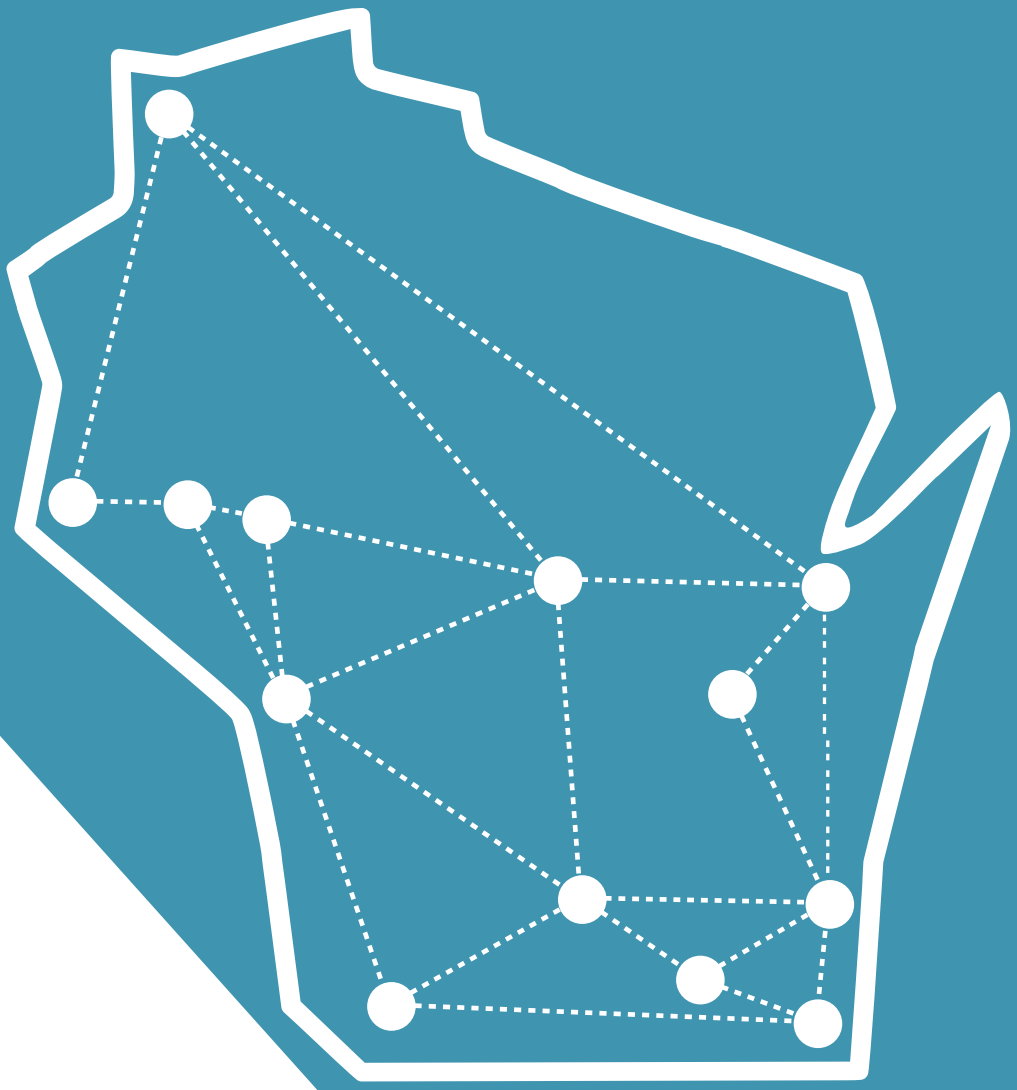

SYMPOSIUM FOR

UNDERGRADUATE RESEARCH, SCHOLARLY & CREATIVE ACTIVITY

May 3, 2025
Memorial Union, Madison, WI

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SYMPOSIUM FOR

UNDERGRADUATE RESEARCH, SCHOLARLY & CREATIVE ACTIVITY

LETTER OF WELCOME

From the President

Welcome!

We are delighted to host this year's Universities of Wisconsin Symposium for Undergraduate Research, Scholarly, and Creative Activity here in Madison, Wisconsin, home of our flagship university, UW-Madison.

This symposium brings together students and research mentors from all 13 of our UW universities, as well as countless guests. Expect to learn and be inspired! The diversity of projects on display – from research posters to oral presentations to art and creative projects – is a testament to the spirit of curiosity and problem – solving that we encourage throughout the Universities of Wisconsin.

It's vital to us that the educational experiences we offer are relevant and apply to real-world scenarios – both in what we teach in our classrooms and laboratories but also the skills and knowledge our students gain. Student projects like the ones presented at this symposium showcase how hands-on experience is gained by identifying challenges and applying creativity, innovation, data, and problem-solving skills to find solutions. And by the way, these endeavors also give our students the kind of experience, knowledge, and skills that will make them sought after by employers.

I'd like to thank the mentors who have provided invaluable support along the way. We know your commitment to enriching your students' education with these projects often demands going the extra mile, and it does not go unnoticed. It is your dedication to your students that helps make all this possible, and we sincerely thank you.

To all our student participants, thank you for sharing your passion and your work. The projects on display at this symposium are a great demonstration of how the Universities of Wisconsin can be a shining example of the creative thinking, innovation, and entrepreneurial spirit that is so necessary to keep Wisconsin's economy and communities vibrant and strong.

Thanks for coming – and enjoy the symposium!

, Jay Rothman
President, Universities of Wisconsin

UNIVERSITIES OF WISCONSIN

KEYNOTE SPEAKER

Dr. Robert G. Hancock

Metropolitan State University of Denver

UNVEILING THE WONDERS OF ONE OF NATURE'S MOST MISUNDERSTOOD CREATURES...TINY BLOODSUCKERS, BUG IMPACTS

Dr. Hancock is a passionate, dynamic, and accomplished Biology educator, with the added expertise of being a uniquely skilled medical entomologist and natural history filmmaker. For the past 16 years, he has been a professor at Metropolitan State University of Denver (MSU Denver), and prior to joining MSU Denver, he had a long career at Cumberland College (now the University of the Cumberlands). His work centers on teaching, advising, and mentoring undergraduate research, with a focus on the behavior and physiology of blood-feeding insects like mosquitoes, blackflies, and bedbugs. Since 2009, he has guided well over 100 student projects, and his students have presented their findings at local, regional, and national conferences, with many contributing to peer-reviewed publications. Dr. Hancock's students' research experiences have led them to successful careers as healthcare professionals, scientists, and educators.

In addition to teaching and research, Dr. Hancock is a natural history filmmaker, using his *MosquitoMan* films to communicate science to broad audiences. His current film project, *MosquitoMan: Invasion of the Man Biters*, explores the global spread of *Aedes aegypti* and *Aedes albopictus*. Dr. Hancock recently presented segments of this documentary to regional public health professionals and mosquito control experts in Jackson, Wyoming. Meanwhile, his lab continues to study the behavior of these invasive species, and they have collaborated with Colorado mosquito control agencies and the State Department of Health on mosquito surveillance efforts. Additionally, his lab also investigating the unique behaviors of neotropical *Sabethes* mosquitoes and plans to establish a laboratory colony of *Culex tarsalis* – a key West Nile virus vector – for future studies and an upcoming documentary, *A Tale of Two Mosquitoes*. More information on his film work is available at MosquitoMan Films.

Beyond science, art has always played an integral role in Dr. Hancock's life. As an entomology graduate student in the 1980s and 1990s, he worked as a professional sculptor, showcasing bronze sculptures at Wildlife and Western Art shows across the Midwest. Around the same time, Dr. Hancock joined the horn section of a Columbus, OH blues band, where he met singer-songwriter Diane Jobe—now wife and artistic partner. Today, in addition to his academic career, he manages and plays trumpet for the Diane Jobe Band in Denver, Colorado.

SYMPOSIUM SCHEDULE

8:15 am	Registration/Attendee Sign-In Opens (Closes at noon) (Great Hall Foyer) *Light breakfast will be provided*
9:15 – 9:30 am	Opening Remarks (Great Hall)
9:45 – 11:00 am	Oral Presentations and Performances (3rd and 4th Floors) Oral Presentations - Beefeaters Room Oral Presentations - Langdon Room Oral Presentations - Council Room Oral Presentations - Capitol View Room Oral Presentations - Multicultural Greek Council Room Performances - Old Madison Room
11:00 – 12:00 pm	Poster & Project Display Session I (Tripp Commons)
11:00 – 12:00 pm	Art Displays (Profile Room)
12:15 – 1:30 pm	Lunch and Keynote Presentation (Great Hall) Keynote Speaker: Robert G. Hancock, Metropolitan State University of Denver
1:45 – 2:45 pm	Poster & Project Display Session II (Tripp Commons)
3:00 – 3:15 pm	Closing Remarks and Acknowledgments (Great Hall)

ACKNOWLEDGMENTS

Gratitude and Appreciation

Professionals from across the Universities of Wisconsin collaborated to provide insight, perspective, and time for this important event. We thank them for their support and expertise!

We would like to extend our sincere appreciation to the following individuals for their support and for making this day possible:

From the Universities of Wisconsin:

Jay O. Rothman, *President, Universities of Wisconsi*n

Johannes Britz, Ph.D., *Interim Senior Vice President, Office of Academic and Student Affairs*

Tracy Davidson, Ph.D., *Associate Vice President, Office of Academic Affairs*

Diane Waters, *Program Associate, Office of Academic Affairs*

Camila Pujades, *Student Assistant, Office of Academic Affairs*

Heather LaRoi, *Strategic Communications Director, Office of Public Affairs, Communications, & Branding*

Karin Wrzesinski, *Creative Manager, Office of Public Affairs, Communications, & Branding*

All student presenters, mentors, faculty, administrators, staff, planning committee members, moderators, volunteers, and attendees.

UNDERGRADUATE RESEARCH, SCHOLARLY, & CREATIVE ACTIVITY UW UNIVERSITY REPRESENTATIVES

UW-Eau Claire	Erica Benson, David Jewett
UW-Green Bay	Renee Ettinger
UW-La Crosse	Nicholas Bakken**
UW- Madison	Cheri Barta Rossi**
UW-Milwaukee	Kyla Esguerra**, Jessica Schuld
UW-Oshkosh	Kathy Zuckweiler
UW-Parkside	David C. Higgs**
UW-Platteville	Holly Attenborough, Hannah Korell
UW-River Falls	Molly Gerrish
UW-Stevens Point	Troy Espe, Sarah Stajkowski
UW-Stout	Chela Cea, Anne Hoeltke
UW-Superior	Ilsa Hoeschen
UW-Whitewater	John Frye

***Denotes symposium planning committee member*

PRESENTATION ABSTRACTS

Investigating DNA Sequences for Nuclear and Chloroplast Gene Regions in *Hydrocotyle* (*Araliaceae*)

Kylie Abbott (UW-Whitewater)– Biology
Mentor: Nicholas Tippery

Hydrocotyle (Water Pennywort) is a genus of aquatic and wetland herbaceous plants, comprising 180 species worldwide. Within North America, there are only 8 native species of *Hydrocotyle* and 3 non-native species, yet not every species is represented by comparable DNA sequence data. The absence of DNA sequences for some species has prevented them from being included in a comprehensive phylogeny for the genus. Moreover, unknown plants cannot be identified using DNA sequences if there is not a suitable comparison sequence available for every species. I set out to obtain DNA sequences for species that had not been sequenced before, and to make sense of existing sequences that may have been misidentified. I learned that about one-tenth of previously published sequences had been misidentified, sometimes even to the wrong plant genus or family. I was able to obtain new data for the native *H. americana*, using specimens from Wisconsin, and the non-native *H. moschata*, which is native to New Zealand and found in California. In this study I also clarified the names and genetic distinctness of two other native species, *H. umbellata* and *H. verticillata.* The native North American species are all closely related, and the next most closely related plants are native to Europe and South America. This study has produced the most complete phylogenetic understanding of *Hydrocotyle* to date.

Poster Presentation **Session II (1:45 - 2:45 pm), Poster #4, Tripp Commons**

MED-T: An Analysis of the Demographic Shift of the Healthcare Field

Eddie Ahler (UW-Platteville) – Biology
Coauthor: Trevor Hudson
Mentor: Richard Dhyanchand

In 2021, Wisconsin Council on Medical Education and Workforce (WCMEW) published "THE FUTURE OF WISCONSIN'S HEALTHCARE WORKFORCE", which provided a review of Wisconsin's healthcare workforce across a broad spectrum of professionals. The report included projections of supply and demand of workers in 2035 and concluded that an overall shortage of 19% (~25,000 workers) was likely unless aggressive actions were taken. The declining population of male students in the pre-health educational pathway is a major concern at universities nationwide. Reversing this trend could be part of the solution. A demographic breakdown of the enrollment at UW-Platteville was performed and indicates decreasing trends in male student attendance across all colleges at this university. Specifically, we found that the male enrollment in the department of biology decreased by 8.2% over the past 10 years. This data was corroborated by publicly available data from other universities, showing that UW-Platteville is not alone in the decreasing enrollment of male students. The purpose of this analysis is to investigate this trend in greater detail locally and support a parallel study harnessing focus groups aiming to understand the male student motivation behind the decrease. Understanding and shifting this trend could help address Wisconsin's projected workforce shortfall.

Poster Presentation **Session II (1:45 - 2:45 pm), Poster #1, Tripp Commons**

What Changed on the Journey? How Chinese Food Carries Culture and Its Adaptation to the American Market

Gwen Albers (UW-Eau Claire) – International Business, Marketing Analysis
Mentor: Kaishan Kong

This project investigates how cultural products, practices, and perspectives are shaped and evolve through intercultural experiences over time, with a specific focus on Chinese cuisine in the United States. It addresses two central questions: (1) why and how did earlier immigrants adapt Chinese food to cater to the American community? and (2) what is the current development of Chinese cuisine in the U.S., and how does this evolution reflect broader cultural development? The study employed a mixed-methods approach, combining a literature review and qualitative research. Four key themes emerged: the impact of food culture, the role of modern innovation, the influence of cultural identity, and the significance of cultural adaptation. These themes informed a survey of 35 students at a mid-sized Midwestern university and in-depth interviews with 8 Chinese foreign exchange students at the same institution. The responses revealed a strong link between food and culture, highlighting how migration and intercultural exchange foster the evolution of traditional practices in a new environment. The findings illustrate how Chinese cuisine in the U.S. has transformed over time, reflecting a blend of preservation, adaptation, and innovation. This process not only meets local tastes but also challenges perceptions of authenticity in food. Additionally, the study emphasizes how the creation of hybridized culinary traditions contributes to cultural identity while promoting dialogue between different cultural groups. By examining the historical and contemporary transformations of Chinese cuisine, this research sheds light on the broader dynamics of cultural exchange, globalization, and the role of food as a vehicle for cultural connection and evolution.

