosteroids as a second line therapy. Interleukin-1 (IL-1) receptor antagonists are recognized as an alternative third line therapy for recurrent pericarditis. The case is a 40-year-old male who presents to the ER with substernal pleuritic chest pain, pericardial friction rub on exam, and is diagnosed with pericarditis. This study is exploring the efficacy of IL-1 antagonists compared to the first line therapy of NSAIDs plus colchicine at resolving pericarditis. Databases searched include PubMed and Cochrane, filtering for high quality literature and case reports within the last 10 years. Based on the articles gathered, IL-1 antagonists are effective in the treatment of recurrent pericarditis, however there is limited data directly comparing its efficacy to the first line treatment as well as limited data of its use in the setting of acute pericarditis like the patient in the case. Because of this, IL-1 antagonists should not be the first choice for patients with acute pericarditis. Should they develop recurrent pericarditis, IL-1 antagonists are a viable treatment option, particularly if other therapies have failed.

B.G.36 Comparing Self-Efficacy of In-Person vs. Virtual School Psychologists

Katie Banie
Co-author: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

The emergence of virtual school psychology practice has led to increased efficiency and flexibility of the role, as well as the promise of addressing shortages. However, more research is needed to examine these innovative practices within legal and ethical frameworks, to ensure equitable services for all students and families. The current study aims to identify practitioners' service modality and self-efficacy in conducting professional practices while comparing a sample of in-person and virtual school psychologists.

B.G.37 Rural Mental Health: School Psychologist Self-Efficacy of Counseling

Jessica Brinkman
Mentor: Robert Dixon, Psychology

Mental health challenges continue to impact children and youth with an estimated prevalence of 1 in 6 children between 2 and 8 having a diagnosed mental, behavioral, or developmental disorder (CDC, 2023). Further, incidences of anxiety and depression almost double as children grow from childhood to adolescence, becoming an area to prioritize (Berryhill et al. 2022; CDC, 2023). With 50% of the lifetime mental health conditions beginning at age 14 and the average delay of the onset of symptoms to treatment is 11 years (NAMI, 2023), it is critical for rural areas to consider the options and expertise of school psychologists for treatment when they have less access to specialized providers (Morales et al. 2020).

B.G.38 Fidaxomicin Cures *Clostridium difficile* More Often, with Less Recurrence, than Vancomycin

Garrett Curler and Carson Borgstrom
Mentor: Karen Hayter, Health Professions

Clostridium difficile infection (CDI) is a common complication of inpatient antibiotic treatment resulting in copious diarrhea. Particularly in elderly or hospitalized patients, CDI commonly recurs contributing to its significant morbidity and mortality. For many years, standard treatment utilized metronidazole (MTZ) or vancomycin (VCM). Guidelines recently changed favoring fidaxomicin (FDX) and vancomycin with metronidazole no longer a first-line treatment. This

applied research study examined the advantages and disadvantages of FDX and VCM in treating a 78-year-old female with CDI subsequent to antibiotic therapy for community-acquired pneumonia (CAP). Searches of PubMed and Cochrane Library were utilized. Research shows that FDX achieves global cure for CDI more often than VCM (RR= 1.18, 95% CI=1.09-1.26), and that FDX has a lower recurrence rate than VCM (RR=0.59, 95% CI=0.47-0.75). Despite its greater effectiveness, FDX is not always the preferred treatment as it is more expensive than VCM or MTZ. Additionally, in severe cases of CDI there is no statistically significant difference between FDX and VCM. It is important to ensure treatment for CDI does not conflict with the antibiotic treatment for CAP. In the absence of severe CDI or contraindicating antibiotic treatment for CAP, the recommendation is that the patient receive FDX.

B.G.39 Using Wise Feedback Intervention to Improve Parent and Teacher Communication

Lauren Eiselt
Mentor: Jocelyn Newton, Psychology

School psychologists work on behalf of students, families, and educators to develop a shared understanding of students' performance (Reschley & Christianson, 2012). It is critical that school psychologists know and use best practices when working with teachers and parents. The current study looks at an intervention aimed to enhance family and school partnerships. Results of this study will inform school psychologists regarding approaches to maintaining positive and strong teacher - parent communication.

B.G.40 Evaluation of an Interoception Curriculum at a Tier 1 Level

Maya Gorges
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

Supporting students experiencing dysregulation has overtaken the role of many school psychologists within the field. The ability to regulate is crucial for students to successfully meet expectations within an educational setting. Dr. Kelly Mahler's "Interoception Curriculum: A Step-by-Step Framework to Developing Mindful Self-Regulation" provides direct teaching of interoceptive skills that support self-regulation. The following study evaluated the curriculum's effectiveness in building emotional awareness and self-regulation when implemented at a Tier 1 level. When comparing pre- and post-student data on the MAIA-Y, the subscales of Emotional Awareness and Self-Regulation had both clinically significant differences as well as large effect sizes.

B.G.41 UWL Neurological Support Group

Molly Barnhardt, Anna Penkwitz, Jenelle Higgins, Callie Olson, and Jenna Timm
Mentor: Erin McCann, Health Professions

University of Wisconsin-La Crosse Occupational Therapy students will lead the UWL Neurological Support Group from February to March of 2024. This program is divided into five sessions of 75 minutes each and participants are encouraged but not required to join every week. Participants will engage in activities such as decorating cookies, exercise groups, leisure exploration, and coping strategies, and will receive education on adaptive equipment and community resources. This client-centered program has been designed to address the needs and gaps in service in populations with neurological conditions identified through research and community outreach. The purpose of this support group is to promote social participation, support mental health, and increase quality of life through activities that are adapted to fit the needs of individuals with neurological conditions.

B.G.42 REACHing Your Goals

Amelia Bates, Kenley Pehrson, Shalynn Griesmer, Valerie Johnson, and McKinsey Vrana
Mentors: Kim Servais (Health Professions) and Gretchen Clements, LPC, CSW (St. Clare Health Mission)

The REACHing Your Goals group was created to support and engage local underserved individuals in La Crosse, WI. These individuals deserve the same opportunities as the general population to participate in meaningful activities and feel a sense of belonging in the community. The goals of this program were that participants will improve their sense of belonging by participating in socialization and reflection activities, develop life skills needed to maintain their health and professional skills, and improve their sense of wellbeing to support instrumental activities of daily living. These goals

were measured with the use of the Modified Neuro-QoL Positive Affect and Well-being Likert scale. A goal of an increase of ≥ 5 points from the end of the program was desired. Pre session mood was tracked to allow participants and leaders to identify what mood they were bringing into the session. Mood changes were tracked post session to quantify effects of group activities on mood. These goals were accomplished through the sessions titled You Belong Here, Life Skills, Sensory Exploration, Professional Development, and Coping With Change and Leisure Exploration. This program was a partnership with St. Clare Health Mission, carried out at the Reach Center in La Crosse. This program was unique to the Reach Center as they don't have any occupational therapy-based programs.

B.G.43 The Sensory Safari: Where Sensory Meets Adventure!

Alissa Benson, Carly Richter, Allison Cuddihy, and Carrie Fowle
Mentor: Kim Servais, Health Professions

The Sensory Safari is a 5-week group program for adults with disabilities receiving services at Aptiv. Aptiv is an organization with a location in La Crosse, WI that has served individuals with disabilities for almost 50 years. Participants will explore the 5 senses to promote emotional regulation and increase coping skills to ultimately increase occupational engagement and support social participation. Individuals with disabilities have a wide variety of symptoms that impact their sensory needs. Our research identified sensory based techniques are effective interventions for treatment of behaviors in adults with poor sensory processing. However, there is a lack of sensory based offerings for adults in the area, and no current sensory based groups offered at Aptiv. Therefore, there is a need for this group and for participants to understand their sensory preferences and use this information in their daily lives to feel their best and be able to participate in the things they want and need to do.

B.G.44 Paving a Purpose

Becca Lee, Macy Jackan, Lauren Guglielmi, Haley Flood, and Nick Reid
Mentors: Erin McCann (Health Professions) and Michelle Goldsmith, COTA (Mayo Clinic Health System)

The Paving a Purpose group works to create group-centered programs that promote social participation and improve quality of life through community engagement activities. We believe that social isolation has a negative impact on residents who reside in assisted living. We are committed to providing an engaging program to facilitate social participation and leisure exploration. By having participants engage in the Paving a Purpose program, they will improve their quality of life, increase social participation, and promote a healthier lifestyle. The Paving a Purpose group consists of five occupational therapy students from UWL whose goal is to increase social participation and leisure exploration for residents at Hillview Terrace Assisted Living. This group will be implemented for five consecutive sessions on Fridays with each session lasting between 1-2 hours. Residents who wish to participate will engage in an icebreaker, an activity, and a wrap-up every week. The activities throughout the week include potting plants, making cards, making and donating tie blankets, reading with kids, and looking back. The facility will be provided with a resource binder to reference in the future if they wish to continue and adopt these activities in their lives.

B.G.45 Crafts, Cards, & Connect: Building Community Fun

Maleah Wohletz, Kristi Larsen, Kaleigh Roeder, Emily People, and Meaghan Salomaki
Mentor: Brandon McCauley, Health Professions

The La Crosse Housing Authority caters to a marginalized community by providing affordable housing for low-income individuals, predominantly aged 55+ and/or with disabilities. This program will be specific to Sauber Manor as these residents face various health challenges and financial constraints which were exacerbated by social isolation following the COVID-19 pandemic. To address these issues, occupational therapy students from the University of Wisconsin - La Crosse have formulated a 5-week program aimed to enhance social engagement and improve the quality of life of Sauber Manor residents. Weekly 90-minute sessions will feature various games, crafts, and team-based activities, led by students. The program is designed to foster social skills, socialization, and offer an enjoyable experience for residents. To operate this program, a budget of \$496.17 will cover supplies, snacks, and prizes. Post-program recommendations include a list of game recommendations to sustain community engagement within Sauber Manor following programming. The goals of the program include alleviating social isolation, promoting social interaction, and improving the overall quality of life of Sauber Manor residents. These changes will contribute positively to residents' mental and physical health.

B.G.46 Investigating the Role of Axl in Regulating Migration in Chk1 Inhibitor Resistant Breast Cancers

Dannira Kulenovic and Anar Fynbu
Co-authors: Grace Endres, Emily Goodbrand, and Mary Scott
Mentor: Sierra Colavito, Biology

Triple negative breast cancers are challenging to treat, and the rising prevalence of drug resistance in breast cancers as a whole has limited the efficacy of traditional treatment pathways. Our lab has developed a model of drug resistance in the Chk1 pathway, and we believe targeting the protein Axl will relieve the resistance. Chk1 regulates the cell cycle, ensuring that cells divide with minimal DNA damage. Axl drives mechanisms such as proliferation, invasiveness, and survival of cells. We hypothesize that targeting Axl with the inhibitor R428 will reduce the migratory potential of our Chk1 inhibitor resistant cells. Cells were plated with their respective drug, AZD7762, R428, or the combination of AZD7762 and R428, in a Boyden chamber, then incubated for 24 hours. The wells were then washed, fixed, and stained with crystal violet before counting. The counting process was blind and standardized through written instructions. These values were recorded and averaged to determine how many cells had migrated in each well. In one cell line, resistant cells appear to have higher migratory capacity compared to their sensitive counterparts. Counting of additional cell lines is in progress. This data can help inform drug development by identifying which mechanisms are affected by protein inhibitors.

B.G.47 Trauma Impacts on Neurodivergent Adult Identities

Elizabeth Lecker
Co-author: Ruth Schumacher-Martinez
Mentor: Ruth Schumacher-Martinez, Psychology

Neurodivergence and trauma are identities that intersect often in the lifetimes of neurodivergent individuals. The voices of neurodivergent individuals are often overlooked or silenced when it comes to sharing experiences regarding trauma, so this study aims to gather more information about the diverse experiences these groups have faced. Diverse trauma experiences are explored as well as suggestions for the implementation of trauma informed care in schools. Individual perspectives are shared regarding the intersection of neurodivergence and trauma between adults aged 18-25.

B.G.48 Lifestyle Modifications and Pharmacologic Treatment of GERD

Regan McElfresh and Jennifer Schaeffer
Mentor: Karen Hayter, Health Professions

Gastroesophageal reflux disease (GERD) is a chronic gastrointestinal disease. GERD occurs from the relaxation of the lower esophageal sphincter, which leads to a backward flow of stomach acid into the esophagus. Heartburn and regurgitation are the two hallmark symptoms, but other esophageal and pulmonary symptoms may occur as well. The purpose of this study was to identify effective lifestyle modifications combined with standard pharmacologic treatment to reduce GERD symptoms. PubMed and ClinicalKey databases were searched to identify appropriate literature. Proton pump inhibitor (PPI) medications are the mainstay of therapy for patients with GERD and are indicated for a trial of two months, then reassessment of symptoms is indicated due to long-term effects of PPIs. Some long-term side effects of PPIs include kidney injury, myocardial infarction, thrombocytopenia, metabolic bone disease, and iron deficiency. Additionally, up to 50% of patients do not receive adequate relief of PPIs alone. Thus, recent research has shown incorporating weight loss, diet changes, breathing exercises, elevating the head of bed, and tobacco cessation to be effective additions in alleviating GERD symptoms. This case involved a middle-aged male with GERD and symptoms of a cough, snoring, and throat clearing. In middle-aged males with GERD, literature supports starting a trial of PPIs in addition to lifestyle modifications for 8 weeks to achieve maximum symptomatic relief.