Poster Presentation **Session I (11:00 - 12:00 pm), Poster #39, Tripp Commons**

Parasite Communities in Fish Populations of Northern Wisconsin

Connor Alton (UW-Parkside) – Biological Sciences
Mentor: Jessica Orlofske

Fish parasites are vital to aquatic ecosystems, serving as indicators of water quality and ecosystem health while revealing environmental stressors. However, parasites also harm fish health and quality, which can negatively impact the stability of commercial and recreational fisheries. I expect lake size will impact the intensity of parasites in the fish. I predict that smaller lakes will have a greater intensity of parasites since there could be a greater fish density facilitating parasite transmission. Using traditional hook and line methods, I collected four species of game fish, including *Sander vitreus* (Walleye); *Micropterus salmoides* (Largemouth Bass), *Micropterus dolomieui* (Smallmouth Bass), as well as E*sox lucius* (Northern Pike) from three lakes in Northern Wisconsin. Because of the unpredictability of catching only game fish, I also opportunistically harvested panfish (*Lepomis macrochirus*, Bluegill; *Lepomis gibbosus*, Pumpkinseed; and *Perca flavescens*, Yellow Perch) to obtain an accurate census of fish parasites in these lakes. In addition to the capture location, I also documented environmental characteristics including water temperature and clarity. Overall, I dissected 31 game fish and 22 pan fish (Pike=17, Turner=23, and Amik=13). I recovered parasites from every fish in this study. Among the lakes, most parasite taxa were shared in gamefish; however, intestinal helminth abundance varied (Pike=69.08, Turner=91.2, and Amik=44.88). Contrary to my prediction, the smallest lake had the lowest intensity of parasites per gamefish. A commonality among the three lakes was the presence of the dominant parasite *Neascus* spp. (Blackspot). Furthermore, *Neoechinorhynchus* sp. was a dominant intestinal helminth observed at all three lakes. Further analysis will focus on resolving the parasite community for each fish species. Establishing an initial parasite community for these lakes can be used to help track how communities fluctuate in the future in response to changes in external factors.

Poster Presentation **Session I (11:00 - 12:00 pm), Poster #6, Tripp Commons**

The Effects of Biochar Incorporation on Arbuscular Mycorrhizal Fungi Colonization of Alfalfa Plant Roots

Carissa Ashman (UW-Green Bay) – Environmental Engineering Technology
Mentor: Kpoti Gunn

Organic materials transformed to biochar using a pyrolytic process present the opportunity to immobilize contaminants chemicals from agricultural soil profiles, therefore protecting public health. Biochar has also been shown to improve soil quality, therefore creating ideal conditions for nutrients cycling and plant growth. Agriculture is a key economic sector in Wisconsin, using nearly 13.8 million acres of the state's lands, with more than 6% of agricultural land used for alfalfa in support of dairy production. Arbuscular mycorrhizal fungi (AMF) are symbiotic soil fungi that enhance plant nutrient and water uptake in exchange for root exudates, carbon in the form of sugar and organic acids. While past studies have found strong mutual benefits to the symbiotic relationship between alfalfa and AMF, the literature is silent about the impact of biochar on that relationship. This study investigates the effects of woodchip-based biochar application on AMF colonization and growth of alfalfa (*Medicago sativa*). We hypothesize that increased biochar incorporation enhances the arbuscular mycorrhizal fungi colonization in the alfalfa roots, with greater biochar ratios resulting in greater AMF colonization. This study examined two key aspects: the percentage of roots colonized by AMF, and the growth performance of the plant. Measuring AMF colonization provides insights into enhanced interactions that occur between AMF and biochar. Field conditions were simulated in a controlled condition greenhouse using the ceramic Wagner pot method recognized by the scientific research community as the most effective method to test for the effects of soil amendment on field crops. The pots were filled with a topsoil collected from a local agricultural field that has recently hosted alfalfa production. The top 6 (six) inches of the pots were set up to have varying biochar to-soil ratios of 0%, 1%, 2.5%, and 3.5% w/w. The percentage of roots that have AMF colonization was measured on days 34, 48, 62, and 76 using the root staining method. Plant heights were measured every other day. Preliminary data showed a positive statistical relationship between biochar ratios and plant height. Upcoming AMF colonization measurements will provide information on the relation between biochar application and AMF population. Results from this study will support the innovative use of biochar application as a strategy to enhance carbon sequestration in agricultural soils in Wisconsin.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #47, Tripp Commons**

You're Drilling Me Crazy: Trepanation and the Evolution of Human Knowledge and Behavior

Megan Bahr (UW-Parkside) – Anthropology, Sociology
Mentor: Keith Biddle

Performed as early as the Neolithic (around 10,000 BCE), trepanation is the practice of drilling, scraping, or cutting into the skull. The Neolithic was defined as the beginning of human settlement, leading to the further advancement of stone tools. Trepanation highlights this advancement, as the procedure has been executed with tools made from a variety of materials available to the different cultures. This variety of material may also contribute to the variation in the methods used. Some variation is claimed in the motives, characterized as being either therapeutic: to treat discomfort and/or injury, or ritualistic: to remove evil spirits. Modern versions of this procedure exist and are known as craniotomies, craniectomies, or burr hole surgeries. Just as in past societies, these procedures are used to treat brain injuries known today. In the archaeological record, skulls exhibiting signs of trepanation have been found over the past century across the world. And yet, research on the procedure has been sporadic through the years, leaving questions about both methods and motives. Therefore, a review of the extant literature from these different geographical regions is needed for better clarity. The purpose of this project is to review past literature from around the world and compare these cases by region and time. Study methods will involve statistical analysis to compare the frequency of trepanation by the different techniques and motives hypothesized by each of the authors. Early results of statistical analysis indicate a higher frequency of therapeutic trepanations across time and region, with the locations, methods, and rate of healing presenting patterns in the data as well. This research contributes to discussions on the evolution of human knowledge and behavior through time and across geographic space. Through these discussions, trepanation can be recognized throughout different cultures as an innovative procedure rather than a deviant activity.

Poster Presentation **Session (II (1:45 – 2:45 pm), Poster #7, Tripp Commons**

Soybean (Glycine max L.) Response to Increased Nickel Soil Content

Brendan Baird (UW-Madison) – Horticulture
Mentor: Natasha Rayne

Nickel (Ni) is an essential nutrient to plants and has been shown to play a role in urease production, thus increasing nitrogen (N) metabolism in soybeans (Glycine max L.). Nickel deficiencies have shown up in highly leached soils in Brazil and in randomly dispersed crops and soils in the U.S. A greenhouse study was conducted at the University of Wisconsin West Madison Research Station to evaluate the interaction between Ni and N- uptake and metabolism in soybean. A Ni deficient soil was collected in south central Wisconsin. Treatments added to the soil included six Ni rates of 0, 1, 2, 4, 8, and 16 ppm applied as NiSO4 and two rates of N, 0 and 200 ppm, applied as NH4NO3. Each treatment was replicated 4 times bringing the number of pots to a total of 48 (6x2x4). Six seeds were planted in pots with a plastic liner and were weighed every couple of days to add enough water to reach field capacity (29% wt/wt). The number of plants in each pot was reduced to three once the plants were established and then measurements were taken weekly. Measurements included height, chlorophyll, and growth stage. At maturity and termination, nodule count, nodule weight, Ni, N, and urease concentration in leaves were measured. Results show that as Ni rates increased N uptake and urease concentration in soybean plants increased.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #21, Tripp Commons**

Synthesizing Zinc Oxide for the Photocatalytic Degradation of Organic and Pharmaceutical Compounds

Nicholas Barmore (UW-Whitewater – Professional ACS Chemistry
Mentor: Steven Girard

Contamination of water supplies with difficult to filter organic compounds, including organic dyes and pharmaceuticals, presents a significant problem for lakes, rivers, and streams. Organic compound contamination can have serious effects on human and environmental health if not properly treated. Here, we investigate the photocatalytic degradation of the organic dye methylene blue with UV irradiation. Wide band gap semiconductors are of interest as photocatalysts: upon UV light exposure to semiconductors in solution, electrons can be excited into the conduction band. These excited electrons contribute to creating free radicals in solution, degrading organic components. Zinc oxide is one such semiconductor with a wide band gap of 3.3 eV that has shown much promise in the field for its low cost, ease of preparation, great photocatalytic capacity, stability, and biocompatibility. Unfortunately, ZnO has not seen utility due to TiO2, in general, having a higher number of active sites for photocatalysis, leading to higher percent degradation. This study will use TiO2 as a standard to compare degradation values too. Here, we present the synthesis of ZnO photocatalysts for degradation of methylene blue. First, a hydrothermal reaction between zinc acetate and hexamethylenetetramine is carried out in an equimolar solution of 1.0 M at 250 °C for 24 hours. The ZnO is extracted and a 0.0050 g sample is weighed out to add into a dish with 50 mL of 10 ppm methylene blue. This is then added into a dark UV chamber under stirring for 3 hours to allow for sample degradation, taking a sample every 30 minutes to quantify degradation efficiency. Finally, these samples are analyzed using UV-visible spectroscopy to determine the percent degradation of methylene blue. We will also report the effects of doping the ZnO with Sn, Mg, and Ce, in order to compare their photocatalytic activity relative to TiO2.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #37, Tripp Commons**

Time Matters-Investigating the Best Time for the Application of Cancer Treatment

Annette Barzano (UW-Parkside) – Applied Health Science Concentration Physician Assistant
Coauthors: Holly Skinner, Tabitha Badington, Katelyn Bergmann, Nolan Kraus, Tysly Butler
Mentor: Fabian Preuss

Cancer is the second leading cause of death in the USA. Tumor development is a major factor of cancer, with cell growth ranging from rapid to benign. The development of some tumors and applicable tumor treatment are bleak, with pancreatic cancer only 13% of patients live past 5 years after diagnosis. While numerous anti-cancer drugs have become available over time, more aggressive cancer effects typically lead to increase in the toxicity load and collateral damage to the host's tissues and organs. For this project, Athymic nude mice were utilized to study human pancreatic cancer cell development, as without a thymus the mice fail to develop T-cells, which normally would target and destroy cancerous or viral infected cells, making these animals very suitable for xenografting. Our athymic nude mice were injected with human pancreatic cancer cell lines subcutaneously and the cell deposits were allowed to grow for four weeks before evaluated for tumor development in the flank of the animal. At the four-week mark, the success rate of tumor implantation is determined and positive animals subjected to cancer drug treatments. Animals were separated into four groups, receiving weekly treatments at different times of the day (morning, afternoon and night), with the 4th group serving as vehicle control (not treatment). The animals' health was monitored daily and their body weight and tumors sizes assessed weekly. Gemcitabine (an FDA approved anticancer drug) was injected into the tumors to determine the time-of-day admission on treatment and body toxicity.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #35, Tripp Commons**

A Summer Poem: Exploring the Poetics of Personal Alchemy & Defiance of Optimization in the Long Poem Form

Sophie Bebeau (UW-Green Bay) – Writing & Applied Arts B.F.A.
Mentor: Christopher Williams

The long poem, traditionally associated with ancient epics like Beowulf and the Odyssey, or literary feats of ambition like Milton's Paradise Lost and Pound's The Cantos, has long been a vehicle for exploring expansive narratives and complex themes. In today's optimization-obsessed society, where attention is fragmented and engagement often superficial, the art of writing and reading the long poem becomes increasingly vital to revive and evolve, inviting willing sustained attention and exploration. How, then, can the contemporary poet harness the power of the long poem to subvert today's cultural zeitgeist? My project, A Summer Poem, takes up this question, using the long poem form to explore themes of mental illness, generational trauma, and resilience through a 92-day chronology that spans across each day of the summer months—June, July, and August. Drawing inspiration from contemporary long poems like Bernadette Mayer's Midwinter Day, Annelyse Gelman's Vexations, and Maggie Nelson's Bluets, A Summer Poem constructs a narrative of transformation, inconsistency, and a resignation of oneself to life by employing poetic techniques that are particularly effective within the long poem structure. In this presentation, I will read selected sections from A Summer Poem, highlighting how poetic techniques and thematic elements specifically suited to the long poem form interact and evolve throughout the poem's progression. I will explore how the long poem form allows for a meandering, temporally linear exploration of themes that inherently resist linearity and stands in contrast to our contemporary culture of brevity and ultra-optimization. I will conclude with a broader discussion on how the long poem is uniquely suited as a vessel for exploring the poetics of personal alchemy, its potential as autopoietic machine, and what it can offer us in today's contemporary moment.