B.G.49 Aggregation for Eradication: An Exploratory Grass Carp Management Strategy in the Upper Mississippi River

Max Monfort
Co-authors: James Wamboldt (United States Geological Survey), Matthew Acre, Ph.D. (United States Geological Survey), and David Schumann
Mentor: David Schumann, Biology

Grass Carps (*Ctenopharyngodon idella*) can alter trophic dynamics via excessive aquatic macrophyte consumption when introduced to new areas. Increased commercial captures of Grass Carp in the Upper Mississippi River (UMR) and Great

Lakes Basins paired with their ability to evade traditional fisheries gears represent a substantial challenge for management. An attractant and bait specific for Grass Carp has been evaluated in some invaded systems (e.g., Lake Erie), but their potential application in the UMR has not yet been fully recognized. We aim to refine methodology from previous studies and describe the ability of automated bait delivery systems to alter the Grass Carp behavior and aggregate them in pool 19 of the UMR. Specifically, our objectives are to: (1) describe Grass Carp movement ecology within the riverscape before, during, and after bait application, and (2) determine Grass Carp movement responses to feeding; use of the feeding area, time occupied at feeding area, and the attraction distance from the feeding area. Grass Carp behavior will be evaluated in response to the deployment of a Grass Carp-specific bait (n = 120) using acoustic telemetry arrays deployed at four locations in pool 19 during 2024 (March-November) If successful, these methods could provide an exploratory, yet innovative, Grass Carp management strategy for more efficient removals within the UMR and other invasion fronts.

B.G.50 The Use of Photoplethysmography Technology to Detect Atrial Fibrillation

Morgan Nordbeck, Lauren Degn, and Drew Marting
Mentor: Karen Hayter, Health Professions

Atrial fibrillation (AF) is a common cardiac arrhythmia resulting in a lack of atrial contractions in relation to ventricular contractions. AF increases the risk of stroke, so most patients should consider starting anticoagulation therapy once diagnosed. Since this arrhythmia can present without any symptoms, early detection of AF can reduce adverse outcomes and accelerate treatment initiation. In recent years, electronic devices, such as smartwatches, have been developed with the intent of detecting cardiac arrhythmias. This technology could make drastic improvements in the medical care of those diagnosed with AF and those at risk for AF. This applied research study investigated the accuracy of AF detection in devices with photoplethysmography (PPG) technology when compared to the gold-standard 12-lead electrocardiogram. Databases including PubMed, EBSCO, Google Scholar, and JANE were used to obtain literature for this study. The available evidence on PPG devices shows promising data relating to the accuracy of AF detection. A meta-analysis found the pooled sensitivity and specificity of AF detection by smartwatches to be 93% (95% CI 84-94%) and 94% (95% CI 55-99%). However, the reviewed research included studies that were low in quality and indicated high risks of bias. In adults with hypertension, obesity, and hyperlipidemia who are diagnosed with AF, a device with PPG technology would be beneficial to detect future AF episodes.

B.G.51 Universal Mental Health Screening: Key Stakeholder Perceptions

Hannah Olson
Mentor: Daniel Hyson, Psychology

Universal Mental Health Screening (UMHS) is an essential tool that holds the potential to revolutionize the way we approach the mental well-being of children in schools, ensuring early identification and intervention for students in need. So, what is holding schools back from implementing these services for their students? This study is designed to gain insight into the perceptions of key stakeholders on UMHS, as well as identifying potential opportunities and obstacles to implementing these services.

B.G.52 School Professional Perceptions of Seclusion and Restraint Use K-12

Kayley Provenzano
Co-author: Jocelyn Newton
Mentor: Jocelyn Newton, Psychology

Seclusion and restraint techniques have been argued as necessary to provide safety to children who are severely dysregulated. Unfortunately, research indicates that these techniques may cause additional harm to children through re-traumatization, producing feelings of fear and shame, sensory deprivation, increased physical aggression, injury, and in some cases, death (Mohr, 2001). Further, other ethical concerns include departure from evidence-based practice and least intrusive intervention, removal from educational settings, reliance on seclusion and restraint in absence of effective programming, disproportionate use in minoritized groups, and lack of training, supervision, and monitoring (Scheuermann et al., 2016). Although there are several risks associated with seclusion and restraint, little research has been conducted to explore school professionals' perceptions surrounding the use of seclusion and restraint within K-12 schools. Exploring the perceptions of school professionals surrounding the use of seclusion and restraint in a K-12 setting is crucial in understanding and identifying key factors that influence frequency of use.

B.G.53 Wellbeing and K-12 Experiences in Late-Identified Neurodivergent Women

Madison Wog
Co-author: Ruth Schumacher-Martinez
Mentor: Ruth Schumacher-Martinez, Psychology

Late identification of neurodivergence in women can have detrimental long-term impacts, such as identity confusion, exhaustion, co-occurring mental health difficulties, decreased self-esteem, difficulty in relationships, and self-blame. This qualitative study explores the impact and overall well-being of seven late-identified neurodivergent women. School psychologists play a vital role in early-identification and providing supports. They should ensure comprehensive evaluations and advocate for inclusive and accessible educational environments for all students, both with and without identified disabilities.

B.G.54 Purification and Characterization of Six Hemerythrin Proteins from *Myxococcus xanthus*

Mason Stenzel
Mentor: Daniel Bretl, Microbiology

Myxococcus xanthus is an aerobic soil bacterium that is studied for its extensive repertoire of signaling systems. These signaling systems are comprised of proteins that sense and respond to environmental signals and are used by all bacteria to drive a wide range of behaviors. In *M. xanthus*, these systems mediate elaborate responses to changes in the dynamic soil environment, some of which may start by sensing fluctuations in oxygen concentration. One such oxygen-responsive signaling system is the NmpRSTU system. Recently, the Bretl lab has shown that the final response protein of the NmpRSTU system, NmpR, binds to the promoter region of genes important for oxygen management. One of these genes is *mxan_5531*, which is predicted to encode a hemerythrin protein. Hemerythrin proteins are oxygen-binding proteins that are found in all domains of life, including in eukaryotes where they are primarily used for oxygen transport or cell signaling. The function of hemerythrin proteins in bacteria varies greatly depending on which species they are found in; their role in *M. xanthus* is completely unknown. *M. xanthus* encodes five additional predicted hemerythrin proteins, all of which appear to be independent of the NmpRSTU system. The goal of my work is to purify and characterize all six of these proteins, allowing us to determine if they are *bona fide* hemerythrin proteins and to characterize their function(s) in *M. xanthus*.

B.G.55 Evaluation of an Underwater Camera Method to Sample Freshwater Fish Assemblages under the Ice

Ben Patschull
Mentors: Ross Vander Vorste and David Schumann, Biology

Ice cover has long restricted our understanding of the habitat use patterns of fishes in temperate aquatic ecosystems by preventing the use of conventional sampling methods. Standardized underwater camera surveys are not frequently applied in freshwater environments; however, technological advancements may now permit the use of this gear in freshwater systems. Using methods developed for shallow marine ecosystems, we described the suitability of camera sampling for fish assemblages in two backwaters on the Upper Mississippi River (i.e., Stoddard Island Complex and Lawrence Lake). To assess the effectiveness of the gear in various environments, water clarity (cm), vegetation cover indices, sky cover, and ice depth (cm) were measured at randomly selected sampling points throughout each lake (n = 42 per lake). Using AICc model selection techniques we found that water clarity was included in the most top performing models. The top performing model to estimate viewing radius included only water clarity, although substantial support for three additional models was apparent ($\Delta AICc < 2$). Additional analyses must be conducted to assess whether the variation in viewing radius impacts the suitability of the underwater camera sampling method in freshwater.

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

C.G.31 Tenecteplase vs. Alteplase for Treatment of an Acute Ischemic Stroke

Molly Arttus and Kari Smerud
Mentor: Karen Hayter, Health Professions

An acute ischemic stroke is the result of artery occlusion and subsequent hypoperfusion of the brain. In a 78-year-old female with atrial fibrillation, hypertension, and hyperlipidemia, who is experiencing this type of stroke, the most efficacious treatment must be determined. Current FDA approved treatment of an ischemic stroke involves the use of alteplase, a fibrinolytic, within 4.5 hours of symptom onset. However, tenecteplase, a newer fibrinolytic being studied, has displayed promising results as an alternative to alteplase. To determine the best treatment plan for the patient, applied research techniques were used, in which meta-analyses, systematic reviews and primary literature were reviewed to compare evidence-based outcomes for alteplase and tenecteplase. No significant differences were found in safety, efficacy, or cognitive outcomes between the two drugs. However, the longer half-life of tenecteplase permits the drug to be administered as a single bolus as compared to alteplase which requires multiple doses. This allows for quicker door-to-needle time and less room for human errors. More research is needed to establish superiority of tenecteplase but given the comparable efficacy, we recommend tenecteplase to allow for expeditious treatment.

C.G.32 Associations of Polymorphisms in Vitamin D and Iron-Related Genes with Vitamin D Supplementation and Iron Status in Women

Cheyenne Banasik
Co-authors: Lydia Schult and William Murphy
Mentor: Margaret Maher, Biology

Vitamin D (vitD) and iron status in humans are related through the hepcidin hormone system. Deficiency or excess of these nutrients can adversely affect human health. Genes involved in the hepcidin system include vitamin D receptor (VDR); CYP2R1, which codes for 25-hydroxylase, an enzyme that converts cholecalciferol to calcidiol; vitamin D binding protein (VDBP); hepcidin antimicrobial peptide (HAMP); and homeostatic iron regulator protein (HFE). Genomic DNA was isolated from whole blood of 17 female participants (18-23 y.o.) engaged in a vitamin D3 (400 IU) supplementation study. Single nucleotide polymorphisms (SNPs) of the above genes were chosen and will be used to haplotype participant DNA for clinical phenotype associations with the following vitD and iron status parameters. Pre- and post-supplementation calcidiol levels were 21.0 ± 1.7 ng/ml and 21.4 ± 1.6 ng/ml, respectively (n=12, p=0.19). Pre- and post-supplementation hepcidin levels were 6.4 ± 1.5 ng/ml and 6.8 ± 1.5 ng/ml, respectively (n=10, p=0.39). These results and the ferritin assay results will be reported considering SNP haplotypes upon completion.

C.G.33 Glucocorticoid Therapy for Acute Respiratory Distress Syndrome Secondary to Sepsis

Kaydi Breeser and Katie Knott
Mentor: Karen Hayter, Health Professions

Diffuse injury to the alveolar-capillary membrane secondary to a systemic disease process is known as acute respiratory distress syndrome (ARDS). This causes respiratory insufficiency, hypoxia, and bilateral radiographic infiltrates resulting in abrupt dyspnea. This is further complicated by sepsis which, like ARDS, involves an inadequate production of cortisol in response to stress. This study aimed to review current literature regarding the benefit of glucocorticoids in addition to standard supportive care for ARDS with sepsis in order to make treatment decisions. The review included systematic reviews (SRs), meta-analyses (MAs), and randomized controlled trials from Cochrane Library and PubMed. The primary outcome was mortality rate following administration of glucocorticoids or placebo. There is limited literature with a focus on ARDS secondary to sepsis, a disease state with striking mortality. In the review of literature, one MA found significant reduction in 28-day mortality for adults with ARDS (p<0.01). These results were inconsistent since many studies showed no difference in mortality with glucocorticoids (RR=0.77, 95% CI 0.57-1.05). Importantly, there were no significant adverse effects with corticosteroid use. In this case of an adult male with cholecystitis and sepsis, glucocorticoids remain a viable option for treatment of ARDS.

C.G.31 Aggregate Nesting, Parasitism, and Pollination in Solitary Ground-Nesting Bees

Danielle Hudson and Ian McGuigan
Co-author: Barrett Klein
Mentor: Barrett Klein, Biology

Solitary ground-nesting bees offer important ecological services as pollinators of native plants and crops. Although they nest solitarily, with one female per nest and no cooperation among females, some species build their nests in dense aggregations. This unexplained behavior can pose a problem: parasitism. Parasites, like the kleptoparasitic *Nomada* bees, are attracted to dense groups of organisms. We aim to determine whether dense nest sites have higher host success or parasitism rates. We will excavate bee nests of the solitary ground nesting *Andrena dunningi* in varying proximity to nearest neighboring nests. We will then extract larvae from each nest, identify them as host bee or kleptoparasite, and detect differences in the rate of parasitism related to the proximity of nearest neighboring nests. Additionally, we will collect pollen specimens from various solitary ground-nesting bee species at a variety of sites in southwestern Minnesota and southwestern Wisconsin. These samples will be analyzed genetically through DNA extraction, amplification, and sequencing to identify plant species. The aim will be to describe pollination habits and ascertain if there are any bee-plant relationships with threatened or endangered plants. These studies will provide foundational knowledge that will help future monitoring and conservation efforts.

C.G.32 Student-Teacher Relationship Impact on High School Motivation

Kyle Kargel
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

The present study aims to examine the relationship between high school student perceptions of their student-teacher relationships and their intrinsic motivation. According to Yeager et al. (2014), low student motivation is one of the most reported issues by teachers in the classroom. High school students interact with multiple different adults daily, all of which impact their sense of their school environment. A better understanding of how student-teacher connections impact students can improve the ability of school staff to support students.

C.G.33 Prevention of Cold-Induced Apoptosis in Platelets from Humans and Thirteen-Lined Ground Squirrels (*Ictidomys tridecemlineatus*)

Vanessa Mbuyi, Lydia Mack, and Gabe Simpson
Mentor: Scott Cooper, Biology

Platelets are blood cells involved in blood clotting. Human platelets stored in the cold undergo apoptosis, a process also known as programmed cell death, and are swiftly eliminated from circulation following transfusion. As a result, platelets are typically stored for 7 days at room temperature due to concerns regarding microbial contamination. The platelets of hibernating mammals, such as thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*), remain in circulation after storage at 4°C, deeming this organism a novel animal model for cold storage of platelets. When ground squirrel platelets are cooled, they adopt a rod-like shape that can be activated by Taxol, a chemotherapeutic drug. Human and ground squirrel platelets were stored at room temperature and 4°C for 7 days, both with and without Taxol or EGTA, a calcium chelating agent. Human platelets stored in cold conditions exhibited a rise in expression of apoptotic markers, a change mitigated by EGTA, but not by Taxol. Ground squirrel platelets stored in cold conditions showed reduced apoptosis levels compared to those stored at room temperature, regardless of Taxol and EGTA treatment. To explore mechanisms by which ground squirrels evade platelet apoptosis, the glycoprotein 1b α receptors were tagged with fluorescent-labelled antibodies in samples of both human and squirrel platelets. When analyzed using Fluorescence Resonance Energy Transfer (FRET), human platelets stored in cold showed an increase in FRET consistent with clustering of receptors. These data will be compared to the ground squirrel samples stored in cold.