Performance **10:15 am, Old Madison Room**

Solving Math Problems Together: Exploring Translanguaging in Spanish-English Bilingual Children

Christine Becerra Lopez (UW-Madison) – Psychology and Chican@ & Latin@ Studies
Mentor: Martha Alibali

The current study aims to investigate the extent to which bilingual children shift between languages during collaborative math tasks and to explore the potential relationships between language shifting, known as translanguaging, executive function abilities, and mathematical abilities. By considering students' unique linguistic backgrounds, the study highlights the potential benefits of creating a translanguaging environment to enhance student's mathematical performance. Furthermore, this study aims to analyze any correlations or lack thereof between mathematical test scores, translanguaging and executive function. The research methodology includes pretesting, a collaborative intervention, and post-testing. This study will implement a mixed-design approach using qualitative analysis of language shifting moments and quantitative analysis to measure additional tasks such as executive function assessments and language use and proficiency evaluations. This study aims to contribute to the limited existing research on translanguaging in educational settings, ultimately promoting inclusivity and providing valuable insights into effective instructional strategies for bilingual students.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #17, Tripp Commons**

AI-Powered Intelligent Reporting System for Enhancing Physical Classroom Accessibility

Calvin Berndt (UW-Green Bay) – Computer Science
Mentors: Farzana Aktar and Iftekhar Anam

Physical classroom accessibility is often overlooked and can be a barrier for students with disabilities. Issues like inadequate lighting, inaccessible paths, limited resources and no audio support can hinder student engagement and academic success. To address these challenges, we propose an AI powered intelligent reporting system to assess and improve classroom accessibility. Our system uses the Classroom AUDIT standard, a widely accepted framework for accessibility assessment, built into a mobile app. Our app collects data through a structured questionnaire which is then analyzed using Trichotomous Tailored Sub-Branching Scoring (TTSS) method. This proprietary scoring system converts complex accessibility issues into measurable metrics generating clear actionable insights. A key innovation of this system is the ability to produce AI driven reports. Each report includes: 1. TTSS accessibility scores 2. Expert evaluations from accessibility professionals 3. AI powered recommendations using Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG) technology. By providing context specific recommendations our system goes beyond ADA compliance and offers solutions to improve learning environments. The system has been piloted in 70 classrooms at a Midwestern University and showed that simple changes like adjustable seating, tactile maps and lower blackboards can make a big difference. This interdisciplinary research provides a scalable and practical way to assess classroom accessibility. By giving institutions data driven insights our tool promotes inclusive education, student engagement, retention and academic success. Ultimately this project aims to make accessible classrooms the norm so every student can have an equitable learning experience.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #23, Tripp Commons**

Parent Factors and their Effects on Emerging Adult Internalizing Behaviors

Blake Beyer (UW-Parkside) – Psychology
Mentor: Meredith McGinley

This study examined how parental anxiety and depression influences emerging adult (EA) anxiety and depression, and whether this influence is carried through deleterious parenting behaviors such as overparenting, distress intolerance, and hostility. Research has indicated that parental mental health issues can disrupt emotional regulation, leading to distress intolerance and as a result, parenting behaviors such as hostility and overparenting (a parenting style that restricts a child's autonomy and is developmentally inappropriate). These parenting behaviors have been linked to increased depression and anxiety within emerging adults. The current study included 290 EAs and their closest parents; each completed surveys that measured mental health, parenting styles, and self-perceptions. Self-reported anxiety and depression were measured using the Depression Anxiety Stress Scales. Distress intolerance was measured using the Coping with Children's Negative Emotions Scale. The Multidimensional Overprotective Parenting Scale was used to measure overparenting, and the Warmth and Hostility Scale measured hostility. Key findings suggest that parental depression was associated with EA depression both directly and indirectly (through distress intolerance and hostility). Parental depression was also related to overparenting; however, overparenting did not predict EA depression. For anxiety, no direct link between parental and EA anxiety was found. Parental anxiety was associated with distress intolerance, overparenting, and hostility. However, the only significant mediation found for EA anxiety was the path among parental anxiety, overparenting, and EA anxiety. These results indicate that parental mental health is key in predicting EA mental health, especially when considering the role of parenting behaviors. Namely, parental mental health may spillover and adversely impact parental decisions, leading to behaviors such as overparenting, distress intolerance, and hostility. Future interventions aimed at reducing parental distress intolerance and hostility, as well as educating parents about the impact of overparenting, may help reduce harmful parenting behaviors and in turn, EA depression and anxiety.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #40, Tripp Commons**

Using FANTASY (Fully Automated pythoN Tool for AGN Spectra analYsis) to Explore the Diversity of Quasar Phenomenology

Jaxom Blaser (UW-Stevens Point) – Physics
Mentor: Sebastian Zamfir

Quasars give us a glimpse into how the physics works in the center of active galactic nuclei (AGN) and its surroundings environment. This research utilizes FANTASY, and open-source Python tool for multi-component AGN spectral fitting in the optical rest-frame (3600-8000 A). We analyze low-redshift ($z < 0.85$) quasars using high signal-to-noise SDSS spectra, focusing on (1) internal broad emission line shifts. (e.g, FeII, Balmer lines), (2) giant radio quasars (GRQs) with jets > 0.7 Mpc, and (3) quasars with extreme colors. This poster presents progress on spectral modeling and initial findings, with ongoing work aimed at refining emission-line diagnostics and quasar classification.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #47, Tripp Commons**

Enhanced Bioactivity of Titanium Implants via Silicide-Bioglass Coatings

Foster Boom (UW-Whitewater) – ACS Chemistry
Coauthors: Jeremy Kehoe, Jacob Slinde
Mentor: Steven Girard

In recent years, the field of biomedical engineering has seen significant advancements in the development of biomaterials for implantable devices and tissue engineering applications. Titanium (Ti) and its alloys have gained widespread popularity due to their excellent mechanical properties, but they have low bioactivity (fusion with bone tissue). In this study, we propose a novel approach to enhance the bioactivity of Ti implants and integration of titanium within the human body by coating the titanium surface with bioactive glass, mediated by a titanium silicide layer. The experimental methodology involves depositing a silicide coating on titanium substrates using a combination of reactions with eutectic salts, a reducing agent, and heat. Then, bioactive glass is grown onto the metals using a general sol-gel method. Analysis is accomplished using scanning electron microscopy (SEM) and X-ray diffraction (XRD) to assess the morphology, phase composition, and surface properties. We show that the interfacial silicide coating on titanium significantly enhances adhesion of bioactive glass, thus improving the biocompatibility of titanium, whereas bioactive glass has little affinity and cannot be grown onto bare titanium. The results of this study have the potential to contribute to the development of improved biomaterials for orthopedic and dental applications, where a strong and stable bond between the implant and surrounding tissue is crucial for long-term reliability.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #42, Tripp Commons**

Condensed-Phase Effects on the Structural and Energetic Properties of Nitrogen Donor-SO2 Complexes

Aaron Botsch (UW-Eau Claire) – Chemistry, A.C.S. Certified, Comprehensive Major
Mentor: James A. Phillips

This project is concerned with solvent effects on the structural properties of nitrogen-donor-SO2 complexes, including: H3N-SO2, and its methylated (CH3 containing) analogues. The goal is to assess the extent to which inert, condensed-phase environments (solid neon, argon, and nitrogen) induce structural change in these systems. Experimentally, we utilize infrared spectroscopy to observe shifts in key vibrational modes that parallel the compression of the N-S bond. Theoretically, we use quantum-chemical calculations (computer simulations of the bonding) to predict gas-phase structural properties, bond energies, vibrational frequencies as well as the energy profile along the N-S bond. Our preliminary computational results indicate that these complexes will undergo significant structural changes. A great deal of effort went into identifying the optimal computational methods to make this determination. The first consideration was identifying which among twelve methods tested best predicated the experimental frequencies of SO2, and using this method, we will report gas-phase and structures and predicted frequencies for H3N-SO2, CH3H2N-SO2, (CH3)2HN-SO2 and (CH3)3N-SO2. Collectively these complexes span a great range of interaction strengths, specifically: H3N-SO2: –6.6 kcal/mol (RNS=2.685 Å), CH3H2N-SO2: -8.4 kcal/mol (RNS=2.509 Å), (CH3)2H2N-SO2: -11.0 kcal/mol (RNS=2.334 Å), (CH3)3H2N-SO2: -13.4 kcal/mol (RNS=2.302 Å). We also explored the performance of various computational methods for energetic results by comparing them to a very high-level model and also compared predicted frequencies to those previously measured in solid nitrogen. .

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #50, Tripp Commons**

The Effect of Spirituality and Religion on the Cessation of Drug Use and Crime among Reentering Offenders

Patrick Brannon (UW-La Crosse) – Psychology
Mentor: Nicholas Bakken

The role of religiosity in post-release substance use and criminal activity has produced mixed findings in the prisoner reentry literature. While some studies highlight its protective effects, few have explored the distinct impacts of religiosity and spirituality on post-release behavior. This study addresses that gap by analyzing a contemporary sample of 352 formerly incarcerated individuals. Results indicate that spirituality significantly influences the cessation of substance use, though its effect on reducing post-release criminal activity is moderate. In contrast, religious involvement, while offering some protection, has a weaker impact on both outcomes. These findings offer valuable insights into how religiosity and spirituality shape the reentry process, with implications for policy.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #34, Tripp Commons**

Sex Difference in Stress-Induced Increase in Epithelial Permeability in the Mouse Colon

Lauren Broman (UW-La Crosse) – Biology Major: Biomedical Science Concentration
Coauthor: Lexi Valeri
Mentor: Sumei Liu

This research explored the role biological sex has in increased epithelial permeability in the proximal and distal mouse colon. The inner lining of the intestines is made of epithelial cells held together by tight junctions that prevent harmful or foreign material from crossing through the gut and into the body. Stress has been proven to increase the permeability of the epithelial intestinal layer, contributing to the development of irritable bowel syndrome (IBS) and other gastrointestinal diseases. IBS is more common in females, but prior studies have been inconclusive on finding a link between increased intestinal permeability and biological sex. Mice were divided into four groups (10/group): control male, control female, IBS male, IBS female. IBS animals were restrained for one hour/day for five consecutive days. Control animals were kept in their home cages and did not experience restraint. Following the final restraint/control session, the proximal and distal colon were removed. The mucosa/submucosa of each preparation was mounted to an Ussing Chamber. FITC-inulin and horseradish peroxidase (HRP) were added to the luminal side of the chamber to measure paracellular and transcellular permeability, respectively, 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 male and female mice in the distal colon but did not increase transcellular permeability in either group in the proximal colon. 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 to reduce the symptoms of gastrointestinal distress.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #10, Tripp Commons**

Investigating the Role of the Omega Subunit of RNA Polymerase in Translation Elongation in *Escherichia coli*

Jonathan Buscher (UW-Madison) – Biochemistry, Statistics
Mentors: Trevor Rowray, Rachel Mooney, and Robert Landick

RNA polymerase is an essential enzyme in the process of gene expression and is conserved across all domains of life. The bacterial RNA polymerase holoenzyme is comprised of the core subunits α2ββ'ω alongside a promoter-specific σ factor, the smallest subunit, omega (ω) being nonessential in most bacteria. However, ω is widely conserved, with eukaryotic homolog Rpb6 and RpoK in archaea, and may stimulate transcription. Encoded by the *rpoZ* gene and having strong interactions with the β' subunit, the exact role of ω remains unclear, although it is suspected to facilitate β' folding alongside the assembly β' with α2β, as it copurifies with RNA polymerase. A single amino acid mutant in ω, N60D, was reported to have acquired significant secondary structure relative to wild type ω and to exhibit a dominant lethal phenotype in vivo in ω-null Escherichia coli. In vitro, the literature indicates that RNA polymerase with this substitution is unable to initiate transcription, providing a promising avenue for studying the broader role of the ω subunit, particularly in transcription elongation and regulation, which remain largely uninvestigated. We utilize RNA polymerase purified with either wild type or N60D ω in scaffold-based in vitro transcription assays, bypassing initiation during standard time course experiments to measure overall elongation rate, pausing, and termination. With the development of these results, we aim to better characterize the effects of the ω subunit on transcription post-initiation. Additionally, we will attempt to pair in vitro results with further investigating the in vivo effects of the N60D mutation, with growth curve experiments under a range of growth conditions to confirm the reported phenotype alongside performing a broader screen of ω in vivo.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #34, Tripp Commons**

Food Safety Net & Nutrition Incentive Programs: A Case Study of One Wisconsin Farmers' Market SNAP Market Match Program with Statewide Implications – Part II

Maya Campbell (UW-Eau Claire) – Accounting, Finance, Information Systems
Coauthors: Stevie Harper, Teigen Ploeckelman, Monica Sha
Mentors: Eric Jamelske and Briana Rockler

Food insecurity is a significant issue facing many American households. The Supplemental Nutrition Assistance Program (SNAP) provides increased access to food for families in need. Additionally, fruit and vegetable (FV) consumption has been shown to improve health and reduce the risk of a variety of chronic diseases. However, poor nutrition among children and adults, including low FV intake have contributed to rising rates of obesity in America. It is particularly challenging for low-income households to purchase/eat the recommended amount of FV. Farmers' markets offer a wide variety of fresh, local and healthy foods, especially FV, but data show that low-income households are much less likely to shop at farmers' markets. The Eau Claire Downtown Farmers' Market (ECDFM) sponsors a Market Match Program (MMP) incentivizing. This presentation uses 2023 and 2024 survey data to highlight the many benefits of the MMP, while also exploring a variety of barriers to using the MMP mapped to corresponding changes that might reduce these barriers. Our results show most SNAP shoppers do not regularly shop at the market with the most reported barriers being limited market hours/locations, limited SNAP benefits running out and not remembering. We also provide demographic characteristics for all survey respondents. *Connected to two other presentations on the same topic, same mentors, different students, same title – parts I, III.

Oral Presentation **10:15 – 10:30 am, Capitol View Room**

Isolation and Purification of Polyphenol Oxidase (Tyrosinase) from *Solanum Tuberosum*

Abigail Carlson (UW-River Falls)– Biochemistry
Mentor: Ross Jilk

Polyphenol oxidase (tyrosinase) catalyzes the oxidation of phenolic compounds to quinones, which undergo non-enzymatic polymerization to form melanins. These complex polymers serve as key pigments in biological systems, contributing to mammalian pigmentation and enzymatic browning in produce. Enzymatic browning leads to the annual loss of approximately 1.3 billion tons of food, exacerbating methane emissions, food security, and climate change challenges. Inhibiting tyrosinase is a promising strategy to extend the shelf life of produce and reduce waste. In this study, tyrosinase was purified from *Solanum tuberosum* using ammonium sulfate precipitation, dialysis, and gel filtration chromatography on Sephadex G-150, followed by hydrophobic interaction HPLC on Butyl Sepharose 4 Fast Flow resin. Enzyme activity was carried out using UV-visible spectroscopy and protein concentration was determined using a Bradford assay. The specific activity of the sample was found to be 119.35 units/mg, with a 315.54% yield on total activity in the crude extract. Results reveal unexpected yields in purified samples, potentially due to the co-purification of a natural tyrosinase inhibitor. These findings highlight the importance of developing effective tyrosinase inhibitors for food preservation and medical implications. Future research will optimize purification methods, explore inhibitory mechanisms, and address unexpected enzyme activity to enhance understanding of tyrosinase and its broader applications.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #28, Tripp Commons**

Lessons Learned from a Community Needs Project in Western Wisconsin, a Pilot Project

Morgan Carriveau (UW-Eau Claire) – Spanish and Latin American Studies
Mentor: Kati Barahona-López

This project aims to explore how parents in dual immersion programs conceptualize their needs and how their social environment influences the identification and articulation of these needs. While community needs assessments typically focus on identifying essential resources, fewer studies examine how individuals perceive their needs, particularly in the context of dual immersion programs, which often face under-resourced academic conditions but are socioeconomically diverse. Using a mixed-methods approach, my project focuses on developing a community needs assessments with parents/guardians of children in dual immersion programs. I will be presenting on my pilot project which is composed of 3 families from the dual immersion program. My presentation will show how social context influences the way parents understand and request resources, shedding light on the interplay between personal and institutional needs. These findings will inform the larger research project and support practices and policies to better address the needs of families in dual immersion programs.

Oral Presentation **10:30 – 10:45 am, Multicultural Greek Council Room**

Rural Perceptions of Urban Wisconsin: The Effects of Milwaukee

Anna Castonia (UW-Milwaukee) – Political Science
Mentor: Phillip Rocco

Existing research identifies a pattern of political resentment expressed by rural Wisconsinites towards urban Wisconsinites (e.g., Cramer 2016). However, place-based identities and resentment may not always correspond consistently. Identities are diverse throughout various types of places and the resentment that is felt by people can differ both by population subgroup (Borwein and Lucas 2023; Brown et al. 2024) and place, notably in a state's largest city (Gamm and Kousser 2013). This study aims to evaluate if perceptions of Milwaukee, the most populous city in Wisconsin, shape rural Wisconsinites' general attitudes towards urban places in the state. It also aims to evaluate the extent to which these attitudes take the form of or consist of resentment. To answer these questions, 32 Wisconsinites

who either reside in non-metropolitan areas, are self-described as rural, or have experience living in non-metropolitan areas, were interviewed about topics consisting of the place they live, impressions of and quality of representation in rural, suburban, and urban places in Wisconsin, and their experiences surrounding the city of Milwaukee. From these interviews, it appears that while Milwaukee may play a role in the impressions of urban Wisconsin, it is not the only city that is associated with urbanity. Additionally, the impressions surrounding Milwaukee from rural Wisconsinites do not seem to be uniform and can differ from what is most prevalent in news and media sources.

Oral Presentation **10:15 – 10:30 am, Multicultural Greek Council Room**

The Impact of Medical Malpractice Reform: Non-Economic Damages in Minnesota and Wisconsin

Inessa Cernohous (UW-Eau Claire) – Healthcare Administration
Mentor: Melissa Emerson

Medical malpractice, which provides legal redress to patients who have been injured due to the negligence of a healthcare provider, is a complex area of law with numerous areas of debate. Many worry that the current system leads to unnecessary litigation, enables defensive medicine, and raises the cost of healthcare. These concerns have led to various forms of medical malpractice reform, with one of the most common being caps on non-economic damages, which limit the monetary amount a patient can receive for things like pain and suffering. Proponents argue that these caps reduce the number of malpractice cases, saving money and decreasing defensive medicine, while opponents say caps unfairly take away from injured patients and are ultimately ineffective at targeting healthcare costs. Left up to the states, caps on damages are a divisive topic with varying levels of caps in place around the United States. This case study presents a history of medical malpractice reform, investigates the efficacy and constitutionality of caps on damages, and explores the impact of Minnesota and Wisconsin's contrasting laws. As a widespread method of tort reform, the intention of this research is to consider both sides of the argument in order to better understand if caps should continue to be utilized or if they do more harm than good.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #49, Tripp Commons**

Impact of Gradation Changes on the Volumetric Properties of Asphalt Mixtures

Matthew Christensen (UW-Platteville) – Civil Engineering - Construction Emphasis
Coauthors: Erik Zieba, Ethan Randow
Mentor: Danny Xiao

Gradation, or the particle size distribution of aggregates in an asphalt mixture, plays a critical role in determining the performance and durability of pavement. Therefore, adjustments should be made in the asphalt plant whenever significant changes of gradation are detected. However, the current practice is reactive and delayed due to the lengthy testing process. The objective of this study is to investigate the impact of gradation changes on the volumetric properties of a typical Wisconsin asphalt mixture. The tests involved sieving and sorting the aggregate to control the specific gradation, mixing samples of various gradation changes (e.g., increase 5% of #8 sieve) compared to the standard mix design, and testing the changes in bulk specific gravity (Gmb), theoretical maximum specific gravity (Gmm), air voids, and voids in the mineral aggregate (VMA). It is envisioned that results from this study will contribute to the ultimate goal of helping asphalt plants react to gradation changes in a much faster and timely manner so that high-quality asphalt mixtures are produced at all times.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #6, Tripp Commons**

Proteomic Analysis of Amyloid Proteins within the Sperm Acrosome in Freshly Ejaculated Human Semen

Emily Connell (UW-Whitewater) – Biology
Mentor: Nathaly Cormier

Amyloids are misfolded proteins that order themselves in cross β-sheets during specific conditions, and they have been found in the brains of patients diagnosed with Alzheimer's, Parkinson's, prionopathies and other neurodegenerative diseases. Previous studies have shown that amyloid proteins are involved in non-pathological functions important for biological processes such as storage of hormones, production of melanin and protection of spermatozoa during their maturation in the epididymis. Moreover, it has been shown that protein-forming amyloids are present in the acrosomal matrix (AM) of epididymal spermatozoa in mice. Our lab has previously identified similar proteins in the AM of ejaculated bovine and Rhesus monkey spermatozoa by indirect immunofluorescence and mass spectrophotometry (MS) analysis, but their function remains unknown. In the light of these results, we hypothesized that these protein-forming amyloids are conserved among species, including humans. To test this hypothesis, we isolated proteins from the total AM (tAM) of ejaculated human spermatozoa and identified potential amyloidogenic proteins by MS analysis. The proteomic data was then analyzed with the Waltz-DB 2.0 algorithm to detect motifs known to be found in proteins forming amyloids. Identifying these potential amyloidogenic proteins in the tAM of human spermatozoa will get us one step closer towards elucidating why these sperm proteins were conserved during evolution and provide insights about their function in mammalian reproduction. All together, these results could help us understand the phenomenon of protein aggregation in the development of neurodegenerative and prion-transmissible diseases.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #28, Tripp Commons**

Approximate Multi-Agent Average Consensus in the Presence of Byzantine Agents

Ian Cooper (UW-Whitewater) – Computer Science and Mathematics
Mentor: Hairi Hairi

Consensus algorithms are fundamental in distributed systems, enabling agents to reach consensus while each agent is constrained to communicate with its neighboring agents. The presence of adversarial Byzantine agents poses significant challenges for normal agents to achieve consensus, in particular, average consensus among all normal agents. Specifically, Byzantine agents send arbitrary values to their neighbors instead of their true values. This research investigates multi-agent approximate average consensus algorithms in the presence of Byzantine agents. We empirically analyze the conditions under which approximate average consensus remains achievable and simulate various network topologies, local agent strategies, and Byzantine threat models to evaluate convergence and stability. Using these criteria, a computer program to simulate approximate consensus was developed to further analyze approximate average consensus algorithms.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #3, Tripp Commons**

Creative Composition and the Correlation to the 21st Century American Dance Field

Maia Rose Correia-Fill (UW-Milwaukee) – BFA Dance
Mentors: Mair Culbreth and Sonya Martin

As the American contemporary dance field transitions into its next "era" due to evolving technological integrations, patrons desire new approaches to engage with original choreographic compositions. Within this adaptation, there is a call to investigate how dance artists can apply the tools within their artistic "toolbelt" to adapt to the unique needs, and future trends which define and shape the contemporary dance field. The following study investigates how creative compositional tools correlate to the unique mediums of the field, specifically within the post-covid-19 era, where dance artists practice their choreographic engagement within the physical and metaphysical world. This research contributes to the body of knowledge through the investigation of choreographic structures applicable in the 21st century. In addition to the study of compositional tools, this research aims to address trends in consumer behavior by investigating impactful ways to present one's artwork within a technologically autonomous environment. The research methodology is structured to use a qualitative descriptive model that employs auto-ethnography as the primary method of data collection. Over the course of 8 weeks, eight to ten participants will engage in seminar-style studio practice courses, where participants will be exposed to different compositional tools, then asked to reflect upon the perceived effectiveness for composing original work within technologically integrated mediums. This methodology is built upon Skains 2018 methodology for practice-based research in the fine arts. My research and composition of this new dance has allowed me to continue to deepen my knowledge of composition tools codified within the era of post-modern dance, and how to wield them into the new and unique mediums of the 21st century.

Performance **9:45 am, Old Madison Room**

A Series of Unfortunate Works

Corvus Crass (UW-Parkside) – Art Education
Mentor: Arbor Archuletta

Art is subjective, and beauty is in the eye of the beholder. Yet still, we all gather to admire and appreciate art at every skill level, from putting a child's drawing on the fridge to an art gallery of all of one's life's work. I believe that art is something that ties us together, especially in times of struggle and hardship. As a queer artist, I pour my heart into creating art that represents my community and my experiences. These pieces represent some of that.

Art Display **11:00 – 12:00 pm, Profile Room**

Divergent News Framing of Territorial Disputes: A Comparative Analysis of Global News Agencies

Rafael DaCosta (UW-Eau Claire) – Business Administration and Journalism
Mentor: Won Yong Jang

We investigate the enduring complexities of South Korean-Japanese-Chinese relations, focusing on the territorial disputes over the Liancourt Rocks (Dokdo/Takeshima) and the Senkaku/Diaoyu Islands. These disputes, deeply rooted in historical, geographical, and political factors, have long been contentious, complicating diplomatic negotiations. Over the past century, fluctuations in mutual perceptions and attitudes have been exacerbated by misperceptions and a lack of understanding among the parties involved. Using Herman and Chomsky's Propaganda Model, we explore how global political institutions shape media interpretations, particularly through news framing. We examine how foreign policies and national ideologies influence the coverage of international conflicts and territorial issues. Our analysis focuses on the persistent news frames of three prominent global news agencies—AP, Xinhua, and Reuters—whose extensive coverage of these territorial disputes between 2020 and 2024 provides a valuable basis for comparison. We combine traditional content analysis, focusing on the quantity, sources, and types of foreign news coverage, with a qualitative assessment of the framing of images and roles in the reports. Variations in coverage reflect the dominant ideologies and national interests of each agency's e nation, revealing distinct journalistic norms. The divergent news framing of territorial disputes underscores how media outlets prioritize their respective geopolitical concerns, shaping public perception and policy responses. We contribute to the understanding of mediated public diplomacy and propaganda in the Asia-Pacific region, offering insights into the role of media in framing global issues and influencing public opinion.
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Oral Presentation **9:45 – 10:00 am, Multicultural Greek Council Room**

Food Safety Net & Nutrition Incentive Programs: A Case Study of One Wisconsin Farmers' Market SNAP Market Match Program with Statewide Implications – Part III

Morgan Dekan (UW-Eau Claire) – Economics, Math
Coauthors: Abby McCullough, Cassandra Riehle, Sarah Schrauth
Mentors: Eric Jamelske and Briana Rockler

Food insecurity is a significant issue facing many American households. The Supplemental Nutrition Assistance Program (SNAP) provides increased access to food for families in need. Additionally, fruit and vegetable (FV) consumption has been shown to improve health and reduce the risk of a variety of chronic diseases. However, poor nutrition among children and adults, including low FV intake have contributed to rising rates of obesity in America. It is particularly challenging for low-income households to purchase/eat the recommended amount of FV. Farmers' markets offer a wide variety of fresh, local and healthy foods, especially FV, but data show that low-income households are much less likely to shop at farmers' markets. The Eau Claire Downtown Farmers' Market (ECDFM) sponsors a Market Match Program (MMP) incentivizing. This presentation uses 2023 and 2024 survey data to highlight the many benefits of the MMP, while also exploring a variety of barriers to using the MMP mapped to corresponding changes that might reduce these barriers.

Our results show most SNAP shoppers do not regularly shop at the market with the most reported barriers being limited market hours/locations, limited SNAP benefits running out and not remembering. We also provide demographic characteristics for all survey respondents. *Connected to two other presentations on the same topic, same mentors, different students, same title – parts I, II.

Oral Presentation **10:30 – 10:45 am, Capitol View Room**

Enhancing Accessibility in Exhibition Design: Lessons from 'Beyond the Gaze' Exhibition

Josh Deutschlander (UW-Eau Claire) – Illustration
Mentor: Jill Olm

This research examines how 'Beyond the Gaze' exhibition improved accessibility within Foster Gallery and provides recommendations for museums and other cultural institutions to ensure access for all visitors. Existing guidelines, such as the 2010 American with Disability Act (ADA) Guidelines, outline only basic requirements. A 2020 LA County Arts and Culture report highlights accessibility challenges in the arts through interviews with disabled artists. It emphasizes that while accessibility broadens engagement, barriers persist. Some artworks remain inaccessible unless designed inclusively, and modifications can sometimes alter interpretation. My approach includes evaluating Foster Gallery's physical space, signage, exhibition design, and visitor experience to identify both strengths and areas for improvement. I used feedback from artists and accessibility professionals to create practical solutions. This research reveals that while the exhibition made strides in accessibility within Foster Gallery, such as improved signage, wider circulation routes, and tactile exhibition elements, more improvements are needed. Key recommendations for galleries include alternative text formats, interactive audio guides, adequate seating, and accessible exhibition layouts that meet and exceed ADA standards. By prioritizing accessibility, institutions can create environments where all individuals can fully engage with and enjoy artistic and historical experiences.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #36, Tripp Commons**

Breaking Barriers - Gender Law and Female Entrepreneurship

Khang Duong (UW-La Crosse) – Finance & Business Analytics
Coauthor: Aditya Anil
Mentor: Nabamita Dutta

Our research aims to examine how laws can impact female entrepreneurship across different contexts. We use a new measurement from the World Bank's Women, Business, and the Law (WBL) index 2.0, focusing on legal systems in place to help female entrepreneurs. Specifically, we explore how gendered differences in legal access in the context of accessing credit, registering businesses, opening bank accounts, and laws relating to inheritance influence female entrepreneurship outcomes relative to males. We also want to distinguish between opportunity driven and necessity driven entrepreneurship across genders and whether differences in legal access can explain some of the gaps.
The research will provide insights into how policymakers can enhance female entrepreneurship by improving legal frameworks, particularly in developing economies where women face significant financial and institutional barriers. We will also investigate potential moderating factors such as economic institutions and culture, which have been shown to affect female entrepreneurship outcomes. Empirical models like OLS, fixed effect, marginal effect plots, and matching models will be used to test our analysis. We will also present ideas for future related research, as the WBL index is fairly new and thus understudied. The contribution of our work is twofold: 1) we will examine the effectiveness of legal/policy frameworks as they relate to female entrepreneurship, and 2) we will examine how these systems interact with formal economic institutions and informal institutions such as culture. The latter will help to understand what frameworks must be in place for a nation to foster successful female entrepreneurs and promote an equitable entrepreneurial landscape.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #49, Tripp Commons**