C.G.34 Aggregate Nesting, Parasitism, and Pollination in Solitary Ground-Nesting Bees

Danielle Hudson and Ian McGuigan
Co-author: Barrett Klein
Mentor: Barrett Klein, Biology

Solitary ground-nesting bees offer important ecological services as pollinators of native plants and crops. Although they nest solitarily, with one female per nest and no cooperation among females, some species build their nests in dense aggregations. This unexplained behavior can pose a problem: parasitism. Parasites, like the kleptoparasitic *Nomada* bees, are attracted to dense groups of organisms. We aim to determine whether dense nest sites have higher host success or parasitism rates. We will excavate bee nests of the solitary ground nesting *Andrena dunningi* in varying proximity to nearest neighboring nests. We will then extract larvae from each nest, identify them as host bee or kleptoparasite, and detect differences in the rate of parasitism related to the proximity of nearest neighboring nests. Additionally, we will collect pollen specimens from various solitary ground-nesting bee species at a variety of sites in southwestern Minnesota and southwestern Wisconsin. These samples will be analyzed genetically through DNA extraction, amplification, and sequencing to identify plant species. The aim will be to describe pollination habits and ascertain if there are any bee-plant relationships with threatened or endangered plants. These studies will provide foundational knowledge that will help future monitoring and conservation efforts.

C.G.35 Student-Teacher Aggregate Nesting, Parasitism, and Pollination in Solitary Ground-Nesting Bees

Kyle Kargel
Co-author: Daniel Hyson
Mentor: Daniel Hyson, Psychology

The present study aims to examine the relationship between high school student perceptions of their student-teacher relationships and their intrinsic motivation. According to Yeager et al. (2014), low student motivation is one of the most reported issues by teachers in the classroom. High school students interact with multiple different adults daily, all of which impact their sense of their school environment. A better understanding of how student-teacher connections impact students can improve the ability of school staff to support students.

C.G.36 Prevention of Cold-Induced Apoptosis in Platelets from Humans and Thirteen-Lined Ground Squirrels (*Ictidomys tridecemlineatus*)

Vanessa Mbuyi, Lydia Mack, and Gabe Simpson
Mentor: Scott Cooper, Biology

Platelets are blood cells involved in blood clotting. Human platelets stored in the cold undergo apoptosis, a process also known as programmed cell death, and are swiftly eliminated from circulation following transfusion. As a result, platelets are typically stored for 7 days at room temperature due to concerns regarding microbial contamination. The platelets of hibernating mammals, such as thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*), remain in circulation after storage at 4°C, deeming this organism a novel animal model for cold storage of platelets. When ground squirrel platelets are cooled, they adopt a rod-like shape that can be activated by Taxol, a chemotherapeutic drug. Human and ground squirrel platelets were stored at room temperature and 4°C for 7 days, both with and without Taxol or EGTA, a calcium chelating agent. Human platelets stored in cold conditions exhibited a rise in expression of apoptotic markers, a change mitigated by EGTA, but not by Taxol. Ground squirrel platelets stored in cold conditions showed reduced apoptosis levels compared to those stored at room temperature, regardless of Taxol and EGTA treatment. To explore mechanisms by which ground squirrels evade platelet apoptosis, the glycoprotein 1b α receptors were tagged with fluorescent-labelled antibodies in samples of both human and squirrel platelets. When analyzed using Fluorescence Resonance Energy Transfer (FRET), human platelets stored in cold showed an increase in FRET consistent with clustering of receptors. These data will be compared to the ground squirrel samples stored in cold.

C.G.38 IV Magnesium Sulfate Treatment for Acute Exacerbations of COPD

Jessica Merzenich and Evan Teynor
Mentor: Karen Hayter, Health Professions

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory disease of the lung that causes extensive airway restriction. Acute COPD exacerbations are currently being treated with short-acting beta-2 adrenergic agonists and short-

acting anticholinergics. The purpose of this applied research is to determine if a single IV dose of magnesium sulfate is beneficial as an additive treatment for a middle-aged male experiencing increased dyspnea and wheezing due to COPD exacerbation. Magnesium sulfate can be used for bronchodilation and inhibition of histamine and acetylcholine release. Cochrane, PubMed, and other databases were searched for studies comparing the efficacy of IV magnesium sulfate and placebo for improvement of COPD exacerbation symptoms and hospital admission rates. Articles were selected based on validity, level of evidence, and application to the clinical question. The results suggest that IV magnesium sulfate may decrease dyspnea severity, improve pulmonary function, and reduce hospital admissions. However, the limited sample size from the studies (n= 33 to 330) and the discrepancy among their findings does not currently support a recommendation of using IV magnesium sulfate. The current research holds promise, and larger trials should be performed to determine if IV magnesium sulfate should be added to the existing standard of treatment.

C.G.39 Glycemic Control with Triple Therapy vs. Insulin Monotherapy in Treatment Resistant Type 2 Diabetes Mellitus

Ally Nelson and Sydney Plautz
Mentor: Karen Hayter, Health Professions

Following lifestyle modifications, metformin is the first line treatment for type 2 diabetes (T2DM). Antihyperglycemic agents such as sulfonylureas (SU), dipeptidyl peptidase-4 inhibitors (DPP4I), glucagon-like peptide-1 receptor agonists (GLP1RA), sodium-glucose cotransporter-2 inhibitors (SGLT2I), and insulin are added in various combinations to lower HbA1c (glucose levels). In the case of an adult with treatment resistant T2DM on metformin, SU, and GLP1RA, this applied research study aims to compare glycemic control with metformin, SGLT2I, and GLP1RA therapy to insulin monotherapy. Cochrane review and PubMed were used to synthesize the literature. Patients treated with metformin plus SGLT2I compared to metformin plus SU were significantly less likely to experience inadequate glycemic control. Additionally, triple therapy of metformin, SGLT2I, and DPP4I lowered HbA1c by an average of 0.56% compared to metformin plus DPP4I. In a direct comparison, GLP1RA decreased HbA1c by an average of 0.32% more than DPP4I. Compared to insulin monotherapy, insulin plus oral hypoglycemics reduced HbA1c by 0.4-1%. Regarding this case, evidence suggests that SGLT2I offers better glycemic control than SU and should be initiated with metformin and GLP1RA. If additional reduction in HbA1c is indicated, insulin can be supplemented.

C.G.40 Quadriceps Strength Differences between Different Patellar Straps and Control

Nicolette Schaeffges
Co-authors: Scott Doberstein and Ward Dobbs
Mentors: Scott Doberstein and Ward Dobbs, Exercise & Sport Science

Context: Patellar Tendinopathy is a chronic overuse injury that causes inflammation of the patellar tendon from repetitive knee extension/flexion movements with forceful quadriceps contraction. To treat PT, clinicians should focus on reducing the load of the knee extensors and generally strengthen the quadriceps.⁵⁻⁷ Clinicians may implement a patellar tendon strap (PTS) during activity which is placed mid-patellar tendon as tight as preferred. Research has shown the strap reduces pain, but the biomechanical changes have not been studied. The present study is the first to determine that the Mueller strap™ quantitatively is a more beneficial orthotic to use compared to pre-wrap. Methods: A randomized controlled study was performed with 15 healthy participants with no prior lower extremity injury in the dominant leg between the ages 18-24. Each participants used the Mueller strap™ was placed mid patellar tendon tighten by 2 inches, the pre-wrap was wrapped eight times with slight tension, and nothing as part of the experiment. Concentric, active knee extension was performed at eight different velocities, initially picked at random order, (270, 90, 30, 210, 400, 330, 450, and 150 deg/sec) then repeated in the same sequence for each trial and participant for all three trials. Results: Comparison within-subject effects demonstrates a significant difference between the three trial groups ($F=7.182$, $df=2,1.680$, $p<0.005$) and the eight velocities ($F=68.689$, $df= 7,1,169$, $p<0.001$).

C.G.41 Occupation-Based Needs and QOL in Individuals with Parkinson's Disease

Jenelle Higgins, Jenna Timm, Lauren Guglielmi, Meaghan Salomaki, and Amelia Bates
Mentor: Naghmeh Gheidi, Health Professions

Parkinson's disease is a progressive, neurodegenerative condition that affects many individuals over the age of 60. The symptoms of this disease include motor and non-motor symptoms that impact an individual's independence and quality of life. The purpose of this study was to determine the quality of life and occupational needs of individuals with Parkinson's disease. To collect data, online questionnaires made by researchers were distributed to potential participants.

Potential participants were also contacted via phone to complete surveys over the phone. Exclusion criteria consisted of a past medical history of cancer, stroke, or dementia, individuals diagnosed within the last six months, those with Parkinsonism, and individuals who did not provide informed consent. Data analysis consisted of a descriptive presentation and Spearman Correlation test to assess quality of life and needs. The results of this study can be used by occupational therapists to address the needs of individuals with Parkinson's disease to improve their quality of life.

C.G.42 Impact of Pelvic Floor Dysfunction (PFD) on Occupations in Middle-Age Women

Kenley Pehrson, Shalynn Griesmer, Kinsey Vrana, and Callie Olson
Mentors: Naghmeh Gheidi and Kim Servais, Health Professions

Pelvic floor dysfunction (PFD) leads to decreased support of the pelvic organs, incontinence of urine and feces, and sexual dysfunction. PFD is prevalent among women and is progressively growing; with an estimation of 43.8 million women having at least one symptom of PFD by 2050. However, there is limited research addressing the impact of PFD on occupations throughout the lifespan. PFD impacts individuals' quality of life and leads to dissatisfaction with occupational performance, as it disrupts an individual's daily activities (I/ADLs), sleep, work, leisure, sexual activity, and socialization. There is limited literature that addresses the impact of PFD on middle aged women's perception of occupational performance and daily occupations. The objective of this study was to identify the impact of PFD symptoms on daily occupations and quality of life in middle aged women. A Qualtrics Survey revised from the Mothers and Children (MAC) survey that encompasses pelvic floor symptoms and how they impact meaningful activities and quality of life was distributed to biological females between ages 35-65 years. Women with no pelvic floor symptoms or currently pregnant were excluded.

C.G.43 Common and Effective Chronic Pain Interventions Used by Occupational Therapy Clinicians in the United States

Haley Flood, Ali Benson, Carrie Fowle, and Maleah Wohletz
Mentors: Naghmeh Gheidi and Brandon McCauley, Health Professions

Chronic pain is a prevalent concern within the United States, yet current research lacks definitive conclusions on the most effective occupational therapy interventions to address it. A 12-item Google Forms survey was sent nationally to voluntary participants through the Exxat platform and members of the Occupational Therapy Educators Facebook group. Data was collected surrounding the clinician demographics, clinicians' preference for physical or non-physical intervention use, and the commonality and effectiveness of interventions. Effectiveness was based on the clinicians' experiences and the patients' objective and subjective outcomes. Data was analyzed using SPSS 29. By investigating these key aspects, this descriptive study aims to understand the current practices related to chronic pain management utilized by licensed occupational therapists. By identifying the most common and effective approaches, clinicians can better tailor their treatments and integrate evidence-based strategies which may significantly improve patient outcomes and quality of care.

C.G.44 The Effect of Student-Led Occupational Therapy Intervention on Improving Quality of Life

Rebecca Lee, Macy Jackan, and Carly Richter
Mentors: Naghmeh Gheidi and Laura Schaffer, Health Professions

Chronic conditions can impact an individual's perceived quality of life (QOL). QOL encompasses many domains including environmental, psychological, social, and physical health. An Occupational Therapist (OT) can address the impairments associated with various chronic conditions through providing client-centered interventions that address the deficits that are present. Through the interventions provided, an OT's goal is to increase an individual's participation in their occupations and help improve their QOL. Literature has shown that OT interventions have been effective in improving QOL. However, the impact of OT student-led interventions on QOL is unclear. The aim of our study is to determine whether interventions provided by OT students at UWL's OT Adult Clinic will have an impact on participants' QOL. A repeated measure design was used for this study. Wilcoxon tests were implemented to examine the QOL outcomes before and after intervention.

C.G.45 A Cross-Sectional Study on the Epidemiology of Parkinson's Disease in Wisconsin

Kristi Larsen, Val Johnson, Kaleigh Roeder, Emily Peoples, and Allison Cuddihy
Mentor: Naghmeh Gheidi, Health Professions

Parkinson's disease (PD) is a quickly growing neurologic condition that is prevalent around the world. Many different characteristics have been identified as risk factors, including age, sex, and exposure to environmental hazards. The purpose of this study is to examine the prevalence of PD within 150 miles of La Crosse, WI, as well as to identify any possible risk factors among this population. Participants of the study have a diagnosis of PD and were recruited through multiple hospitals, student-run clinics at UWL and PD support groups in the area. Participants were asked to complete a student designed research survey identifying personal characteristics and exposure to risk factors. Data analyses were completed through SPSS.

C.G.46 Predictors of Student Success in Occupational Therapy Graduate Program at University of Wisconsin-La Crosse

Anna Penkwitz, Nick Reid, and Molly Barnhardt
Mentors: Naghmeh Gheidi and Polly Berra, Health Professions

Master of Science in Occupational Therapy (MSOT) is a well-known program at University of Wisconsin - La Crosse (UWL). Understanding the criteria that predict students' success in this field will help the program continue having successful outcomes. The goal of this study is to determine predictors of student success within the UWL's MSOT program. We utilize a quantitative correlational study using archival data. This study collected data from UWL students who graduated from the MSOT program and passed their National Board Certification of Occupational Therapy (NBCOT) exam from 2007-2023. The predictors being investigated are graduate requirement exam (GRE) scores, undergraduate (UG) grade point average (GPA), UG demographics including age and gender, and pre-requisite course grades including lifespan development, abnormal psychology, Anatomy and Physiology I and II, physics, statistics, and sociology. The dependent variables include the fieldwork performance evaluation, MSOT student NBCOT score, MSOT student foundational science course grades, and MSOT student cumulative GPA. Pearson correlation coefficient with an alpha value of 0.05 was utilized to find the correlation between factors using SPSS version 29. Ordinary least squares stepwise regression ($\alpha=0.05$) was also run to find predictors for each dependent variable.

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

D.G.2 Examination of *fimB* Transcriptional Site Point Mutations on *fimB* Transcription in Uropathogenic *Escherichia coli*

Shahina Sultana and Jenna Blomquist
Co-author: William Schwan
Mentor: William Schwan, Microbiology

Uropathogenic *Escherichia coli* (UPEC) is the leading cause of human urinary tract infections. Type 1 pili encoded by *fim* genes are responsible for the attachment of UPEC to bladder epithelial cells. We are interested in how point mutations in two *fimB* promoters affect the ability of UPEC to transcribe *fimB* when grown in different environments. Bacteria were grown to mid-logarithmic phase in pH 5.5 or pH 7 buffered Luria broth (LB) with or without 400 mM NaCl. Total RNA was extracted, complementary DNA synthesized, and quantitative reverse transcribed-polymerase chain reaction analyses performed to quantitate the level of *fimB* transcription. A UPEC strain with a TATA box mutation in *fimB* promoter two displayed less *fimB* transcription versus the unmutated *fimB* strain when grown under all conditions. Lower *fimB* transcription was observed in strains that contained first AC and higher affinity mutations in *fimB* promoter two versus the unmutated strain in cells grown in acidic pH/high osmolarity and neutral pH/low osmolarity LB media. Mutants contained higher affinity AC, or GAD box mutations displayed lower *fimB* transcription in neutral pH/high osmolarity LB media versus the unmutated strain. In this study, the *fimB* promoter two is engaged to drive *fimB* transcription.

D.G.38 Evaluating Suitable Habitat for Brook Trout (*Salvelinus fontinalis*) in the Driftless Area within Dolostone and Sandstone Rock Geologies

Brandon Thill

Mentor: Jason Freund, Biology

Being the only species of stream trout native to Wisconsin, Brook Trout play a valuable role in the economics and culture of the state. As the amount of suitable habitat offered in Wisconsin is expected to decrease 68% by the year 2050, researching areas where the decline is not as prevalent is important to gain an idea of what conservation strategies may be implemented for the preservation of Brook Trout habitat. Our study focuses on a small portion of the Driftless Area where Brook Trout are predicted to have available habitat over the next 50 years. The study area is divided by two bedrock geologies, sandstone and dolostone, and includes Brook Trout dominated and Brown Trout dominated streams. Habitat surveys and snorkel surveys were conducted using a transect based method to quantify habitat within streams of both geologies. Through our findings thus far, multivariate models such as principal component analyses and multiple regression AICs demonstrate that lower mean summer stream temperatures were predicted by conductivity and mean depth of the stream. Sites with these corresponding variables were more typically occupied by Brook Trout while Brown Trout were absent. Using the results from this study, we will be able to decipher which variables in the Brook Trout dominated streams are allowing the populations to remain healthy and implement them through conservation practices in other streams, ultimately providing more sustainable habitat for generations to come.

D.G.39 Changes in Tryptophan Hydroxylase 2 and 5HT1A Receptor Density in Response to Nicotine in the In Vitro Brainstem of the American Bullfrog *Lithobates catesbeiana*

Tyler Billman

Co-author: Kelsi Bellisle Mentor: Cord Brundage, Biology

Bullfrog, *Lithobates catesbeiana*, is a vertebrate animal model used to study toxicology and developmental physiology. Our research is focused on better understanding vulnerability to brainstem respiratory centers in the pathology of sudden infant death syndrome (SIDS). We propose that a link between nicotine exposure during development leads to changes in the serotonin signaling cascades of respiratory coordinating neurons. Caudal raphe neurons send serotonin fibers that extend and terminate directly on or near respiratory neurons in the brainstem. Late metamorphic tadpoles demonstrate an increase in lung burst activity with exposure to low concentrations of serotonin mediated in part by 5-HT1a receptor (5HT1aR) activation. This developmental change may be due to the number of fibers and/or 5-HT1a receptor density. Using the NIH Basic Local Alignment Search Tool (BLAST) we compared human and bullfrog 5HT1aR and tryptophan hydroxylase 2 (TH2) protein sequences and found a 34 and 65 percent identity match respectively. Quantitative western blot analysis of both proteins indicates developmental shifts in the serotonin network during metamorphosis. These results were supported by staining of TH2 in caudal raphe brainstem sections from pre-metamorphic tadpoles and post- metamorphic frogs. Impairments to the serotonin network may underlie a toxidrome associated with developmental nicotine exposure and further support the increased risk of SIDS following exposure.

D.G.40 Analysis of Influenza Virus Variation after Genetic Bottlenecks

Maxwell Bohl, Camryn Oachs, and Julia Gall

Mentor: Peter Wilker, Microbiology

Influenza viruses are human and animal pathogens. These airborne-spread viruses infect the respiratory tract of humans and can cause disease ranging from mild discomfort to death. In the United States roughly 30 million cases of seasonal influenza are reported yearly of which 500,000 require hospitalization. Previous students looked at how the imposition of genetic bottlenecks, like those experienced during transmission of the virus, resulted in viruses with reduced replication ability relative to the parental strain A/Victoria/361/2011 (H3N2). This project is a reconfirmation of those results and extend analysis to non-coding regions of the influenza virus strain. The replicative ability of these viruses was evaluated by comparing growth rates in cell culture over 48 hours relative to the parental virus. The genetic differences between the parental strain and the derived viruses were then analyzed by converting their genomes to DNA using reverse transcription polymerase chain reaction, and then sequenced using Illumina next generation sequencing. The changes in the derived virus lines were determined by comparing reference influenza genomes and the parental virus sequence. Further investigation into which of these changes affect viral protein function can then be done.

D.G.41 Impact of Megakaryocytes on Metastatic Triple Negative Breast Cancer Cells

Seth Holden

Mentor: Sierra Colavito and Jaclyn Wisinski, Biology

Bone metastasis is the most common cause of death in females with breast cancer. This project looks to increase understanding of bone metastasis and why it leads to such a poor prognosis. It tries to do this by seeing how metastatic breast cancer cells are affected by megakaryocytes and osteoblasts, which are some of the cells native to the space within the bone. Various conditioned medias will be made to mimic the effects of exposure to the bone marrow environment. These conditioned media will be used in several tests. Proliferation assays will be used to measure the amounts of cell divisions breast cancer cells undergo when exposed to these conditioned medias to show how a tumor would respond in a patient's bone. Several simple biological assays will also be performed to see how the cells change physically. These will include tests for migration, invasiveness, and colony formation abilities. These are all characteristics of cancer cells that could be affected by the unique metabolites found in the bone marrow. Knowing these characteristics about bone metastasized breast cancer cells will help shed light on the dangers of bone metastasis, and possibly lead to the development of treatments that can increase the survival rate of those diagnosed with this horrible condition.

D.G.42 Supporting the Management of Plains Topminnow (*Fundulus sciadicus*) in Nebraska Through Structured Decision-Making

Avery Lettenberger

Co-authors: David Schumann, Keith Koupal, Ph.D. (Nebraska Game & Parks Commission), and Sarah Nevison (Nebraska Game & Parks Commission)

Mentor: David Schumann, Biology

Decision making in conservation requires recognition of ecological, social, and political perspectives and the economics of management strategies. Natural resource management decisions have uncertainties, especially in cases of lesser studied fishes. Structured decision-making (SDM) and Bayesian decision networks (BDN) have increasingly been used to develop decision tools for managers to inform best actions while embracing uncertainty. Through SDM, stakeholders deliberate important ecological and population processes to identify management strategies most likely to achieve their desires. Their beliefs and best available science are incorporated into a BDN model to rank management actions to best allocate resources by informed decisions. The Nebraska Game and Parks Commission (NGPC) recognized SDM was needed for Plains Topminnow (*Fundulus sciadicus*) (PTM), a prioritized species for management lacking an organized management plan in Nebraska. PTM has seen ~70% decline in Nebraska, attributed to changes in stream flow, habitat degradation, stream fragmentation, introduced fish, and climate change. A stakeholder group of 10 staff from NGPC have provided input through the SDM and BDN modelling processes intending to reverse declines of PTM. A spatially tiered BDN was constructed with the fundamental objective of PTM persistence in a stream reach, watershed, and region. Through this approach, a standardized, non-regulatory management plan can be used to conserve PTM in Nebraska.

D.G.43 Reliability of Heart Rate Variability and Ventilatory Threshold across Exercise Modalities

Mimi Lucido

Co-authors: Ward Dobbs and Glenn Wright

Mentors: Ward Dobbs and Glenn Wright, Exercise & Sport Science

Aerobic exercise intensity is typically prescribed using heart rate (HR) derived data as HR is associated with oxygen consumption (VO₂). More recently, heart rate variability threshold (HRVT) has been shown to be related to ventilatory thresholds (VT) which may provide a valuable tool for gauging submaximal exercise intensity, as it can be measured with a HR monitor. Purpose: The purpose of this research was to examine the reliability between HRVT and VT with different modalities of exercise, cycling and running. Methods: Ten healthy individuals participated in this study. Participants completed four maximal graded exercise tests (GXT), two on a treadmill and two on a cycle ergometer. During the GXT, intensity gradually increased every 2 minutes on the treadmill, and continuously increased at a rate of 50 Watts every 2-minutes while cycling. Throughout all GXT, participants were equipped with an HR monitor and expired gases were collected through open circuit spirometry for continuous collection of HR and metabolic data, respectively. Results & Discussion: This abstract is being submitted as a work in progress. Data collection is ongoing, but results will be prepared for dissemination prior to the symposium.

D.G.44 Effects of Exercise-Induced Exosomes on Triple Negative Breast Cancer Cells

Kaitlyn Schneider

Co-authors: Sierra Colavito and Jennifer Klein

Mentors: Sierra Colavito and Jennifer Klein, Biology

Triple negative breast cancer (TNBC) is an aggressive form of breast cancer that is extremely difficult to treat due to the lack of hormone or Her2 receptors on the plasma membrane. Currently, the most used treatment methods include surgery and chemotherapy, both of which are invasive and generally have negative effects on the patient. This creates the need for a less invasive and more effective treatment method. Ongoing research shows that exercise can decrease TNBC tumor growth, suggesting that physical activity releases a systemic mediator of cancer growth into the bloodstream. It is hypothesized that these mediators are released via a type of extracellular vesicle, called an exosome. Exosomes can carry miRNAs that cause repression of translation of proteins, resulting in downstream effects such as changes in proliferation and epithelial to mesenchymal transition (EMT). These miRNAs can be identified and used to target and treat TNBC tumors. Preliminary data suggested that exosome treatment reduced the proliferation of a TNBC cell line, but not of an epithelial mammary cell line. The goal of this study was to determine the effects of exercise-induced exosomes on proliferation, phosphorylation of kinases, and EMT to better understand the molecular mechanisms that allow exercise to cause decreased tumor growth in TNBC.

D.G.45 PECS 2

Payton Ruckdaschel

Mentor: Daniel Friedenreich, Exercise & Sport Science

Since 1970, there has been a 20% rise in the consumption of sugar sweetened beverages in the western diet. Consuming more than one of these sugar sweetened beverages a day increases the risk of developing metabolic syndrome along with cardiorenal metabolic syndrome, insulin resistance, type 2 diabetes, and hypertension. Fructose seems to be the main culprit. Previous studies have revealed that 25g of fructose is not enough to contribute to a negative impact on vascular functioning. However, 75g of fructose did reveal a negative effect on vascular functioning post exercise. Thus, the question is raised to figure at what amount of fructose consumption will we first start to see a decline vascular functioning. AIM #1: Determine the metabolic response to varying quantities of fructose Objective #1: measure metabolites of fructose and glucose metabolism including lactate, fructose, glucose Objective #2: Measure changes in energy expenditure, carbohydrate and fat oxidation using a metabolic cart AIM #2: Determine the effect of varying quantities of fructose on vascular function Objective #1: measure microvascular function using NIRS around an acute exercise bout Objective #2: Measure nitrate/nitrite as indicators of nitric oxide availability AIM #3: Determine the sympathetic response to varying quantities of fructose Objective #1: measure heart rate variability around exercise

D.G.46 Triple Negative Breast Cancer Effects on Megakaryocytes

Tristin Studer, Elena Kozich, Karissa Valitchka, Leah Tomaz, and Lexi Miller

Co-author: Jaclyn Wisinski

Mentors: Jaclyn Wisinski and Sierra Colavito, Biology

Breast cancer cells can metastasize to the bone marrow. Recent research has shown that elevated platelet counts can correlate with metastatic cancer (Liu et al. 2021). Since platelets are formed from megakaryocytes found in the bone marrow, we suspect that metastatic breast cancer could influence the production of platelets. adhesion assays were conducted in 96 well plates measuring adhesion of DAMI cells that were exposed to triple negative breast cancer media, osteoblast and a mixture of both (double conditioned media) concentrations of 5uM and 50 uM PMA were added induce adhesion. Preliminary results showed that DAMI cells treated with double conditioned media adhered less than that of other treatments. Further work looks to identify 'what' is being released from either the bone marrow or megakaryocytes to propagate metastasis to the bone.