The Effect of Sense of Agency on Voluntary Motor Action

Samantha Esp (UW-Parkside) – Psychology
Mentor: Melissa Gregg

The Libet paradigm (Libet et al., 1983) demonstrated that brain activity (indicated by an ERP component called the readiness potential, or RP) precedes the conscious decision to act by 500 msec, indicating that neural activity, rather than "free will" causes voluntary acts. Recent research has examined the influence of free will beliefs (FWB) on the RP. For example, Rigoni et al. (2011) found that amplitude of RP's was lower in a group that had diminished FWB. Although previous research has established that amplitude of RP's can be influenced by FWB, scientific literature has yet to determine how sense of agency (SoA) may affect RP's. SoA, or perceived control over our environment, helps maintain psychological stability and flexibility when faced with challenges. The purpose of this study was to determine whether one's SoA affects amplitude of RP's. Participants completed a motor task adopted from Libet et al. (1983). An analog clock was presented to participants on a monitor. Participants watched as one clock hand made a full rotation every 2 seconds. Participants were instructed to press a button to stop the clock hand when they felt the urge. This task was repeated for 100 trials while brain activity was recorded with a 32-channel EEG system. Participants completed a Sense of Agency Scale (SoAS) before and after completing the task. The SoAS is used to quantify each participant's SoA. It was hypothesized that amplitude of RP's would differ between individuals with varying SoA. Specifically, we predicted that participants with a low SoA would have a smaller RP than participants with a high SoA. The results of this study will provide a better understanding of how SoA relates to motor acts, broader context for understanding the nature of consciousness, and have potential to inform future investigations of the relationship between mind and brain.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #37, Tripp Commons**

Functional Analysis of the *akt-1* Gene in *Brugia malayi*

Sarah Ferguson (UW-Whitewater) – Biology-emphasis in Pre-Biomedical Professions
Mentor: Kirsten Crossgrove

Lymphatic Filariasis, a debilitating human disease, is caused by the parasitic nematode *Brugia malayi*. For our model organism, we are using the free-living nematode *Caenorhabditis elegans*. Both *C. elegans* and *B. malayi* share similar growth stages controlled by environmental conditions. When conditions are unfavorable, *C. elegans* enters dauer, pausing its growth until conditions have improved. Similarly, in *B. malayi*, the infective (iL3) stage remains arrested until it is transmitted from the mosquito to the human bloodstream. The insulin/IGF-1 signaling (IIS) pathway regulates dauer formation and recovery of *C. elegans* and we hypothesize that the same pathway regulates the iL3 stage in *B. malayi.* In the IIS pathway, we are studying the *akt-1* gene. Once activated, AKT-1 phosphorylates the DAF-16/FOXO transcription factor, the major target of the IIS pathway. We used bioinformatic tools to identify the predicted *Bma-akt-1* gene and PCR (Polymerase Chain Reaction) to amplify its sections from cDNA; a DNA copy of mRNA that encodes proteins. Using PCR, we have confirmed the predicted *B. malayi* mRNA sequence for isoform A. We cloned AKT into an expression construct for use in cell culture. Previous results show that *Bma*-DAF-16 can activate a reporter gene in cell culture. We hypothesize that *Bma*-AKT-1 can inhibit *Bma*-DAF-16 activity. Preliminary results show that coexpression of *Bma*-AKT-1 reduces the ability of *Bma*-DAF-16 to activate a reporter gene. Overall, we hope to determine if *Bma*-AKT-1 shares functional similarities with AKT-1 in other organisms, potentially revealing new drug targets for *B. malayi*.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #17, Tripp Commons**

Identifying Challenges Related to the Management of Comorbidities in People with Dementia in Residential Care: Expert Delphi Consensus Exercise

Kandis Fieber (UW-Eau Claire) – Healthcare Administration
Coauthors: Emma Cochrane, Sara Lacoursiere
Mentor: Frances Hawes

Improving early detection, management, and treatment of comorbid conditions to dementia in residential care could slow down cognitive and functional decline, and increase residents' quality of life. We conducted a Delphi study comprising three rounds (two surveys and an interview) to identify the most difficult dementia comorbidities to deal with in residential care and related issues. Participants were 15 UK-based experts including academics, residential care workers, geriatricians, and neuropsychologists. In the first-round of the Delphi, experts mentioned 15 comorbid health conditions to dementia and 19 issues. In the following rounds of the Delphi mental illnesses, delirium, and sensory impairments were identified as the most difficult comorbidities to dementia to deal with. Medication management, symptom management, shortage of staff, lack of training among staff, and limited resources from the broader healthcare system were identified as the most difficult issues when dealing with dementia comorbidities.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #18, Tripp Commons**

The Role of Experiential Avoidance in Disordered Eating Attitudes and Behaviors and Alcohol and Nicotine Consumption in College Students

Hailey Fish (UW-Whitewater) – Psychology
Coauthors: Heather Guiney, Iliana Aviles
Mentor: Heather Niemeier

Young adulthood is a high-risk developmental stage for multiple potentially harmful behaviors including disordered eating, alcohol misuse, and nicotine use. Experiential avoidance refers to the tendency of an individual to avoid or control distressing psychological experiences. Experiential avoidance has been used to understand why individuals, such as college students, engage in high-risk behaviors. Some individuals may use alcohol or nicotine to avoid or control distressing psychological experiences, such as disordered eating attitudes and behaviors. Much of the previous research has focused on these relationships in women; this study includes college students of all genders and utilizes updated assessment measures validated in all genders. This study explores the relationships amongst disordered eating attitudes and behaviors, experiential avoidance, and alcohol and nicotine consumption. Participants were UW-Whitewater students recruited through email, organizations, professors, and posters around campus; their mean age was 20 years; 68% of the sample identified as female, 31% identified as male, and less than 1% as another gender identity; 83% identified as white, 6% Black, 3.5% Hispanic, 2.2% American Indian or Alaskan Native, 1.9% Asian or Pacific Islander, and 1.9% Multiracial. The mean body mass index was 25.6 (SD 5.8). Participants completed the Acceptance and Action Questionnaire, the Acceptance and Action Questionnaire for Weight-Related Difficulties, and the Eating Pathology Symptoms Inventory as well as frequency of alcohol and nicotine consumption measures. Initial bivariate correlations demonstrate significant relationships between experiential avoidance and disordered eating behaviors (binge eating, purging, restricting, and excessive exercise) but not attitudes (cognitive restraint and negative attitudes towards obesity). Significant relationships were also found between disordered eating behaviors (purging and restricting) and nicotine use. Binge drinking was found to significantly correlate with negative attitudes towards obesity, purging, muscle building, and binge eating. Gender differences amongst these relationships will also be explored. Understanding the connections among multiple risk behaviors in college students can help develop prevention and intervention strategies to decrease such behaviors.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #22, Tripp Commons**

Applications of Blockchain in Farm Environments

Brandon Fowler (UW-Platteville) – Computer Science
Mentor: Yanwei Wu

Advancements in smart farming technology are driving positive changes in the dairy industry. These innovations include digital tools such as smart monitoring devices, communication systems for data transfer, data analytics for processing large datasets, and AI/machine learning for informed decision-making in key areas such as feeding, milk harvesting, health monitoring, and overall herd management. However, while these advancements offer significant benefits, they also introduce new cybersecurity risks that were not prevalent in traditionally mechanical farming systems. Notable incidents include a ransomware attack on a Wisconsin dairy farm in November 2019 and a cyberattack on Massachusetts-based HP Hood Dairy in 2022. Additionally, in the fall of 2021, the FBI reported that six grain cooperatives were targeted during harvest season. This project aims to analyze data security at Pioneer Farm and propose a blockchain framework to enhance data privacy, integrity, and authorized access. In this project, we assess the sensitivity of various data types within the farm's ecosystem and design a blockchain-based solution to safeguard critical information. We propose the design and implementation of a parachain-based architecture on the Polkadot network, leveraging its unique advantages for IoT environments, such as interoperability and seamless integration. This architecture ensures that data from various sources, including sensors, devices, and applications, can communicate efficiently and securely across the network. The proposed system has the potential to significantly enhance several critical areas, including disease tracking, animal welfare, data availability, and supply chain integrity.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #13, Tripp Commons**

Oxidation Reactions of Pinenes in the Atmosphere

Kaci Granroth (UW-River Falls) – Chemistry
Mentor: Stacey Stoffregen

α-pinene and β-pinene are volatile organic compounds (VOCs) that are produced by plants and other living things. When pinenes are released into the atmosphere, they undergo oxidation reactions which can lead to formation of hydroxyl radicals. Hydroxyl radicals are important oxidants in the atmosphere that can decompose organic pollutants. This research focused on modeling the oxidation reactions of α-pinene and β-pinene and determining whether hydroxyl radicals are created. Gaussian 16 software was used to model the oxidation reactions at the ωB97X-D level of theory with the 6-31G(d) and ccPVTZ basis sets. WebMO was used to visualize the results of the calculations. All calculations were run on the Midwest Undergraduate Computational Chemistry Consortium (MU3C) cluster. All minima were confirmed with vibrational frequency analyses and IRCs were used to confirm the structures of transition states. The relative energies of reactants, transition states, and intermediates were determined and used to assess which oxidation pathways were most favorable and will be presented.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #10, Tripp Commons**

Reclaiming Queer Spaces: Neptune Club

Morgan Greene (UW-Milwaukee) – Bachelor of Architecture
Mentor: Adam Thibodeaux

In this study, I worked with a plethora of people to explore and document the architectural and cultural legacy of the former Neptune Club, located at 1100 E Kane Pl in Milwaukee, WI. Partnering with Michail Takach from the LGBTQ History Project, I gained invaluable insights into the neighborhood's transformation during the 1970s and the pivotal role played by the queer community in shaping its character. With official building plans unavailable through city records, our research methodology relied on a comprehensive collection and analysis of archival materials, oral histories, on-site documents, interviews, and historical photographs. This multifaceted documentation process allowed us to reconstruct the layered history of the Neptune Club, uncovering narratives that have long been marginalized or erased from conventional accounts. By integrating current site conditions with historical data, the study reveals how

queer populations adapted and appropriated existing architectural spaces to create culturally significant havens amidst a rapidly evolving urban landscape. Our approach not only highlights the building's original design and function but also interrogates the socio-political forces that led to the subsequent obscuring of its legacy. This project contributes to ongoing research into the reclamation of architectural spaces by marginalized groups. It challenges dominant narratives by evidencing the tangible impact of queer communities on urban development and cultural memory in Milwaukee and explores how their narrative shapes the way others interpret the space. Ultimately, the study serves as a catalyst for further exploration into how similar spaces may be reinterpreted, preserved, and celebrated as integral parts of a city's diverse heritage.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #42, Tripp Commons**

The Shape of My Heart: Building a 3D Model of a *Xenopus* Heart

Mykaela Grube (UW-Parkside) – Biological Sciences
Mentors: Christopher Noto and Natalia Taft

The *Xenopus laevis* is an aquatic clawed frog, that is a model organism commonly used to research vertebrate heart development, particularly congenital heart defects. Currently there do not exist 3D models of a *X. laevis* heart for use in those types of research. A Diffusible iodine-based contrast-enhanced computed tomography, or DiceCT, scan of *X. laevis* was downloaded from Morphosource and used to build the model. The scan was segmented in the application 3DSlicer with the Slicermorph extensions. The DiceCT allows for a clear differentiation of soft tissue structures and separation of fine-scale anatomical details. The left and right atria were segmented along with the single ventricle and major blood vessels; including the pulmonary vessels. Smaller structures were not segmented. The segmentations were then exported, cleaned up in Blender, and 3D printed into real models larger than the actual size, which can help with didactic learning. Using 3D models have many benefits including, more details of the structures than a 2D image, better understanding of the relative size, and the research of developmental defects.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #16, Tripp Commons**

Evaluating Food Resource Partitioning Between Sympatric Voles in Northern Minnesota

Mollee Gruszynski (UW-River Falls) – Biology
Mentors: Andrew Havales

A common goal in understanding ecological niche differentiation is to assess how species partition food resources. When similar species are classified as herbivores it may be assumed that the species compete for the same resources when they co-occur. Here, we investigate the food resource partitioning between two sympatric vole species using the stable isotope mixing models. The study site is a mixed forest north of Duluth, Minnesota, where meadow voles (Microtus pennsylvanicus) and southern red-backed voles (Myodes gapperi) co-occur. Over a 21-year trapping study, hair samples were taken from 52 meadow voles, and 77 red-backed voles and analyzed for δ13C, δ15N, wt%C and wt%N. We found a statistically significant difference in the mean δ13C and δ15N values between the species indicating a difference in food resource use. This led to the investigation of which food potential resources (plant, fungi, arthropods) are being partitioned and causing the difference in isotopic values. Various plant (n=70), fungi (n=5), and arthropod (n=43) samples were collected and analyzed for δ13C, δ15N, wt%C and wt%N. The consumer (voles) values and potential food resource values were then analyzed using the Bayesian mixing model in R, MixSIAR, to estimate the dietary contributions of plant-derived resources, fungi, and arthropods to each species of vole. The results of this work will further our understanding of how sympatric herbivores partition food resources and inform wildlife managers about how changes to food resources may impact ecological interactions in mixed forests.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #22, Tripp Commons**

Exploring the Relationships among Nicotine Use Expectancies and Disordered Eating Attitudes and Behaviors in College Students

Heather Guiney (UW-Whitewater) – Psychology
Coauthors: Iliana Aviles, Hailey Fish
Mentor: Heather Niemeier