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

E.G.29 Effects of Capsaicin on the Exercise Pressor Reflex

Nik Carpenter

Co-authors: Aaron Wahl and Jacob Caldwell

Mentors: Jacob Caldwell and Salvador Jaime, Exercise & Sport Science

Exaggerated blood pressure responses during physical activity can contribute to cardiovascular disease. The exercise pressor reflex (EPR) contributes to blood pressure regulation by relaying information to the cardiorespiratory control centers of the brain. Reduced EPR responses with the use of topical capsaicin in males has recently been demonstrated. The interaction between capsaicin, the EPR, and biological sex are unknown and further research is warranted. We hypothesized that capsaicin would reduce EPR mediated changes from baseline in men and women and that men would have greater attenuation than females given hormonal differences. Male and female (n=20) subjects were randomly assigned to three experimental groups: 1) capsaicin applied to the exercising arm; 2) capsaicin applied to the non-exercising arm (systemic control) and 3) capsaicin free exercise (time control). Blood pressure was measured with beat-to-beat and centrally adjusted plethysmography. Post exercise circulatory ischemia (PEMI) was achieved with a rapid inflation cuff prior to ending handgrip exercise (HGE) to study trapped metabolite influence. HGE consisted of 30% maximal load at a 40-bpm pace. Females appear to have displayed reduced systolic blood pressure responses compared to males during exercise with capsaicin (Male: $\Delta 23 \pm 4$, Female: $\Delta 17 \pm 7$). In conclusion, current data suggests females may have an attenuated response to HGE with topical capsaicin compared to males.

E.G.30 Relationship among Running-Related Load and Race Performance

Emily Day

Mentor: Naoko Giblin, Exercise & Sport Science

Many runners experience a training set back due to a running related injury (RRI). These injuries are a result of a combination of small repetitive traumas that happen while running and improper/inadequate recovery. The aim of this study was to determine the relationship among different load variables and running performance. All healthy NCAA Division-III cross country athletes (7 females and 6 males) were eligible to volunteer for the study. Athletes placed inertial measurement units (RunScribe) on their shoes during training during training sessions throughout the season (approximately 7 weeks). In addition to the preparticipation survey regarding background information about training habits and past injury history, the athletes were asked to participate in weekly surveys regarding perceived levels of weekly training intensity (rate of perceived exertion, RPE) and sleep quality. Based on compliance, three female athletes' data were analyzed qualitatively. The three participants' data are averaged across 7 weeks of participation. Overall, there seemed to be no significant asymmetry between right and left foot kinematics and kinetics among the participants. There seems to be no relationship between race/practice pace and RPE and sleep hours/quality. Based on this information, there is no single biomechanical factor that is related to performance or weekly training intensity. These runners had a successful, injury-free competitive season.

E.G.31 Clinical Competence in India: A Cross-Cultural Collaboration in Physical Therapy Education

Katharine Hall, Samuel Bach, Kayla Lass, and Anna Edsill

Mentors: Amy Taebel and Steni Sackiriyas, Health Professions

International clinical education opportunities allow graduate students to foster an attitude of cultural relativism, empathy, and inclusion necessary for addressing diverse healthcare challenges in an interconnected world (Peiying et al., 2012). Particularly within healthcare disciplines such as physical therapy, clinical experiences abroad foster cultural competence and adaptability (Huffman et al., 2020). Immersion in foreign healthcare systems not only promotes interdisciplinary collaboration but also enhances understanding of culturally sensitive practices and nurtures empathy towards diverse patient populations (Robinson & Persky, 2019). Purpose: This international clinical education project aimed to improve graduate physical therapy students' understanding of clinical and cultural healthcare practices in India. Methods: Four Doctor of Physical Therapy students from the University of Wisconsin – La Crosse (n=4) engaged in a two-week clinical rotation at the Karnataka Lingayat Education University in Belgaum, India. Prior to the rotation, students possessed limited knowledge of clinical practice in India. Throughout the rotation, students underwent pre- and post-examinations to assess their learning progress and proficiency in physical therapy practices in the Indian context. Results and

Discussion: Anticipated findings will be presented upon completion of the analysis, with the abstract slated for dissemination before the symposium.

E.G.32 Immediate Effect of Transcutaneous and Percutaneous Neuromuscular Electrical Stimulation on Quadriceps Neuromuscular for Power and Reaction Time: A Pilot Study

Alexa Jaggi and Seth Polfus
Mentor: Hanni Cowley, Health Professions

BACKGROUND: The Physical Therapy profession utilizes interventions that include electrical stimulation, and these techniques are taught in UW-La Crosse curriculum. Dry needling (DN) is an intervention where a fine wire is inserted into a target muscle with or without percutaneous electrical stimulation (PENS). Transdermal electrical neuromuscular stimulation (TENS) uses electrodes on the skin surface. **METHODS:** 20 participants volunteered for this pilot study and were randomly placed into an intervention group and assigned an intervention limb: a control, DN, PENS, and TENS. DN and PENS groups had one sterile needle inserted into four locations on the anterior thigh. The TENS group had four adhesive electrodes placed in a similar location. PENS and TENS groups had electrical stimulation for 5 minutes. The control group did not have needles inserted or electrodes placed. Neuromuscular pre and post testing was recorded to both the intervention and non-intervention limb. Balance was measured using the Y-Balance Test Lower Quarter (YBT-LQ) and assessed in the anterior, posteromedial, and posterolateral directions. Pain pressure threshold data was collected at the knee before using an algometer. A Visual Analog Scale will be utilized to rate perceptions before, during, and after treatment. **RESULTS and DISCUSSION:** statistics are still being calculated but will be ready to present for the research symposium.

E.G.33 Immediate Effect of Transcutaneous and Percutaneous Neuromuscular Electrical Stimulation on Quadriceps Neuromuscular for Balance and Pain Perception: A Pilot Study

Madison Stelten and Mackenzie Thelemann
Mentor: Hanni Cowley, Health Professions

BACKGROUND: The Physical Therapy profession utilizes interventions that include electrical stimulation, and these techniques are taught in UW-La Crosse curriculum. Dry needling (DN) is an intervention where a fine wire is inserted into a target muscle with or without percutaneous electrical stimulation (PENS). Transdermal electrical neuromuscular stimulation (TENS) uses electrodes on the skin surface. **METHODS:** 20 participants volunteered for this pilot study and were randomly placed into an intervention group and assigned an intervention limb: a control, DN, PENS, and TENS. DN and PENS groups had one sterile needle inserted into four locations on the anterior thigh. The TENS group had four adhesive electrodes placed in a similar location. PENS and TENS groups had electrical stimulation for 5 minutes. The control group did not have needles inserted or electrodes placed. Neuromuscular pre and post testing was recorded to both the intervention and non-intervention limb. Reaction time was measured using the BlazePod™ lighted puck system for a 30 sec trial. Power was measured using a single-leg vertical jump assessment. **RESULTS and DISCUSSION:** statistics are still being calculated but will be ready to present for the research symposium.

E.G.34 Effects of Intermittent Hypoxia on the Central and Peripheral Vascular System

Hannah Kufalk
Co-author: Jacob Caldwell
Mentor: Jacob Caldwell, Exercise & Sport Science

INTRODUCTION: This study explored the effects of intermittent hypoxia on central and peripheral blood pressure in 11 college-aged participants. Hypoxia, reduced oxygen availability, stimulates blood flow, with nitric oxide (NO) playing a crucial role. However, the vascular changes induced by breathing hypoxic gas remain underexplored. Intermittent bouts of hypoxic gas, each six minutes, have potential health benefits in vascular function. Our hypothesis was that intermittent hypoxia enhances central and peripheral blood pressure, improving overall cardiac function. **METHODS:** The randomized study consisted of three lab visits, about two hours, and an additional familiarization visit. Pre-testing includes ultrasound imaging of the brachial artery, blood pressure, and pulse wave analysis. Near-infrared spectroscopy (NIRS) assesses small blood vessel function. Testing comprises three protocols: intermittent hypoxia, continuous hypoxia, and time control. Intermittent hypoxia involves five cycles of 6 minutes on and 4 minutes off hypoxic gas. Continuous hypoxia includes 20 minutes of room air followed by 30 minutes of hypoxic treatment, maintaining 80% arterial saturation. Post-trial assessments replicate the pre-testing order for comparison. **CONCLUSION:** Data collection is ongoing, and results are pending. Preliminary findings suggest that hypoxic treatment may influence a reduction in central and peripheral blood

pressure, potentially contributing to improvements in cardiac health.

E.G.35 Immediate Effect of Transcutaneous and Percutaneous Neuromuscular Electrical Stimulation on Quadriceps Neuromuscular Force Production and Range of Motion: A Pilot Study

Mia Kohls and Ann Westra
Mentor: Hanni Cowley, Health Professions

BACKGROUND: The Physical Therapy profession utilizes interventions that include electrical stimulation, and these techniques are taught in UW-La Crosse curriculum. Dry needling (DN) is an intervention where a fine wire is inserted into a target muscle with or without percutaneous electrical stimulation (PENS). Transdermal electrical neuromuscular stimulation (TENS) uses electrodes on the skin surface. **METHODS:** 20 participants volunteered for this pilot study and were randomly placed into an intervention group and assigned an intervention limb: a control, DN, PENS, and TENS. DN and PENS groups had one sterile needle inserted into four locations on the anterior thigh. The TENS group had four adhesive electrodes placed in a similar location. PENS and TENS groups had electrical stimulation for 5 minutes. The control group did not have needles inserted or electrodes placed. Neuromuscular pre and post testing was recorded to both the intervention and non-intervention limb. Force production was measured using a handheld dynamometer stabilized with a strap. Range of motion of the knee joint was measured during the Modified Thomas test using a long arm goniometer. **RESULTS and DISCUSSION:** statistics are still being calculated but will be ready to present for the research symposium.

E.G.37 Changing Prevalence of La Crosse Virus and *Aedes triseriatus* in La Crosse, WI

Drew Lysaker
Co-authors: Brad Tucker (University of Wisconsin-Madison), Todd Osmundson, Lyric Bartholomay, Ph.D. (University of Wisconsin-Madison), and Barrett Klein
Mentor: Barrett Klein, Biology

La Crosse virus (LACV), transmitted to humans via the bite of an infected *Aedes triseriatus* mosquito, was discovered in La Crosse, WI in 1964. LACV causes one of the most common vector-borne diseases in people under the age of 18 in the United States. The number of cases has declined through the 2000's in Wisconsin, suggesting that the epidemiology of the virus may have changed. We collected mosquito eggs using oviposition cup traps from several sites across La Crosse County. We hatched eggs, raised, identified, and tested adults for LACV to determine whether virus prevalence has decreased in vector populations. *A. triseriatus* is still found throughout La Crosse County, though only a small number of mosquitoes tested positive for LACV, suggesting the prevalence of LACV has decreased in western Wisconsin.

E.G.38 Gender Differences in Achilles Tendon Loading in Recreational Runners

Alex Olver and Amanda Thiers
Co-author: Haley Reiersen
Mentors: Thomas Kernozek and Drew Rutherford, Health Professions

Achilles tendon (AT) pathologies make up 9-11% of all running-related musculoskeletal injuries. Females are more likely to sustain a running related injury. The purpose was to compare gender differences in AT loading variables during running. Twenty-six females and twenty-three males participated. Kinetics and kinematics were used with the musculoskeletal model to estimate muscle force to obtain AT force. Ultrasound was used to measure AT cross sectional area used to determine AT stress. Males displayed a higher AT force (13%), medial (34%), and lateral (23%) gastrocnemius peak force. However, males demonstrated a 23% higher CSA compared to females resulting in 4% differences in AT peak stress based on gender. AT CSA appears to modulate AT stress differences based on gender even though males display a higher AT force due to greater gastrocnemius forces during running. These findings may have implications regarding the etiology of AT injury and loading in recreational runners.

E.G.39 Teacher Facilitation Tools for Students with Emotional Behavioral Disorders

Rylee Quandt
Mentor: Jenna Starck, Exercise & Sport Science

The physical education classroom accommodates a diverse array of students hailing from varied backgrounds, abilities, and cultures. Here, students engage in activities to foster lifelong physical fitness and enhance their social and emotional

competencies. Students with emotional behavioral disorders stand to gain significantly from targeted social-emotional training. Such students often grapple with challenges related to emotional regulation, behavior management, communication, and social interactions. With the prevalence of emotional behavioral disorders increasing in educational settings, educators find themselves grappling with the task of supporting these students effectively within an environment that can be demanding for them. One promising approach that integrates social-emotional learning with physical education is adventure education. This journal article aims to provide facilitation strategies that can aid teachers in imparting adventure education concepts to students with emotional behavioral disorders, all while integrating key social-emotional competencies.

E.G.40 Central and Peripheral Hemodynamics during Squat vs. Leg Press in Sedentary and Trained Young and Middle-Aged Adults

Larissa Rowley and Morgan Gove
Mentor: Salvador Jaime, Exercise & Sport Science

Central and peripheral hemodynamics can be used to determine pressure of blood against the walls of blood vessels. This can be critical information when analyzing the risk of cardiovascular implications. Previous research suggests exaggerated central and peripheral hemodynamic responses to resistance exercise, which may augment risk of cardiovascular events particularly in individuals at a higher risk. However, these findings are inconsistent largely due to a lack of research comparing manipulation in training variables. The purpose of this study is to compare the differences in central and peripheral hemodynamics in response to moderate and high-intensity squat and leg press exercises in sedentary and active apparently healthy adults. This study will include 10 apparently healthy adults between the ages of 18-30. The participants will complete six trials involving two one rep max tests for squat and leg press and the last four trials will consist of doing 15 reps at 60% and 8 reps at 80% for both squat and leg press for three sets. Blood pressure will be measured on the brachial artery and central pressures will be calculated using a validated transfer function. Data collection and analysis are ongoing. This abstract is submitted as a work in progress and will be ready for dissemination prior to the symposium.