Introduction: Nicotine use among young adults is a relevant health concern. Recent studies have shown an increase in alternative nicotine devices such as vapes and nicotine pouches. Also relevant in this population, are disordered eating behaviors such as binging, purging, and calorie restriction. The current study examines relationships between expectancies of nicotine use, frequency of use, gender, and disordered eating attitudes and behaviors. Methods: Data was collected through a series of questionnaires completed by 318 college students (68% female, 31% male, <1% transgender, non-binary or other, 83% White, 6% Hispanic, 6% Black, 2% American Indian/Alaskan Native, 2% Asian/Pacific Islander, mean age of 20, and mean BMI of 25.6) at the University of Wisconsin–Whitewater. Disordered eating attitudes and behaviors were assessed by the Eating Pathology Symptoms Inventory (EPSI). Frequency of types of nicotine use was assessed. Of the 318 participants, 84 (26%) reported nicotine use within the past thirty days and completed Short Form Smoking Consequences Questionnaire and/or modified versions for vaping and nicotine pouch use that assess nicotine use expectancies on four subscales including negative consequences, positive reinforcement, negative reinforcement, and appetite and weight control. Results: An independent t-test showed that participants who reported nicotine use also reported higher scores of body dissatisfaction, binge eating, purging, restricting and muscle building. A chi-square test showed significant association between gender and type of nicotine use. Bivariate correlations showed significant associations between nicotine expectancies and disordered eating attitudes and behavior subscales from the EPSI. Discussion: The implications of this study are to inform potential health promotion programs seeking to target nicotine use among young adults and give considerations for addressing underlying motives for nicotine use and their expectancies, as well as differences between genders.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #32, Tripp Commons**

Is This Generation Too Tired? The Cultural Impact of Tang Ping and Its Reflection in Western Culture

Beijin Guo (UW-Eau Claire) – Computer Science
Coauthors: Yu Shi, Gwen Albers
Mentor: Kaishan Kong

This poster explores what the impact and similarities between Tang Ping and Quiet Quitting are and their effects on the younger generations. Examining how American colleges students, view and interact with Quiet Quitting, and how American Teacher and Professors view its impact on their future. Then cross comparing how Chinese college students view and interact with Tang Ping, and how Chinese Teachers and Professors view its impact on their future. Through a combination of surveys, interviews, and literature, this project investigates whether this is a generational or cultural issue, looking at how this will impact on the student's future as they advance into the workforce. This study has realized connections between these two cultural issues and their prominent impact for their future for society. This research is relevant to anyone who is a student or in a teaching profession, or those who are interested in the academic trends of the current generation.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #38, Tripp Commons**

Addressing The Gender Gap in Atheist Communities

Kamila Gutierrez (UW-Milwaukee) – Religion, Philosophy, and Ancient Greek Studies
Mentor: Esther Chan

The internet has played a significant role in our social development. Given its prevalence in our lives, various societal institutions have had to adapt to the model of community that can be offered online. Religious communities are a prime example of this; there are social media pages and websites, live-streamed events, and content creators that are dedicated to the spread of religion. Atheist communities have also utilized the internet to educate on what atheism is and explore how the label relates to their lives. Some atheists have become content creators, having pages of up to a thousand followers or more. Through their posts, they enlighten their subscribers to the realities of modern-day atheism and how it differs from person to person depending on their previous religious background, their race or ethnicity, and their gender. In our current internet age, the role of the social media influencer is important due to their presence online and the relationship they cultivate with their audience. The opinions they give have power, therefore if they say there is a disparity between men and women in atheism there can be consequences that force atheists to address this issue in their communities. Studies conducted by researchers across higher-level education institutions point towards atheists embracing free-thinking ideology, and rejecting gendered expectations, although there are still gendered disparities within atheist circles. This poster examines answers from eleven qualitative interviews conducted by a research team that approaches the question of why there statistically more male atheists are than females according to atheist content creators who work on the inside of these spheres. Most posited that women may not be as comfortable or safe being upfront about their atheism due to past religious trauma that enforces deeper ties to religious communities versus that which men have. Women in religion are often told to be subservient to men, therefore they are at a greater risk of damaging their reputation and losing friends and family as a result of nonconformity to religion. With their worth tied to needing to follow the rules, women have a considerable challenge letting go of religion. Furthermore, others pointed to what they take to be intrinsic differences between men and women that may affect the way they engage with atheism, such as men being more competitive and wanting to belong to a team, i.e. Team Atheism, as opposed to women who do not have the same liberty to engage in this competitiveness. While this study is focused on atheism, aspects of this can be applied to how the misogynistic rhetoric of various world religions influences the self-perspective of women and how oppressive systems limit their freedom to interact with other ideologies.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #36, Tripp Commons**

Machine Learning Model For “Scribbler” Adaptive Tool

Veronica Hamilton (UW-Platteville) – Mechanical Engineering
Mentor: Harold Evensen

As a student researcher, my work over the past three semesters has centered on advancing the “Scribbler”, a device aimed at helping children develop writing skills. Originally developed by Engineering Physics Senior Design teams in the spring of 2023 and 2024. The Scribbler combines a microcontroller and a machine learning (ML) model to identify proper ‘scribbling’ motions, triggering music and lights as positive reinforcement. Key areas for improvement were identified following 2024 testing by a speech therapist in Cedar Rapids, including the need for a more sophisticated ML model, improvement on the device’s physical responsiveness, and the need for a wider range in its audio functionality. In my role, I have developed a skillset in ML applications for embedded systems, starting with programming Arduino-based microcontrollers and creating an initial ML motion recognition model. However, this initial ML model for the Scribbler has proved to be too ‘laggy’, requiring the regression back to the original imperfect model from spring 2023. My research for this semester focuses on learning Python-based ML development using libraries like scikit-learn, which I plan to apply to improve the Scribbler’s performance. These refinements aim to address time delay issues and enhance accuracy during activities such as letter tracing. Additionally, I am addressing physical design challenges identified in prior testing, including developing a softer spring for tactile feedback and creating adjustable sound volume. With these improvements, I aim to bring the Scribbler closer to its goal of being a robust, accessible tool for children’s developmental learning.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #45, Tripp Commons**

Discovery and Characterization of Fungal Antimicrobials from Environmental Samples

Katrina Hammerberg (UW-Green Bay) – Biology with emphasis in Microbiology
Coauthors: Ramiro Cortez, Mitchell Starry, Salem Ohizu, Ella Patty, Luke Markiewicz
Mentors: Rebecca Abler, Julie Wondergem, and Lisa Grubisha

With the growing concern over antibiotic resistance, there is an urgent need for new antimicrobial agents. Fungi are known to produce a wide range of bioactive compounds that could provide promising solutions. Our research focuses on isolating filamentous fungi from soil environments and evaluating their antibiotic properties, aiming to identify novel compounds that could contribute to the development of new therapeutic agents. This work demonstrates the importance of cross-disciplinary and cross-campuses collaboration and highlights the value of undergraduate research and mentoring in developing the next generation of scientists.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #41, Tripp Commons**

A Changing Tide Shifts Only Some Boats: Examining Political and Ideological Trends in Liberal Democracies After Major Economic Dislocations

Michael Hansen (UW-Eau Claire) – English – Creative Writing
Mentor: Damir Kovacevic

This project aims to discover whether there were any trends in the politics of five subject countries—the United States, United Kingdom, Canada, Australia, and New Zealand—during elections that took place after periods of economic dislocation that challenged dominant economic orthodoxies at the time, the two periods being the Great Depression and the "Stagflation Crisis". This trend would be a change in ideology, not just in terms of political party. To complete this study, I conducted a large review of literature not only about certain elections, but about the individuals those elections elevated, and the proper way of studying shifts in politics during economic events. I also read literature related to certain key terms that would help me in my studies, like those of ideology (modern liberalism, neoliberalism) and of political history (the history of all major parties in studied countries). After conducting this research, I found that following the Great Depression, there was only a slight shift to the left across the five countries, as while the United States and New Zealand elected strong "modern liberal" governments, Australia and the United Kingdom did not (although the United Kingdom did join the leftward shift in the Depression-focused 1945 election), and Canada was restrained from doing so by a leader who only took limited steps towards modern liberalism. In the case of the Stagflation Crisis, there was a more definitive shift to the right, as the United States, United Kingdom, and New Zealand all elected neoliberal governments following the crisis. Australia and Canada, meanwhile, ended up with modern liberal governments, although ones that were beginning to embrace some tenets of neoliberalism as well. However, governments were less stable during this crisis, and government shifts came late, after less reactionary alternatives had been attempted, a hesitancy not found in the post-Depression electoral period.

Oral Presentation **9:45 – 10:00 am, Beefeaters Room**

"What's the Point of Hauling Stuff Around?": Serhiy Zhadan's The Orphanage and the "Post-Soviet Loser"

Michael Hansen (UW-Eau Claire) – English – Creative Writing
Mentor: Heather Fielding

When he published The Orphanage in 2017, prolific Ukrainian writer Serhiy Zhadan stated his aim in writing the work was to portray the real experiences of people in his home region in the Donbas as Russian troops aided anti-Maidan separatists. A function of realistic representation is the banishment of stereotypes, which begs the question: how does Zhadan deal with or even use common stereotypes or tropes about so-called "post-Soviet states" in The Orphanage? Does he seek to actively banish those stereotypes; does he let them remain, wanting the work to be seen as "authentically" Ukrainian; or does he transform those stereotypes and bring them into the modern times? In this paper, I argue that Zhadan uses the "post-Soviet loser" concept, developed by theorist Tamara Hundorova, to construct the main character of Pasha. Like Hunderova's concept of a "post-Soviet loser", Pasha is apathetic and disillusioned with the state that he works on the behalf of. However, as the novel goes on, Zhadan seeks to subvert and replace the "post-Soviet loser" concept within Pasha, with a new concept of the post-Soviet citizen—one less pathetic and more fitting of, and more inspiring to, a war-weary people. He does this through connecting Pasha with his nephew, who as a member of a new and more strident generation is able to inspire Pasha towards greatness, compared to the apathy stirred in him by the older generations.

Oral Presentation **10:15 – 10:30 am, Beefeaters Room**

Efficient Palladium-Catalyzed Buchwald-Hartwig Amination of Brominated Heterocycles using Pd2(dba)3 and Xphos Ligand

Shaun Harrington (UW-Milwaukee) – Biochemistry
Mentor: Alexander Arnold

Palladium catalyzed reactions have become prominent reactions for creating C-N bonds and are widely used in the synthesis of pharmaceuticals. The reaction progress is substrate specific and supported using specific phosphine ligands with unique electronic and steric properties. In this study, multiple phosphine ligands were investigated in the palladium catalyzed coupling of aliphatic and aromatic amines to a bromine containing benzodiazepine. Our results showed of 5% Pd2(dba)3 in conjunction with 10% Xphos was the best catalytic system when carried out in toluene. Full conversion with aniline was observed within 2 h at 90°C. The addition of THF increased the solubility of some products and improved their yields. In general, yields ranged from 26% to 89%. For ortho substituted aromatic amines, we did not observe reduced product formation due to steric hinderance. All products were analyzed and characterized using liquid chromatography-mass spectrometry and NMR spectroscopy.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #7, Tripp Commons**

Exploring User Experiences with *Amanita muscaria*: A Thematic Analysis of Reddit Online Forum Discussions

Jadyn Hartwig (UW-Eau Claire) – Biochemistry/Molecular Biology
Coauthors: Jared Kendrick, Pravesh Sharma, James Cook, Ghonwa Ahmad
Mentor: Douglas Matthews

Amanita muscaria, commonly known as fly agaric or fly amanita, is a mushroom renowned for its distinctive appearance and psychoactive properties attributed to its compounds, ibotenic acid, and muscimol. Contemporary interest in *Amanita muscaria* has surged, driven by anecdotal reports of perceived psychological and medicinal benefits. However, no clinical studies exist thus far. This study employs thematic analysis of discussions from the "r/AmanitaMuscaria" subreddit on Reddit to explore users' reasons for its consumption and the positive and negative experiences associated with this mushroom. A total of 998 principal posts and their associated 9,542 comments were analyzed, revealing thematic trends in adverse effects, perceived positive (not adverse) outcomes, reasons for use, modes of consumption, and thought perceptions. Findings highlight that users experienced more positive than adverse effects, and adverse effects experienced were minimal and primarily self-limiting. These findings may be particularly salient in clinical settings, as medical providers might find it challenging to uncover *Amanita muscaria* use among their patients unless presented with severe adverse effects. Future research is recommended to investigate *Amanita muscaria*'s pharmacology further to inform patients and medical providers of safe practices. Finally, an innovative methodological strategy is warranted to examine Reddit posts in-depth to understand users' perceptions and attitudes.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #8, Tripp Commons**

Summer Annual Forages and Other Vegetation Cover Influence on Soil Health in Northwest Wisconsin

Heather Hatfull (UW-River Falls) – Soil Science Major - Geology & Conservation Minor
Mentor: Yoana Newman

Understanding soil characteristics is key to developing drought-resistant grazing systems, particularly for sandy soils. Soil Organic Matter (SOM) is a key indicator of soil health and its ability to retain moisture, essential for drought resistance. This study aimed to evaluate changes in SOM in areas with summer annuals cover crops for grazing. The study was conducted in NW Wisconsin on sandy soils (Sand to Loamy sand) with minimal texture variability. Soil properties [OM (only reported), bulk density, pH] were compared under three vegetation-covers: control (native Oak Savanna), perennial cover (native prairie grass mix), and annual cover crops [sorghum (Sorghum bicolor), sorghum hybrids (Sorghum x sudan), sudangrass (Sorghum sudanense) and pearl millet (Pennisetum glaucum L.)]. Soil samples, for physical properties, were collected in fall prior to summer planting, and again after three years. Results show an initial increase in SOM for A horizon for most vegetation covers [7% increase from 2.84 to 3.04% (native Oak Savanna); 10% increase from 1.82 to 2.0% (native prairie), 3% decrease from 1.95 to 1.88% (summer annuals)]. There is evidence of OM leaching in the soil profile, with OM increase in the B horizon for all vegetation covers. The undisturbed condition of the Oak Savanna is likely associated with the highest levels of OM. Additional soil sampling will be necessary to evaluate the long-term effects of the summer annuals and different vegetation covers.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #30, Tripp Commons**

Processes of Soil Formation from Basaltic Bedrock in Reykjanes Peninsula in Iceland

Gwenyth Heidinger (UW-Whitewater) – Geography – Geology emphasis
Coauthor: Dean Wink
Mentor: Prajukti Bhattacharyya

Iceland's Reykjanes Peninsula has experienced many eruptive events. Current volcanic activity began in 2021 with the Fagradalsfjall eruption and is continuing at Sundhnukur. Eye-witness accounts date the previous eruptive phase to 1211, known as the Reykjanes Fires. Recent studies show that basalts at Fagradalsfjall likely came from the mantle plume and the Sundhnukur eruption released magma from a shallower source. This might create chemical difference in the basalt which might influence soil formation. Due to Iceland's unique geographical location, soil formation processes are more dependent on protolith chemistry, rather than biological activities. Our goal is to learn how soil forms from Icelandic basalt. For this project we collected seemingly unaltered and weathered basalt samples that erupted during the Reykjanes Fires. We selected samples based on their alteration colors for powder X-ray diffraction (pXRD) analysis for mineralogical comparison. Preliminary results indicate the presence of olivine, pyroxene, and calcium-rich plagioclase in the unaltered basalt. X-ray fluorescence data show depletion of calcium, magnesium, aluminum, and silicon as weathering occurs. The existence of maghemite in the weathered product might have formed from magnetite in the original basalt as part of the soil forming process. These results will be complemented by petrographic analysis and chemical analysis using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). These results provide insight into the first steps of soil production from basaltic rock in Iceland. This is important for agriculture and soil management. This poster will present our data, analytical methods, and implications of our findings.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #33, Tripp Commons**