E.G.41 The Effect of Electronic Nicotine Delivery Systems (ENDS) on Blood Pressure in Young Adults before and after Exercise

Nathan Staral
Mentors: Salvador Jaime and Jacob Caldwell, Exercise & Sport Science

Electronic nicotine delivery systems (ENDS) have grown in popularity in college aged adults in recent years. While viewed as healthier than smoking, many questions remain about the effects of ENDS on the cardiovascular (CV) system. There is even more unknown when looking at the effects of exercise and the use of ENDS, an area with surprisingly little research. Acute ENDS use has been seen to elicit increases in systolic blood pressure (SBP). Importantly, aortic SBP (aSBP) is a sensitive measure associated with left ventricular afterload and consequentially CV disease. This study will first investigate the effects of ENDS on resting aSBP; and secondly, will investigate the effects of ENDS on aSBP responses after exercise. Healthy college-aged (20-24 years old) young adults completed two sessions of familiarization and two randomized experimental protocols. On experimental days, subjects rested for 10 minutes before collecting baseline measurements. After these measurements, subjects would either vape ad libitum or rest for 60 minutes. Following the 60 minutes, CV measurements were taken again. The subject would then complete the exercise protocol until volitional exhaustion. CV measurements were taken again after exercise at three different time points. Statistics will be used to determine differences in aSBP between vaping and non-vaping sessions at all time points. Data collection and analysis is ongoing; results will be ready for dissemination prior to the symposium.

E.G.42 Microvascular Outcomes with Topical Capsaicin and Hand-Grip Exercise

Aaron Wahl
Co-authors: Nik Carpenter and Jacob Caldwell
Mentor: Jacob Caldwell, Exercise & Sport Science

INTRODUCTION: High levels of oxidative stress and reduced nitric oxide (NO) bioavailability, lead to microvascular endothelial dysfunction, increasing risk of cardiovascular disease. Capsaicin may improve cardiovascular health by enhancing NO-mediated endothelial function, yet its impact on microvasculature remains unexplored. This research hypothesizes that topical capsaicin on the exercising arm enhances tissue resaturation rates, i.e., vasodilation, in college-aged adults. **METHODS:** Nineteen subjects (including 10 early follicular females) were randomly assigned to each group with at least 48 hours between tests: capsaicin on the exercising forearm, capsaicin on the non-exercising forearm, and

control without capsaicin. Procedures included a 10-minute supine rest and post-occlusive reactive hyperemia tests using near-infrared spectroscopy. Measurements occurred at baseline, 30 minutes post application (T30), and 60 minutes post application (T60). RESULTS: Microvascular function was assessed by resaturation (slope 2) measurements from the NIRS device. Time control: T30=1.0±0.24, T60=1.0±0.23. Capsaicin non-exercising arm: T30=0.75±0.17, T60=0.93±0.21. Capsaicin exercising arm: T30=1.25±0.27, T60=1.0±0.23. CONCLUSION: Capsaicin application enhanced microvascular vasodilation at T30, suggesting a potential for enhanced bioavailable NO. These results should be confirmed in an older population where endothelial dysfunction is more prevalent.

E.G.43 Chronic Changes in Red Blood Cell Characteristics as a Contributor to Long COVID

Anna Davenport

Co-authors: Daniel Freidenreich, Scott Cooper, Anna Davenport, Payton Ruckdaschel, and Jonah Zoschke

Mentor: Daniel Freidenreich, Exercise & Sport Science

The purpose of this study is to determine if damaged red blood cells (RBC) contribute to symptoms of long COVID. Acute COVID infection causes damage to RBC by (1) damaging the Anion Exchanger-1 (AE-1) protein in cell membranes which reduces their ability to change their shape to fit through narrow capillaries and (2) causing RBC to produce reactive oxygen species by affecting hemoglobin inside the RBC. These changes can prevent RBC from narrowing to fit through smaller vessels in the body reducing their ability to flow through blood vessels. It can create thrombi, increase inflammation, oxidative stress and cause hypoxia in major organs. We will measure RBC damage by tracing the path of oxygen extraction, transport, and delivery to organs by red blood cells (RBC) in vetted healthy and long COVID subjects. Oxygen extraction will be tested using a pulmonary function cart to measure lung volumes, to detect obstructions and lung diffusion capacity, and measure oxygen extraction. RBC damage will be measured by flow cytometry and RBC deformability by a chip assay using video microscopy which tests the ability of RBC to pass through a channel the size of a capillary. A near infrared spectroscopy (NIRS) device will be placed on their quadricep to measure microvasculature function before and after exercise on a cycle ergometer to measure oxygen delivery to muscle and capillaries distant to the lung. A metabolic cart will analyze oxygen consumption during the cardiopulmonary test.

E.G.44 The Effects of Electronic Nicotine Delivery Systems (ENDS) on Cardiopulmonary Exercise Capacity among Young Adults

Brett Mousel

Co-authors: Nathan Staral, Salvador Jaime, Jacob Caldwell, Ward Dobbs, and Daniel Freidenreich

Mentors: Salvador Jaime and Jacob Caldwell, Exercise & Sport Science

PURPOSE: Electronic nicotine delivery systems (ENDS), also referred to as vaping devices, have seen an immense increase in usage among college-aged adults in recent years. The purpose of this study is to investigate the effects of ENDS use on exercise capacity in college-aged adults. Originally, vaping was intended to take the place of cigarette smoking as a healthier alternative, but its impact on the body during exercise has yet to be investigated. Therefore, the goal of our study is to investigate the acute impact of vaping on maximal whole-body oxygen consumption (VO₂max). METHODS: Six (n=6) healthy college-aged (20-24 years old) young adults completed two sessions of familiarization and two randomized experimental protocols. On experimental protocol days subjects rested for 10 minutes prior to collecting baseline measurements. Then, to determine the effect of vaping, subjects would either vape ad libitum or rest for 60 minutes followed by another set of CV measurements. The subject would then complete the exercise protocol until volitional exhaustion. Upon completion, CV measurements were taken 10-, 20-, and 30- post-exercise. Data were analyzed using a student's t-test. RESULTS AND CONCLUSION: 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.

GRADUATE ORAL PRESENTATION ABSTRACTS

Oral Session A2 8:50 am-9:15 am

O.G.6 Outdoor Recreation Professional's Perceived Safety and Mitigation Strategies Employed to Minimize Unwanted Behavior

Isabella Naughton

Co-authors: Katherine Evans, Dorothy Schmalz, Ph.D. (University of Utah Health), Erin Morris, Ph.D. (State University of New York at Cortland), and Sasha Mader

Mentor: Katherine Evans, Recreation Management & Recreational Therapy

Outdoor recreation is a predominantly male space and there has been minimal research done on the experiences of professionals within the field of outdoor recreation regarding violence. This study aimed to understand professionals' experiences with physical, sexual, or emotional violence while working outdoors. In addition to the professionals' experiences, we also sought to better understand the workplace policies and practices when these experiences of violence are reported. This research encapsulated a broader set of data, but the research question this presentation will encompass specifically focuses on the professionals' perceived safety and the mitigation strategies they employ to increase their sense of safety while working professionally. By beginning to build a better understanding of the experiences of violence and the mitigation strategies employed, we can hope to help to determine what problems occur for women in the field of outdoor recreation and what changes might lessen these experiences. Everyone should feel a sense of safety in their profession and in outdoor spaces. This research helps us to understand how we can make that a better reality for outdoor professionals.

Oral Session B1 9:20 am-9:45 am

O.G.10 Factors Affecting Ectomycorrhizal Community Ecology in the Kickapoo Valley, Wisconsin, U.S.A

Jacob Hansel

Mentors: Anita Davelos and Todd Osmundson, Biology

The Kickapoo Valley in southwest Wisconsin, U.S.A. is a unique ecosystem comprised of old growth and early successional forests that rely on symbioses with the ectomycorrhizal (ECM) community to thrive. To understand how the ECM symbiosis affects the health and stability of this ecosystem, tree, soil bacterial, and ECM community composition was surveyed in 23 plots in the Kickapoo Valley; soil characteristics were also examined. The surveys identified 6 distinct tree communities, which varied along a north to south gradient, with significant differences observed among slope aspects. Soil texture varied among loam, sandy loam, and silt loam. Carbon utilization metabolic assays of the soil bacterial communities showed high functional diversity amongst the surveyed plots. The greatest range of carbon substrate utilization was found in tree communities with significant understory debris. Future analyses include identifying ECM fungi isolated from tree roots in the soil samples to determine ECM fungal community composition on the levels of individual trees, individual soil cores, and entire plots. Tree, fungal, and soil bacterial communities will be identified using Illumina sequencing. Results of these analyses will provide an overview of the factors that affect the interactions of ECM trees, fungi, and soil bacteria of the forested ecosystems within the Kickapoo Valley that can be applied to other temperate forested ecosystems worldwide.

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

O.G.14 Investigation of the Signaling Pathways of Rap1b in Megakaryocytes

Kori Kruegel
Mentor: Jaclyn Wisinski, Biology

The G-protein, Rap1b, mediates megakaryocyte survival and function. Rap1b has been associated with integrin activation, allowing for adhesion and migration, as well as activation of the transcription factor ERK, which leads to proliferation and differentiation. The location of Rap1b within a megakaryocyte is mediated by the phosphorylation by cAMP-dependent protein kinase (PKA). Specifically, unphosphorylated Rap1b associates with membranes, while the negative charge of phosphorylation results in membrane detachment and diffusion throughout the cytosol. Phosphorylation specifically occurs at two Serine amino acids between the protein and lipid anchor. We hypothesize that the phosphorylation state, and therefore location of Rap1b, is the determinate to the proteins function in the cell. Our goal is to further investigate the signaling pathways that lead to activation of Rap1b and preferential activation based on cellular location. To do this, we utilized the Rap1b – Fluorescent Activity REporter (Rap1b-FLARE) in the HEK 293 megakaryocytic cell line. The extent of Rap1b in mutated cell lines was monitored by confocal microscopy. We also will use a biochemical pull-down assay to further determine the extent and preferential activation of Rap1b in megakaryocytes. This investigation will help establish the upstream signaling mechanisms that lead to Rap1b activation.

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

O.G.18 Effects of Aging on Exercise-Induced Extracellular Vesicle Alteration of Immune Cell Activity

Noah Duke
Mentor: Jennifer Klein, Biology

As we age, we lose the ability to recover from exercise and lose muscle mass. Muscle growth is called hypertrophy and occurs after the process known as myogenesis. One factor involved in myogenesis comes from the assistance of the immune cells known as macrophages. These macrophages can polarize into two different types that are pro-inflammatory and pro-resolution, which help the process of myogenesis. What causes the macrophages to polarize is currently unknown, however, we hypothesize that tiny communication cells known as extracellular vesicles (EVs) aid in this process. To test this hypothesis, we need to characterize the effects EVs have on macrophage polarization. To measure gene regulation, we will use qPCR to determine the level of RNA in the cells. When looking at surface markers we will use Flow Cytometry to look at lineage and cell differentiation. Finally, to understand the types of cytokines being released by the macrophages we will use the ELISA technique. Our results show that after being treated with EVs the macrophages will shift from the normal M0 macrophage state to the either the pro-inflammatory state (M1) or anti-inflammatory state (M2). When separated by age we see that our younger subjects EVs polarize macrophages better than old subjects. These results suggest that age could affect the EV signaling pathway that polarizes the macrophages. This lack of polarization could be a reason as to why humans take longer to recover from injury as we age.

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

O.G.22 Examining the Role of Axl Inhibition in Chk1 Inhibitor-Resistant Triple Negative Breast Cancers

Dannira Kulenovic
Mentor: Sierra Colavito, Biology

Triple negative breast cancer is an aggressive disease with few treatment options available to patients. Novel treatment options give hope to those facing this disease; however, drug resistance complicates treatment progress. To further understand how drug resistance effects triple negative breast cancer progression, our lab has developed Checkpoint kinase 1 inhibitor resistant breast cancer cells. Previous literature draws a connection between the protein Axl and the various regulators of the cell cycle, of which Checkpoint kinase 1 is a key modulator of DNA damage repair and transcript integrity. This work examines the interaction of Axl inhibition in combination with Checkpoint kinase 1 inhibition to

determine how Axl promotes this model of drug resistance. Through several cellular and molecular techniques, it is determined that combining an Axl inhibitor with a Checkpoint kinase 1 inhibitor in resistant cells reduces clonogenicity and increases DNA damage, while mesenchymal status remain unaffected, leaving Checkpoint kinase 1 inhibitor resistant cells with greater migratory capacity than their sensitive counterparts. These results can inform clinical researchers of the role of Axl in drug resistant triple negative breast cancers and what treatment combinations may be beneficial to patients struggling with this diagnosis.

FACULTY & STAFF ABSTRACTS

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

C.F.47 Experimental Setup Building for Entangled Two-Photon Absorption Measurements and Its Performance Evaluation

Juan Villabona-Monsalve (Chemistry & Biochemistry) and Lydia Pernsteiner
Co-authors: Lexie Moran and Abby Meltz

Entangled photons exhibit strong nonclassical correlations simultaneously, which allows them to perform non-linear spectroscopy in new ways compared to classical means (Villabona-Monsalve et al., 2020). Here, we report the development of an experimental setup that allows us to prove the occurrence of the entangled two-photon absorption (ETPA) phenomena in a variety of molecules with an interest in photophysics and biology. We use the CW-pumped Type-I degenerate spontaneous parametric down-conversion method to produce entangled photons. The last couple of decades have witnessed the emergence of entangled photons (EP) to probe quantum mechanics processes in atomic and molecular systems. In the entangled TPA (ETPA) technique, a chromophore absorbs entangled photon pairs simultaneously. Due to entanglement, the absorbed photon rate depends linearly on the input photon flux; and this dependence is quadratic for classical TPA. One advantage of ETPA is observing the process at an ultralow light intensity, around six orders of magnitude less than that in the classical experiments. Our experiments can be used to analyze a wide variety of chromophores of chemical and biological significance. We also have plans for using photon quantum correlations of EP to study molecular properties by utilizing a combination of Hong–Ou–Mandel interferometry and other molecular spectroscopy techniques.

FACULTY AND STAFF ORAL PRESENTATION ABSTRACTS

Oral Session A2 9:55 am-10:50 am

O.F.4 Fourth Industrial Revolution: AI and Human Centered Job Creation

Lisa Vander, Economics

The Fourth Industrial Revolution is bringing technology and artificial intelligence into the workplace at staggering rates. Jobs are being lost due to emerging technology at a faster pace than economists and policy makers can keep track of, especially for Non-STEM Higher Education Degree holders. The problem is that not enough “Human Centered” jobs are being created to efficiently utilize the highly skilled college graduate that possesses unique skills and talents that don’t compete with AI. Regional policy makers struggle with knowing how to strategically place their abundantly skilled “human labor” into jobs that match their majors in college. New public investment resources are needed to meet this challenge so economic developers, policy makers and entrepreneurs can reinvent what work looks like and more equitably expand the economy. Placing the needs, desires and post-secondary education public investments ahead of outdated labor demand policies. Placing labor supply at the center of human centered job creation. These transitions turn job creation upside down. Switching from Labor Demand priorities to Labor Supply necessities. Scarce public investment dollars need to be strategically reallocated to more efficiently create the new human centered jobs.

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

O.F.25 Exploring Sexual Attitudes and Experiences among College Students: Insights from a Large-Scale Survey

Berna Gercek-Swing, Psychology
Co-author: Casey Tobin

This study investigated the relationships between sexual attitudes and experiences among college students from two 4-year institutions, one located in the Midwest and one in the Mountain West. A total of 2,230 young adults (age range 18 to 24) comprising 64.5% females and 35.4% males, participated in a survey assessing sexual attitudes and experiences. Examination of the relationship between sexual attitudes and the sexual education received at home and school revealed interesting results. For example, males who received high levels of sex education both at home and at school had marginally fewer liberal attitudes concerning masturbation, abortion, and the use of erotic materials compared to other males who did not receive much sex education at home. Additionally, types of sexual experiences were related to several different attitudes. Males and females with exclusively heterosexual experiences reported more conservative attitudes about the use of erotic materials compared to those with mixed sexual (both exclusively same-sex and range) experiences. Statistically significant associations were observed between gender and types of sexual experiences concerning masturbation behavior. These findings contribute to our understanding of how sexual attitudes and experiences vary among college students and underscore the importance of considering individual characteristics when examining these constructs.

2023 RECIPIENTS OF STUDENT RESEARCH GRANTS

**2023 RECIPIENTS OF
UNDERGRADUATE RESEARCH & CREATIVITY GRANTS**

Name	Department	Mentor	Title
Christopher Aamodt	Biology	Anita Davelos	Passive Restoration of Ectomycorrhizal Fungi in Clear Cut Forests of Kickapoo Valley Preserve
Reed Anderson	Chemistry & Biochemistry	Daniel Grilley	Characterization of the Effects of Truncation on a Cytotoxic Protein
Ky Ariano	Microbiology	Paul Schweiger	Manipulation of Outer Membrane Biogenesis factor GOX1969 to Improve <i>G. oxydans</i> Strain Design
Kelsi Bellisle	Biology	Cord Brundage	Amphibian Neurohomology
Kelsi Bellisle	Psychology	Kevin Zabel	The Role of Parenting Style in First-Generation College Students' Motivational Orientation Towards Pursuing a Future Advanced Degree
Jenna Blomquist	Microbiology	William Schwan	Examination of <i>fimB</i> Point Mutations on <i>fimB</i> Transcription in Uropathogenic <i>Escherichia coli</i> Growing in a Neutral pH Environment
Andreea Bouruc & Sam Kick	Biology	Bradley Seebach	Non-Specific Neurotransmission Improving Attention
Peyton Breunig	Biology	Alder Yu	The Effect of Radiation on Circadian Rhythms
Nicholas Bruder	Psychology	Alexander O'Brien	Mammalian Diver's Reflex Effect on our Cognitive and Physical Abilities
Noah Buck	Sociology & Criminal Justice	Dawn Norris & Nicholas Bakken	Perceived Barriers to Help-Seeking for Older Adults with Mental Health Concerns
Zoey Carlson	Biology	Cord Brundage	Mechanisms and Consequences of Nicotine Exposure in Tadpole Respiratory Responses
MacKenzie Caya, Lexi Ringhofer, Rene Faun, & Nicole Inoue	Biology	Scott Cooper	The Mechanism of Oxidized LDL in Activating Human and Thirteen-Lined Ground Squirrels Platelets
Leo Chavolla	Theatre & Dance	Laurie Kinman & Christopher Kurtz	Bringing Broadway-Caliber Sound Engineering to UWL
Hailey Clark	Psychology	Tesia Marshik	The Link Between Parenting Style and Anxiety Disorders when Childhood Trauma is Present
Cassandra Coats	Biology	Jaspreet Kaur	Understand the Mycorrhizal Ecology of a Rare Terrestrial Orchid <i>Cypripedium reginae</i>
David Ellefson	Biology	Ross Vander Vorste	Effect of Temperature and Food Availability on the Growth and Reproduction of Chironomidae in a Controlled Environment

Name	Department	Mentor	Title
Kaia Elstad	Exercise and Sport Science	Andrew Jagim & Ward Dobbs	The Effects of Creatine Supplementation on Body Composition and Occupation-Specific Performance for Firefighters
Val Fish	Theatre & Dance	Gregory Parmeter	One Nation Controlled by the Media: Theatre Journalism and its Influence on the Evolution of the American Musical
Anna Fisher	Sociology & Criminal Justice	Shanna Felix	Causes, Consequences, and Correlates of Intimate Partner Violence
Samuel Flaig	Biology	Anton Sanderfoot	Light Dependent Dogpile? Investigating Why Chlamydomonas are Unable to Clump in the Presence of Microplastics While in the Dark
Mackenzie Frankland	Psychology	Bianca Basten	Music to Tik Tok: Investigating the Effects of Distractions on Retention
Chelsea Gale	Biology	Cord Brundage	Auricular Location as an Alternative to Rectal for Feline Thermometry
Vanessa Giallombardo	Microbiology	Daniel Bretl	Characterizing Oligomerization of Variants of an NtrC-like Response Regulator from <i>Myxococcus xanthus</i>
Corbin Guy	Biology; Exercise and Sport Science	Jennifer Klein & Daniel Freidenreich	Identifying Gene Expression Facilitated by Exercise-Induced Extracellular Vesicles
Noelle Hackenmueller	Global Cultures & Languages	Kimberly Morris	Diverse Nation, Dying Language Enrollment: Exploring if and Why First-Year University Students Study Foreign Languages
Morgan Hahn	Biology	Cord Brundage	Characterizing the Function Neurotoxic Effects of Developmental Nicotine Exposure on Breathing
Presleigh Hansen	Psychology	Jason Sumontha	Family Stressors and the Impact of Sibling Protective Factors on Repeated Self-Harming and Suicidal Ideation
Abigale Hartwig	Psychology	Ryan McKelley	“Our Friends and How We Make Them”: How Eating Disorders Contribute to Friendships Based Either on Mutual or Competition
Abigale Hartwig	Psychology	Kevin Zabel	“The Toxicity of ‘Wokeness’”: The Validation of a Performative Activism Scale
Adeline Hendrix	Murphy Library	Teri Holford	Diversity in Children’s Book
MJ Hennessey	Chemistry & Biochemistry	Kelly Gorres	Ketone Bodies Influence on Epstein Barr Virus Reaction through Proposed Histone Deacetylase Inhibition
Miryah Henriksen	Chemistry & Biochemistry	Daniel Grilley	Mapping Interactions Important for the Secretion of a Toxic Protein
Emjay Hilliker	Biology	Anne Galbraith	Effects of SK-03-92 Treatment on Copper Homeostasis in Yeast Cells
Nick Horzewski	Geography & Environmental Science	Colin Belby	Quantifying Overwintering Fish Habitat Loss from Sedimentation within Lake Onalaska, Wisconsin

Name	Department	Mentor	Title
Kara Hurlebaus	Psychology	Kevin Zabel	“Attitudes on Sex”: Measuring Implicit Attitudes toward Casual Sexual Relationships and Respect
Gavin Hutchison	Biology	Alder Yu	<i>Per</i> Expression in Alzheimer’s Disease
Kaydee Johnson & Sophia Root	Public Health & Community Health Education	Keely Rees	Analyzing the Effectiveness of Mental Health Community Care: Caring for Ourselves & Each Other
Katie Johnston, Amber Johnson, & Maya Biese	Biology	Jaclyn Wisinski	Effects of Breast Cancer on Megakaryocyte Proliferation
Tyler Kaiser	Biology	Jaspreet Kaur	Effects of Orchid-Specific Bacteria in Addition to Orchid Mycorrhizal Fungi on Orchid Germination
Nicole Kooij	Biology	Tisha King-Heiden	Effects of Chronic Exposure to Thiamethoxam on the Innate Immune Response of Zebrafish (<i>Danio rerio</i>) Embryos
Caelen Lansing	Biology; Exercise and Sport Science	Jennifer Klein & Daniel Freidenreich	Characterizing the Response of Extracellular Vesicles to Aging and Resistance Training
Caelen Lansing	Biology; Exercise and Sport Science	Jennifer Klein & Daniel Freidenreich	Characterizing the Response of Extracellular Vesicles to Aging and Resistance Training: Neurons
Cole Letter	Exercise and Sport Science	Ward Dobbs	Interpretation of the Reactive Strength Index in Division III Athletes
Spark Lim	Psychology	Jason Sumontha	Color-Blindness Racial Attitudes and White Fragility influenced White Individuals’ Racial Justice Commitment in Predominantly White Campus
Dirk Lueck	Geography & Environmental Science	Niti Mishra	Examining Deep Learning Techniques for Detecting Spatially Complex Remnant Hill Prairies in Remotely Sensed Imagery
Brenna Lundgren	Biology	Alder Yu	Determination of Cyclic Bacterial Species Variation in PER-deficient <i>Drosophila melanogaster</i>
Madeline Meltesen	Archaeology & Anthropology	Heather Walder	Analyzing the Spatial Distribution of Lithics at Frog Bay Tribal National Park
Elizabeth Meyer	Psychology	Bianca Basten	Do Individual Differences in Tolerance of Ambiguity and the Role of Situational Ambiguity Affect Memory Accuracy When Exposed to Misinformation?
Grace Meyer	Biology	Cord Brundage	Immunohistochemical Characterization of Developmental Changes in Brainstem Serotonergic Networks
Micah Missall	Exercise and Sport Science	Ward Dobbs	Prevalence of Low Energy Availability in Collegiate Wrestlers
Jack Morrison	Biology	Jaclyn Wisinski	Using Sulprostone to Activate Phosphorylated Rap1B

Name	Department	Mentor	Title
Dylan Motschenbacher	Biology	Cord Brundage	Toxicity of Nicotine and Imidacloprid in Chick Embryos
Sam Nelson	Biology	Anita Davelos	Ectomycorrhizal Tree Communities of the Kickapoo Valley
Sabrina Neurock	Archaeology & Anthropology	Heather Walder	Place-Based Archaeology at the Old Pageant Grounds Site in Red Cliff, Wisconsin
Camryn Oachs	Microbiology	Peter Wilker	Sequencing Influenza Viruses Generated after Serial Passage Under Defined Bottlenecks
Kacie O'Hearn	Mathematics & Statistics	Melissa Bingham	A Median Estimator for Three-Dimensional Rotations with Applications to Joint Data
Anika Oplanic	Biology	Tisha King-Heiden	Influence of Thiamethoxam on Metamorphosis and Thyroid Action in Zebrafish
Katherine Osborne & Margaret Kaiser	Psychology	Alexander O'Brien	Training Implicit Associations That May Be Detected on an IAT Test and Present in Aesthetic Picture Survey
Sidney Paulson	Archaeology & Anthropology	Elizabeth Peacock	How Working Students (Don't) Balance Work and School
Katelyn Phelps	Chemistry & Biochemistry	Daniel Grilley	Understanding the Secretion of a Toxic Protein via a Two-Partner Secretion Pathway
Aliyah Pillai	Chemistry & Biochemistry	Daniel Grilley	Exploration of Biofilm Regulator Protein Regulator
Morgan Priem	Chemistry & Biochemistry	Daniel Grilley	Determining the Effects of Poly-A Tracts and Monovalent Cations on Nucleosome Equilibrium and Dynamic
Ana Radoc	English	Bryan Kopp	Gone Phishing: A Comprehensive Study of Phishing Prevention Tactics at UWL
Sarah Remiker	Microbiology	Michael Hoffman	Mapping Ubiquitin Sites on the HPIV3 Matrix Protein with a Focus on the Nuclear Localization Region
Samuel Richardson	English	Bryan Kopp	The "Anti-American Liberal Elite" Conspiracy Theory and the Construction of Hegemonic Narratives
Mikaela Robarge	Sociology & Criminal Justice	Carol Miller	My Language, My Country: Study of Language and National Identity Across Ireland and The United States
Madeline Ross	Chemistry & Biochemistry	Kelly Gorres	Effect of Aripiprazole on Interleukin-15 (IL-15) and the Epstein-Barr Virus
Olivia Rossman & Sophia Maida	Biology	Alder Yu	The Effect of Genetically Disrupting Circadian Rhythms on the Usage of Mutagenic DNA Repair
Erin Roup & Evelyn Johnson	Biology	Barrett Klein	Decoding The Dance of Sleepless Bees: Behavior, Acoustics, and Thermal Changes in the Communication of Honeybees Experiencing Sleep Loss