Temporal Trends in Water Quality Conditions of the Pike River, Kenosha, WI

Faith Hellmich (UW-Parkside) – Environmental Studies
Coauthors: Hannah Palmen, Lizbeth Aguilar, Logan Aiello
Mentor: Jessica Orlofske

Long-term water quality testing is urgently needed to evaluate the dynamic conditions of freshwater streams, especially those with anthropogenic impacts. In Southeastern Wisconsin, the Pike River whose watershed includes portions of Racine and Kenosha counties, has been deemed an impaired water body by the Environmental Protection Agency, EPA, due to non-point source pollution from development and agricultural activities. Water quality issues can propagate downstream. Thus, Pike River water quality can impact nearshore areas of Lake Michigan. Consequently, in 2018 a monitoring program was established to assess the efficacy of restoration activities in the lower basin of the Pike River by assessing multiple locations in Petrifying Springs Park. The study's primary objective is to assess sedimentation and excess nutrients in the water body by recording levels of total suspended solids, TSS, as well as the concentrations of phosphates and nitrates. In addition to these parameters, pH, dissolved oxygen, conductivity, specific conductance, temperature, and turbidity are measured and assessed. Over the past seven years, these water quality parameters have been measured on a regular basis for four locations in Petrifying Springs Park, monthly or bimonthly. Beginning in 2023, two additional sites were added on the University of Wisconsin – Parkside campus immediately downstream of Petrifying Springs Park. To further support monitoring objectives, benthic macroinvertebrate surveys were conducted beginning in 2023. Here, we evaluate temporal trends within water quality and the macroinvertebrate data to evaluate the effectiveness of management and restoration activities on the Pike River. We expect TSS values to decrease over time and the number of sensitive invertebrate species to increase with restoration efforts that aim to address pollutant runoff.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #20, Tripp Commons**

Shape Dependent Microparticle Filtration and Characterization

Tyler Hendee (UW-Platteville) – Engineering Physics
Coauthors: Mitchell Kallas, Marc Aruguete
Mentor: Gokul Gopalakrishnan

Shape-dependent properties of micro and nanosized particles have been exploited in recent years for applications ranging from energy storage and biofuel production to cancer treatment and drug delivery. While filtration of particles by size has been studied and optimized over millennia of development, shape-based separation is a much more recent and complex problem to solve. In this presentation, we describe the development and testing of a microfabricated silicon-based filter to address this challenge at the microscale. The filter chip is housed in a microfluidic cell that permits forward, reverse, and crossflow circulation to mitigate clogging and increase filter lifetime. We have performed proof-of-concept separations of microspheres from microfibers and applied image processing methods to analyze the results of these experiments. We also address the path towards shrinking the pore sizes to perform similar separations in the nanoscale, particularly targeting bacteria, viruses and prions.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #40, Tripp Commons**

Food Safety Net & Nutrition Incentive Programs: A Case Study of One Wisconsin Farmers' Market SNAP Market Match Program with Statewide Implications – Part I

Marc-Joel Henry (UW-Eau Claire) – Economics, Social Work
Coauthors: Hanlin Liu, Sophia Meisner, Luke Plagens
Mentors: Eric Jamelske and Briana Rockler

Food insecurity is a significant issue facing many American households. The Supplemental Nutrition Assistance Program (SNAP) provides increased access to food for families in need. Additionally, fruit and vegetable (FV) consumption has been shown to improve health and reduce the risk of a variety of chronic diseases. However, poor nutrition among children and adults, including low FV intake have contributed to rising rates of obesity in America. It is particularly challenging for low-income households to purchase/eat the recommended amount of FV. Farmers' markets offer a wide variety of fresh, local and healthy foods, especially FV, but data show that low-income households are much less likely to shop at farmers' markets. The Eau Claire Downtown Farmers' Market (ECDFM) sponsors a Market Match Program (MMP) incentivizing. This presentation uses 2023 and 2024 survey data to highlight the many benefits of the MMP, while also exploring a variety of barriers to using the MMP mapped to corresponding changes that might reduce these barriers. Our results show most SNAP shoppers do not regularly shop at the market with the most reported barriers being limited market hours/locations, limited SNAP benefits running out and not remembering. We also provide demographic characteristics for all survey respondents. *Connected to two other presentations on the same topic, same mentors, different students, same title – parts II, III.

Oral Presentation **10:00 – 10:15 am, Capitol View Room**

Managing and Minimizing Racism and Diversity Resistance in the Workplace

Sayla Hernandez (UW-La Crosse) – Psychology
Mentor: Nese Nasif

Combating systemic racism in the workplace involves addressing deeply rooted institutional biases and discriminatory practices that disadvantage certain groups. However, these efforts often face challenges due to diversity resistance within organizations. Overcoming this resistance requires fostering a culture of openness, education on the benefits of diversity, and creating accountability structures to ensure that equity and inclusion goals are met. Drawing on the work of Daniels (2022), the current research presents a framework to help companies enhance inclusivity and deepen their understanding of diversity. This framework is supported by qualitative research that sampled business organizations as to their current diversity, equity and inclusion policies and practices. It serves as a starting point for driving meaningful and measurable change.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #5, Tripp Commons**

An EEG Investigation of Sleep Quality Memory and Executive Function

José Herrera (UW-Parkside) – Psychology
Mentor: Melissa Gregg

Memory consolidation happens during non-rapid eye movement (NREM) and rapid eye movement (REM) stages of the sleep cycle. Inadequate sleep can impair memory processing and other cognitive functions. This experiment expanded on previous research by correlating several measures of sleep quality (rather than a single measure of sleep duration) with memory and executive function. The purpose of this experiment was to determine if 7 variables of sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction) are correlated with performance on a recognition memory task and two tasks of executive function. A second purpose was to determine if physiological markers of successful memory retrieval differ among individuals with poor sleep quality. Participants completed a computerized auditory or visual memory task that was divided into study and test phases. During the study phase, 256 pictures or sounds were presented one at a time and participants were asked to commit them to memory. During the test phase, studied stimuli were randomly presented with new stimuli. Participants were asked to indicate via a button press whether each stimulus was "old" or "new." EEG signals were recorded via a 32-channel Brain Vision system while participants completed the task. After the memory test, participants completed a digit span task, a trail-making task, and the Pittsburgh Sleep Quality Index. The results indicated behavioral and physiological effects of sleep quality on long-term recognition memory and executive function. Follow-up analyses of the EEG time-frequency oscillations have the potential to identify the phase of optimal information encoding and how encoding is affected by sleep quality and executive function abilities. The results of this study have the potential to improve our understanding of the connections among sleep quality, memory, and general cognitive ability.

Oral Presentation **9:45 – 10:00 am, Langdon Room**

Co-Designing Qualitative Research Tools: Centering Resilience and Cultural Identity in Native American Communities

Tomás Hill (UW-Milwaukee) – Psychology
Mentor: Gabriela Nagy

Native American communities experience disproportionately high rates of mental health challenges, stemming from systemic oppression, intergenerational trauma, and limited culturally competent resources. However, existing research predominantly emphasizes deficits, overlooking resilience factors and age-related variations in mental health. To address these limitations, this qualitative study co-designed a culturally responsive semi-structured interview guide to explore resilience narratives and well-being across the Native American lifespan. Using a community-engaged, human-centered approach, we conducted iterative key informant interviews (n=3) and a talking circle (n=7) with Native American adults and professionals experienced in Indigenous contexts. Participants were recruited through community outreach and university networks. Rapid qualitative analysis methods were employed to integrate participant feedback, focusing on cultural acceptability, clarity, and appropriateness of the guide. Preliminary findings underscored the importance of refining language to shift from deficit-based frameworks toward strengths-based narratives, emphasizing resilience, cultural strengths, and holistic well-being. Participants recommended replacing terms such as "formal healthcare" with "Western healthcare" to avoid reinforcing colonial hierarchies, advocating instead for inclusive terminology reflective of Indigenous epistemologies. Additionally, themes of data sovereignty emerged, highlighting the necessity of ongoing consent, transparency, and community ownership of research data. Participants also stressed flexibility regarding Indigenous identity, advocating respect for individual preferences and varied connections to cultural practices. These insights have informed the iterative refinement of the semi-structured interview guide, resulting in a culturally responsive research tool aligned with Native perspectives on autonomy and meaningful engagement. Ultimately, this guide will serve as a foundation for future qualitative studies exploring resilience and coping mechanisms within Native communities. This study demonstrates the importance and feasibility of culturally respectful, community-centered methodologies, advancing mental health research practices that honor Indigenous epistemologies and address longstanding disparities.

Oral Presentation **10:15 – 10:30 am, Langdon Room**

Synthesis and Biological Studies of Complex Heterocyclic Amines

Megan Honn (UW-Whitewater) – Chemistry
Coauthor: Nelson Klein
Mentor: Hephzibah J. Kumpaty

Enhancing the quality of human life is a key aim in organic chemistry research. Particularly in the field of medicinal chemistry, this effort primarily involves the development of new pharmaceuticals and optimizing existing ones. Among the most prevalent structural moieties in the extensive medicinal chemistry databases are alkyl amines. The tetrahydroisoquinoline (THIQ) ring is widely recognized as a prominent heterocyclic structure, present in numerous natural products and pharmaceuticals that demonstrate significant biological activities. A few examples include antitumor and antimicrobial activities, stimulation of b3 adrenergic receptors and dopamine D3, and 5-HT1 receptor antagonists. Consequently, substantial efforts are dedicated to developing new tetradihydroisoquinoline-based compounds and innovative methods for their synthesis. This study specifically aims toward the efficient development of structurally diverse amines using established protocols from our continued work on carbonyl reductive amination reactions. Its broad applicability lies in the efficacy of the condensation between an aldehyde or ketone with either a primary amine forming an imine or an iminium ion in the case of a secondary amine. The subsequent reaction with a hydride source, such as NaBH3CN or NaBH(OAc)3, leads to an amine of higher order. The scope and limitations of the reactions are being assessed using a diverse set of amines with carbonyl compounds. Special focus is placed on developing an enhanced protocol for economic and environmentally friendly reactions. Preliminary findings regarding the successful synthesis of these molecules and the proposed structure-activity studies will be discussed.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #21, Tripp Commons**

Exploring SDSS Quasars in A Multiwavelength Approach: Optical Spectroscopy, Radio Morphology, and Infrared Photometry

Alexander Hurtado (UW-Stevens Point) – Physics
Mentor: Sebastian Zamfir

I am exploring the properties of low redshift quasars extracted from vetted catalogs (e.g., Wu & Shen 2022, based on the Sloan Digital Sky Survey Data Release 16). I focus on quasars with high quality optical spectra. I complement the optical photometry and measurements obtained from optical spectra with radio properties from online public archives like FIRST (Faint Images of the Radio Sky at Twenty Centimeters), which provide information about radio morphology. I also get infrared photometry from online archives (e.g., Wide-field Infrared Survey Explorer). I am seeking potential correlations between the measures of emission lines in optical spectra, the radio morphology (e.g., extended vs. compact), and optical/infrared photometry. Together, this data may shed light into and provide constraints to the physical models of quasars.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #14, Tripp Commons**

In Vivo Evaluation of FAN-NM-CH3 and Vitamin C Combination Therapy in Cancer Models

Julia Jakusz (UW-Milwaukee) – Biomedical Sciences – BMS and Premed
Coauthors: Taufeeque Ali, Thilini Nimasha Fernando Ponnamperumage
Mentor: Xiaohua Peng

Breast cancers are highly heterogeneous and aggressive, with limited treatment options and poor prognoses, particularly in triple-negative breast cancer (TNBC), the most aggressive subtype. The Peng group has developed FAN-NM-CH3 a reactive oxygen species (ROS)-activated prodrug that significantly outperforms FDA-approved alkylating agents like chlorambucil and melphalan. This prodrug selectively responds to H2O2 triggering activation and subsequent DNA alkylation, which disrupts cancer cell replication and induces cell death. Given the success of combination therapies in preclinical models, this study evaluates the safety and efficacy of combining FAN-NM-CH3 with vitamin C in mice. A safety assessment in CD-1 mice determined the maximum tolerated dose, followed by a 10-week efficacy study in MDA-MB-468, MDA-MB-231, and MDA-MB-453 xenograft models. Tumor and body weights were measured weekly. While all treated tumors exhibited shrinkage, complete tumor regression was observed in the MDA-MB-453 model. Notably, monotherapy with either the prodrug or vitamin C showed limited efficacy, whereas the combination therapy demonstrated significant tumor reduction. These findings highlight the potential of FAN-NM-CH3 in combination therapy, supporting further investigation in patient-derived xenograft (PDX) models to advance clinical translation.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #14, Tripp Commons**

Does Pre-Processing of Photospheric Vector Magnetograms Alter the Information They Contain About Coronal Currents?