Name	Department	Mentor	Title
Katie Sartori	Psychology	Kevin Zabel	When Racial Attitudes Take Flight: Implicit Attitudes and Perceptions of Warmth and Competence toward Airline Employees
Nate Schacherl	Mathematics & Statistics	Chad Vidden	Modeling the Spread of COVID-19 with a Neural Network Learned ODE System
Elizabeth Schneider	Chemistry & Biochemistry	John May	Structure and Stability of a <i>Salmonella</i> Copper Resistance Protein with Changes in a Functional Region
Megan Scott	Mathematics & Statistics	Susan Kelly	Researching the Life and Mathematics Research of Gloria Ford Gilmer
Jeremiah Sesvold	Biology	Eric Strauss	Measuring the Level of Microplastic Pollution in the Black River
Samantha Spencer	Biology	Alder Yu	Detection of Gut Microbiome Changes in Wild Type and Circadian Rhythm Mutant <i>Drosophila</i> Larvae
Maddy Stegeman	Archaeology & Anthropology	Elizabeth Peacock & Amy Nicodemus	Being a Woman in Anthropology/ Archaeology: Experiences Past and Present
Bradley Stephens	Microbiology	William Schwan	Examination of <i>fimB</i> Transcriptional Start Site Point Mutations on Type 1 Pilus Expression in <i>Escherichia coli</i> Growing in High pH/High Salt Environment
Owen Thompson	Chemistry & Biochemistry	Kelly Gorres	Fusion of a Cancer-Associated Protein to Promote Solubility
Owen Thompson	Chemistry & Biochemistry	Kelly Gorres	Structural Determination of a Viral Protein by SAXS
Maxamilian True	Chemistry & Biochemistry	John May	Developing a Purification Method to Isolate a Nonfunctional Variant of the Copper Resistant Protein DcrB
Megan Vandermause	Exercise and Sport Science	Naoko Giblin	Can Prophylactic Knee Braces Change Mechanics when Worn during Exercise?
Mariah Wagner	Biology	Anton Sanderfoot	Microplastics Cause a Model Alga to Clump: Is it the Cell Wall, Growth Phase, or the Plastic?
Matthew Waite	Biology	Ross Vander Vorste	Determining the Best Conditions for Chironomidae Population Growth and Development in a Controlled Environment
Zion Wallace	Biology	Anita Davelos	Ectomycorrhizal Fungal Communities Associated with Hemlock in the Kickapoo Valley
Skylar White	Microbiology	Daniel Bretl	Characterization Of <i>Myxococcus xanthus</i> Phenotypes in Low Oxygen Environments
Cassidy Williams & Alyssa Ottum	Exercise and Sport Science	Jennifer Klein & Daniel Freidenreich	Extracellular Vesicle Influence on Macrophage Polarization and Proliferation

Name	Department	Mentor	Title
Bao Xiong	Theatre & Dance; English	Nic Barilar, Louise Zamparutti, & Mary Leonard	Creative Research for Folklore Inspired Play
Ella Yost	Psychology	Melanie Cary	Mental Imagery, Mental <i>Imagerie</i> : Keyword Mnemonics and Rote for Acquiring Second Language Vocabulary
Meredith Zannacker	Chemistry & Biochemistry	Sujat Sen	Fabrication of Porous Multi-Metallic Thin Films for the Catalytic Conversion of Carbon Dioxide (CO ₂) Conversion
Kassandra Zimmer	Biology	Eric Strauss	Abundance of Microplastics in Silver Carp (<i>Hypophthalmichthys molitrix</i>) in the Upper Mississippi River

**2023 RECIPIENTS OF THE GRADUATE RESEARCH,
SERVICE, AND EDUCATIONAL LEADERSHIP AWARDS**

Name	Program or Department	Faculty Sponsor	Title
Sam Bach	Physical Therapy	Michelle Olson	International Clinical Education Experience: India
Cheyenne Banasik	Biology - Physiology	Margaret Maher	Associations of Polymorphisms in Vitamin D and Iron Related Genes with Vitamin D Supplementation and Iron Status in Women
Maxwell Bohl	Microbiology	Peter Wilker	Analysis of Adaptive Mutations in Influenza Virus After Genetic Bottlenecks
Nik Carpenter	Clinical Exercise Physiology	Jacob Caldwell	The Effects of Capsaicin on The Exercise Pressor Reflex
Anna Davenport	Exercise & Sport Science	Daniel Freidenreich	Chronic changes in red blood cell characteristics as a contributor to long COVID
Noah Duke	Biology - Cellular and Molecular	Jennifer Klein	Human Aging and Exercise-Induced Extracellular Vesicle Alteration of Immune Cell Activity
Anna Edsill	Physical Therapy	Inga Cluppert	UWL Physical Therapy Clinical Experience at KLE Academy of Higher Education and Pediatric Center – Belagavi, India
Sydney Gentilli	Athletic Training	Naoko Giblin	The Impact of Menstrual Cycle Phases on Exercise Performance
Katie Hall	Physical Therapy	Patrick Grabowski	UWL Physical Therapy Clinical Experience at KLE (Karnataka Lingayat Education) Academy of Higher Education in Belgaum, Karnataka, India
Jacob Hansel	Biology	Anita Davelos & Todd Osmundson	Ectomycorrhizal Fungi and Tree Diversity of the Kickapoo Valley Vernon County, Wisconsin U.S.A.
Arden Heath	Microbiology	Paul Schweiger	Characterizing Glucose Transport of <i>Gluconobacter oxydans</i>
Danielle Hudson	Biology	Barrett Klein	The Effects of Aggregate Nesting and Urbanization on Solitary Ground-Nesting Bees
Kori Kruegel	Biology - Cellular and Molecular	Jaclyn Wisinski	Identifying the Role and Signaling Pathway of Rap1b in Megakaryocytes
Hannah Kufalk	Clinical Exercise Physiology	Jacob Caldwell	Effects of Intermittent Hypoxia on the Central and Peripheral Vascular System
Kayla Lass	Physical Therapy	Steni Sackiriyas	Enrichment of UW-La Crosse Doctor of Physical Therapy Education through International Study in India
Brooke Leone	Physical Therapy	Patrick Grabowski	Blood Flow Restriction Effects on Pain Pressure Thresholds and Betaendorphins

Name	Program or Department	Faculty Sponsor	Title
Mimi Lucido	Clinical Exercise Physiology	Ward Dobbs	Recovery Patterns in ROTC Cadets Following the Northern Warfare Challenge
Drew Lysaker	Biology	Barrett Klein	La Crosse Virus and Mosquito Populations in Southwestern Wisconsin
Vanessa Mbuyi	Biology	Scott Cooper	Prevention of Cold-Induced Apoptosis in Platelets from Humans and Thirteen-Lined Ground Squirrels
Benjamin Patschull	Biology - Aquatic Science	Ross Vander Vorste & David Schumann	Development of a Novel Method for Freshwater Fisheries Sampling in Winter Using Underwater Cameras
Payton Ruckdaschel	Exercise & Sport Science	Daniel Freidenreich	The Dose Effect of Sugar Sweetened Beverages on Vascular Function and Metabolism When Consumed after Exercise
Kaitlyn Schneider	Biology - Cellular and Molecular	Sierra Colavito	The Effect of Exercise-Induced Exosomes in Triple Negative Breast Cancer Cells
Cara Senn	Biology	Todd Osmundson	Analysis of Plant and Fungal Lead Contamination in the La Crosse River Marsh
Mason Stenzel	Microbiology	Daniel Bretl	Isolation and Characterization of Hemerythrin Proteins from <i>Myxococcus xanthus</i>
Shahina Sultana	Microbiology	William Schwan	Examination of <i>fimB</i> Transcriptional Site Point Mutations on <i>fimB</i> Transcription in Uropathogenic <i>Escherichia coli</i>
Brandon Thill	Biology - Aquatic Science	Jason Freund	Evaluating Suitable Habitat for Brook Trout (<i>Salvelinus fontinalis</i>) in the Driftless Area within Sandstone and Dolostone Rock Geologies

PRESENTER INDEX

A, B, C, D, E are the poster sessions

P= Poster; O=Oral Presentations; E=Exhibits

F=Faculty & Staff; G=Graduate Students; U=Undergraduate Students

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Anderson, Tristan	A.U.11	Charniak, CJ	A.G.22
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Ankeny, Samantha	B.U.14	Christensen, Olivia	D.U.7
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Byrne, Sophie	O.U.3	Fisher, Anna	O.U.16
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Carvenough, Jordan	E.U.6	Fleegal, Alexa	E.U.11

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Fortner, Amelia	D.U.13	Holen, Erika	O.U.27
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Funk, Courtney	A.G.19	Hutchison, Gavin	O.U.26
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Galbraith, Carly	D.U.15	Inoue, Nicole	D.U.6
Gale, Chelsea	E.U.12	Jackan, Macy	B.G.44, C.G.44
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Gergen, Alex	B.U.11, E.U.13	Jahn, Abigail	D.U.28
Gersbach, Cassandra	O.U.3	Jajtner, Trisha	B.U.26
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Gilles, Alana	A.G.32	Jenks-Recker, Payton	A.U.15
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Gove, Morgan	E.G.40	Jens, McKenna	A.G.30
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Gutenberg, Max	B.U.11	Jonas, Erin	B.U.16
Guy, Corbin	A.U.18	Jones, Rayeann	O.U.5
Hackenmueller, Noelle	E.U.14	Kaiser, Maggie	O.U.13
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Hahn, Morgan	A.U.3	Kargel, Kyle	C.G.35
Haldiman, Makenzie	B.U.16	Kauffman, Mason	A.G.21
Hall, Katharine	E.G.31	Key, Travis	O.U.15
Hameister, Jenasea	A.U.4	Kleinke, Xander	C.U.17
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Hellenbrand, Ethan	B.U.10	Kowitz, Mike	A.G.21
Hendrix, Sarah	O.U.28	Kozich, Elena	D.G.46
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Higgins, Jenelle	B.G.41, C.G.41	Kufalk, Hannah	E.G.34
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Larsen, Kristi	B.G.45, C.G.45	Muhr, Benjamin	O.U.7
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Lecker, Elizabeth	B.G.47	Nachreiner, Kristy	A.U.15
Lee, Rebecca	B.G.44, C.G.44	Naughton, Isabella	O.G.6
Lemanski, Miah	C.U.16	Nelson, Ally	C.G.39
Leone, Brooke	A.G.27, A.G.28	Nelson, Amanda	D.U.25
Lettenberger, Avery	D.G.42	Nelson, Carver	B.U.21
Letter, Cole	C.U.15, D.U.23	Neurock, Sabrina	E.U.18
Lilly, Madalyn	B.U.17, C.U.18	Nisius, McKenzie	A.U.11
Lim, Spark	C.U.18	Noble, Richard	O.U.11
Link, Micah	A.G.32	Nordbeck, Morgan	B.G.50
Lopez-Johnson, Grace	O.U.23	Nordberg, Riley	D.U.15
Lubahn, Cora	B.U.20	Oachs, Camryn	D.G.40
Lucido, Mimi	A.U.5, D.G.43	O'Bryon, Andrea	A.G.34
Lueck, Dirk	B.U.4	O'Hearn, Kacie	E.U.19
Lundgren, Brenna	A.U.2	Olson, Callie	B.G.41, C.G.42
Lutker, Kaley	C.U.19	Olson, Hannah	B.G.51
Lysaker, Drew	E.G.37	Olver, Alex	E.G.38
Mack, Lydia	C.G.36	Oplanic, Anika	E.U.3
Maerz, Grace	B.U.11	Oppermann, Sara	E.U.20
Maida, Sophia	B.U.26	Osborne, Katherine	O.U.13
Mallinger, Noelle	D.U.25	Osmeck, Courtney	D.U.10
Marlis, Antonia	B.U.6	Passow, Rachel	A.G.36
Marting, Drew	B.G.50	Patschull, Ben	B.G.55
Masarik, Courtney	B.U.20	Paulson, Sidney	B.U.23
Mbuyi, Vanessa	C.G.36	Pehrson, Kenley	B.G.42, C.G.42
McElfresh, Regan	B.G.48	Penkwitz, Anna	B.G.41, C.G.46
McGuigan, Ian	C.G.34	Peoples, Emily	B.G.45, C.G.45
McNeill, Morgan	B.U.11	Pernsteiner, Lydia	C.F.47
Mechler, Logan	O.U.31	Perry, Lauren	A.G.35
Meltesen, Madeline	C.U.20	Petersen, Molly	B.U.24
Merzenich, Jessica	C.G.38	Peterson, Abbey	E.U.26
Mettler, Claire	A.G.27	Peterson, Katie	D.U.28
Meyer, Elizabeth	D.U.24	Phelps, Katelyn	B.U.5
Meyer, Lucas	E.U.17	Pillai, Aliyah	B.U.25
Miller, Bethany	D.U.20	Plautz, Sydney	C.G.39
Miller, Fionna	B.U.17	Polfus, Seth	E.G.32
Miller, Lexi	D.G.46	Pollard, Blythe	O.U.19
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Moore, Melody	B.U.32	Reed, Kelley	O.U.27
Morris, Kimberly	E.U.14	Reid, Nick	B.G.44, C.G.46
Morrison, Jack	B.U.21	Reischl, Kinzie	D.U.25
Motschenbacher, Dylan	D.U.27	Remiker, Sarah	E.U.22

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Richardson, Sam	C.U.22	Stern, Emily	A.G.22
Richter, Carly	B.G.43, C.G.44	Stevenson, Justin	C.U.28
Rieman, Seth	B.U.11	Studer, Tristin	D.G.46
Robarge, Mikaela	A.U.12	Stukins, Dylan	B.U.31
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Rogers, Mason	B.U.27	Szymanski, Cade	D.U.34
Root, Sophia	B.U.19	Tara, Vivek	C.U.29
Rosendahl, Scott	E.U.23	Taylor, Jessica	C.U.16
Rossmann, Olivia	B.U.26	Teale, Madeline	A.U.16
Rothmeier, Will	C.U.25	Tessness, Chase	A.U.11
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ABSTRACT BOOK EDITORS

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ABBY PESCHGES

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