Nathan Jarvey (UW-Green Bay) – Mechanical Engineering
Mentor: Brian Welsch

Electric currents flowing in the solar corona are believed to supply the magnetic energy that is suddenly released in solar flares and coronal mass ejections (CMEs). However, key questions about these currents remain open, including: Do coronal currents evolve in systematic ways before flares and CMEs? Also, how are coronal currents affected by these events? The central challenge in addressing questions about coronal currents is that they are not directly observable. Instead, properties of an active regions (AR) coronal currents are usually inferred via modeling based upon observations. One approach is to extrapolate a 3D, non-linear force-free field (NLFFF) model for the coronal magnetic field, Bmodel(x, y, z), from an observed, 2D photospheric vector magnetogram, Bobs(x, y) at z = 0. Often, prior to performing the extrapolation, the observed magnetogram is first "pre-processed" (Wiegelmann et al. 2006), a procedure that modifies the observed field values to minimize Lorentz forces and torques in the input array. Recently, Gauss's separation method (Schuck et al. 2022) was applied to photospheric magnetograms to determine which parts of the observed photospheric field are due to currents flowing (i) below the photosphere, (ii) across it, and (iii) above it. For convenience, we shall refer to currents above (cf., below) the photosphere as coronal (cf., interior, respectively). Gauss's separation method does not rely upon the field being force-free, so no preprocessing is required to apply it. It is possible, though, that pre-processing alters the "photospheric imprints" of coronal currents. To understand the impact of pre-processing on these photospheric imprints, we apply Gauss's separation method to un-pre-processed and pre-processed versions of magnetograms from several active regions that subsequently produced large flares. We then statistically characterize differences in coronal-current imprints between the two versions of magnetograms.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #2, Tripp Commons**

An Efficient and Accurate Semiconductor Self-Assembled Quantum Dot Model

Zach Jensen (UW-Platteville) – Engineering Physics/Mathematics
Coauthor: Fox Gerner
Mentor: Wei Li

We developed an efficient finite element model in COMSOL for self-assembled quantum dots (QDs) of various sizes, shapes, and materials, incorporating k·p heterojunction effects for optoelectronic device design. The four-band model, derived from an eight-band formulation, includes strain and band-mixing effects while maintaining computational efficiency. This method can be applied to optimizing QD-based lasers, LEDs, and quantum computing architectures. The model supports diverse QD geometries beyond mathematically convenient spheres, better reflecting the actual shapes of self-assembled QDs. Additionally, the framework supports widely used semiconductor heterojunction materials, making it applicable in both academic research and industrial applications. These features enable a wide range of QD implementations across the optoelectronics industry. Existing computational methods for self-assembled QDs require supercomputers and extensive computation time, though they achieve high accuracy. To balance efficiency and accuracy, we introduce a reduced four-band model that includes only heavy-hole and light-hole states, significantly reducing computation time while sacrificing minimal accuracy. By lowering computational costs, this approach enables rapid prototyping, real-time design iterations, and broader accessibility of QD simulations. The model's accuracy is validated by its correct prediction of the 2-fold degeneracy of valence band states, as expected from group theory. This model offers an accessible and efficient tool for designing self-assembled QD optoelectronic devices, providing both academic and industrial users with a practical alternative to computationally intensive approaches.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #43, Tripp Commons**

Cancer Risk Behaviors in Latino Men: Cigarette Smoking and Weight Status and its Relationship to Body Image

Diante Johnson (UW-Milwaukee) – Biomedical Science
Coauthors: Wentrell Bing, Carlos E. Rosas, Jacqueline Guzman
Mentor: Lisa Sanchez-Johnsen

Smoking and obesity are two leading causes of preventable mortality in the U.S., including 12 and 13 different types of cancers, respectively. Moreover, there is a high prevalence of smoking and obesity among Puerto Rican and Mexican men, which highlights the need to better understand these health issues in Latino men. The relationship between smoking and body image may be significant, as cessation may lead to weight gain, which may negatively impact body image. However, there is a dearth of research on this relationship among Latino men. The aim of this study was to examine the association between smoking, body image discrepancy (BID), and body satisfaction in Latino men, and to assess whether these relationships varied by ethnic background and weight status. This secondary data analysis included 203 Latino men (99 Mexicans; 104 Puerto Ricans) aged 18 to 65 years with a BMI of ≥ 18.5 kg/m2, who participated in the Latino Men's Health Initiative, a cross-sectional, NIH-funded study. BID was assessed by the Figure Rating Scale, a visual scale of nine numbered schematic figures of men ranging from underweight to obese. Body satisfaction was assessed using the Body Areas Satisfaction subscale of the Multidimensional Body-Self Relations Questionnaire. Multiple regression models examined the associations of smoking with BID and body image satisfaction, controlling for covariates. Interaction terms assessed the moderation by Latino background and weight status. Smoking status was associated with ideal body image after controlling for covariates (B = 0.35, 95% CI: 0.45, 0.65, p = .025). Specifically, being a current smoker was related to endorsing a larger ideal body image compared to individuals who did not report being current smokers. After controlling for demographic variables and covariates, men who reported being current smokers had lower odds of having a negative body image discrepancy than those who do not smoke (OR = 0.46, 95% CI: 0.23, 0.96, p = .038), suggesting men who smoked are less likely to prefer an ideal body image that is lower than their current body image compared to men who did not smoke. Smoking status was not associated with absolute body image discrepancy (p = .574) or body image satisfaction (p = .89), and there was no evidence of moderation by Latino background or weight status (p interaction > .10). Future research is needed to examine the relationship between smoking topography, cessation, and body image among diverse Latino men. This study contributes to the limited

research on the relationship between smoking and body image among Latino men, providing insights into how smoking status may influence body image perceptions among Latinos so that culturally tailored interventions can be developed. This is a secondary data analysis of a study funded by the NIH (R21CA143636 and R1CA143636-S) to Dr. Sanchez-Johnsen. Diante Johnson was supported by the MCW Cancer Center and UWM Undergraduate Research Experience Program (UREP). Jacqueline Guzman is supported by the T32 Biobehavioral Oncology Training Program funded by the NCI (5T32CA269115-02). Funding numbers for the parent study are R21CA143636 and R1CA143636-S.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #54, Tripp Commons**

Controversy on the Streets: Urban Political Economy and Placemaking in Stevens Point's Business 51 Road Reconstruction

Daniel Kangail (UW-Stevens Point) – Social Studies Education
Coauthor: Rebecca Smith
Mentor: M. David Chunyu

The Business 51 improvement project in Stevens Point, WI aims to revitalize a three-mile transportation corridor that includes the Division and Church Streets of Stevens Point. Dubbed a "road diet," the Business 51 project involves reducing some portions of the Division and Church Streets from four lanes to two lanes with a middle left-turn lane to address deteriorating pavement, safety concerns, and multimodal needs - including improved pedestrian and bicycle connections. Despite significant funding, including a $3.5 million grant from the Wisconsin Department of Transportation, the project has faced significant challenges since the beginning. In 2023 a city road project referendum, initiated by the Southside Business Association with the aiming of pausing the 51 project, passed by a narrow margin. In early 2025 a proposed roundabout at Division Street and Fourth Avenue has sparked a major debate amongst city officials, resulting in a mayoral veto for the proposed roundabout and an override of the mayoral veto by the city council later. This research applies Logan and Molotch's use value vs. exchange value framework as well as Sherry Arnstein's ladder of citizen participation concept to assess the development of the Business 51 project and why it has generated so much controversy of citizen participation concept to assess the development of the Business 51 project and why it has generated so much controversy.

Oral Presentation **10:45 – 11:00 am, Capitol View Room**

Garden Ethics: School Gardens for Virtue Ethics in the Biology Curriculum

Katie Kapp (UW-Whitewater) – Broadfield Science Teaching License Program
Mentor: Eric Luckey

This research project aims to address the question: How might the use of school gardens in the instructional environment promote the development of students' virtue? While school gardens are often employed to bolster students' basic scientific competency, this project asks how gardens might also be leveraged by educators to promote our students' acquisition of Neo-Aristotelian virtues while also achieving classroom content goals. While the importance of ethics in science education has been a topic of increasing interest in recent years — there is little written about how virtue ethics can fit into the science curriculum, and even less on why and how educators might promote virtue through the specific educational opportunities like a school garden. My project employs philosophical methods to argue for the use of virtue ethics in science curriculum. Philosophical methods have a longstanding history in the development of curriculum and instructional practices, as they help educators answer two foundational questions; namely, "What educational purposes should schools seek to attain?" and, "What educational experiences can be provided that are likely to attain these purposes?" (Tyler, 1949). Informed by the works of Neo-Aristotelian virtue ethicists, my work makes the case that school gardens offer a prime setting for the habituation of virtue within the context of a biology course. Moreover, my research concludes with a few practical suggestions for educators to implement a school garden suitable for the habituation of virtue and the provision of high-quality biology instruction.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #26, Tripp Commons**

Maternal Responses to Infant Disengagement: Physical Strategies Mothers Use to Maintain Attunement with Their Infant

Ravneet Kaur (UW-Milwaukee) – Kinesiology
Mentors: Victoria Moerchen and Jacqueline Westerdahl

Early caregiver-infant interactions are critical for healthy infant development. A key aspect of dyadic interaction is behavioral attunement. Attunement is the contingency and congruency of each member's behavior, relative to the other's cues. Existing evidence that physical interaction is the primary mode of communication between dyads during early infancy, supports that physical behaviors during interactions are particularly important to achieve attuned, positive interactions. Emerging research shows caregivers select from a repertoire of physical behaviors to sustain mutual attunement with their infants throughout interactions. However, little is known about how caregivers modify their physical behaviors to restore mutual attunement after it is lost. This study addressed this gap, by exploring how mothers immediately adjust their physical behaviors after their infant disengages during interactions, in an attempt to re-engage them. We conducted a secondary analysis of existing video data of 20 mothers interacting with their 4-month-old, typically developing infants. Each interaction included 5 minutes of free-play and was coded in 1-second intervals for maternal physical behavior, infant engagement, and mother-infant attunement. Preliminary results show that following infant disengagement, mothers used one of three re-engagement strategies: switched to a new behavior (61.3%), continued the same behavior (22.6%), or stopped touching the infant (16.1%). Success rates for re-engaging the infants were 21.1%, 57.1%, and 0%, for strategies of new behavior, continued behavior, and stopping touch, respectively. Regardless of re-engagement strategy, mothers responding to infant disengagement with a playful behavior had the highest success rate for re-engagement (50%). These results provide evidence that mothers respond to infant disengagement with physical strategies to re-achieve attunement after it has been lost. Our findings support ongoing investigation into how physical behavior during dyadic interaction can promote attuned interactions and ultimately improve infant developmental outcomes.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #43, Tripp Commons**

The Impact of Sex and Age on the Effect of Acute Alcohol Exposure Across the Lifespan in Rats

Jared Kendrick (UW-Eau Claire) – Neuroscience
Coauthors: Audrey Crippen, Jadyn Hartwig, Samuel Stumo, Aeda Zank
Mentor: Douglas Matthews

The world's population is rapidly aging due to increased healthcare, better nutrition, and clean water. Older people use healthcare significantly more than younger people and the increase in the number of older individuals threatens to overwhelm healthcare systems. Older adults consume alcohol, often in binge patterns. Therefore, understanding the impact of alcohol use in the aged population is critical. Recent animal research has shown that aged male rats are significantly more sensitive to the effects of acute alcohol exposure compared to adult or adolescent male rats on a variety of behavioral tasks including ataxia. However, it is currently unknown if sex-differences exist in the effect of acute alcohol exposure in aged animals. Given the increase in alcohol consumption in both the aged female and aged male population it is important to understand if aged females are more, less, or similarly sensitive to acute alcohol compared to aged male rats. Aged (24 months), adult (3 months) and adolescent (36 days) female and male Sprague-Dawley rats were tested for alcohol-induced ataxia on the aerial righting reflex (ARR) task. All subjects were tested before (baseline) the administration of either 1.0 g/kg or 2.0 g/kg alcohol (w/v) and then 10, 20 and 60 minutes following the I.P. administration. Acute ethanol administration produced a significant impairment in the ARR task that was age and sex dependent ($p < 0.05$). Specifically, aged animals were significantly more impaired on the ARR task than adult or adolescent animals ($p < 0.05$). However, female animals were significantly less impaired on the ARR task following the 1.0 g/kg dose compared males ($p < 0.05$) but not the 2.0 g/kg dose. Blood alcohol concentrations were similar between ages and sex. The current work highlights the importance of studying sex-dependent effects across the lifespan and highlights additional factors that may be contributing to the increase in alcohol consumption in the older population. Supported by NW Mayo Healthcare – UW Eau Claire Research Innovation Council.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #8, Tripp Commons**

Characterizing the Relationship Between Self-Reported Trauma and Neural Indices of Cognitive Inhibition

Hossein Khatibi (UW-Milwaukee) – Psychology
Mentor: Zachary Gemelli

Individuals who have experienced trauma can harbor intrusive thoughts, experience emotional numbness/distress, and even live in a constant state of fear. The concept of trauma has existed for centuries. Ancient times explained these people as "affected", World War I referred to it as "shell shock", and contemporarily, it is known as Post-Traumatic Stress Disorder (PTSD), yet the underlying neurocognitive construct of trauma has yet to be fully characterized. Characterizing the underlying neurocognitive indices in trauma is critical to establishing new treatments and improving existing treatments. Thus, the purpose of the current research is to characterize the relationship between self-reported trauma severity and neural indices of cognitive inhibition. The Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5), a self-report questionnaire, will be used to examine trauma severity on a dimensional scale. In addition, a computerized experimental task will be administered to measure cognitive inhibition whilst brain activity is recorded using electroencephalography (EEG). It is anticipated that those with greater trauma severity will exhibit overactive brain indices as a compensatory mechanism to maintain behavioral performance resulting in inefficient and excessive cognitive inhibition. The overall goal of this study is to characterize the neural markers of PTSD which may contribute to improving existing treatments and establishing new treatments. Key words from the study that would require definitions include EEG, cognitive inhibition, PTSD, and the PCL-5.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #23, Tripp Commons**

What Information Children Prioritize When Interpreting Another's Emotion

Sascha Krause (UW-Madison) – Neurobiology & Spanish; Global Health, Health Policy, & Chicane/Latine Studies Certificates
Mentor: Hannah Jean Kramer

A smile or frown, amongst other external cues such as screaming or laughing, are immediate indicators of emotion that young children primarily rely on. Children begin to incorporate external features into emotional understanding at ages 4-5. To reason about another's emotion with greater accuracy, the capacity to put together different pieces of information is eventually developed - as seen in older children. By approximately 8-9, children demonstrate a more complex perspective on interpreting how people feel, once in varied contexts. Older children and adults often use both the physical expression of an individual along with contextual knowledge to provide a complete understanding of how someone else may feel. While previous research has focused on external cues, such as facial expressions, less work has been done on how internal or contextual cues may also influence emotion reasoning. This study seeks to develop an understanding of how emotions are perceived from the combination of external elements with internal information that could not be determined from a smile or frown. In a survey presenting 14 possible pieces of information to know when trying to understand someone else's emotion, children from ages 4 through 9, select which they would prefer to be revealed out of two immediate choices. Potential choices may include contextual information, such as a person's normal behavior, or visual cues, such as what this person is doing with their body. To illustrate, a child observes an image of a person walking into a room and is tasked with discovering how this individual feels inside. For example, the child may prefer knowing someone's current life situation as opposed to their physical status. The findings of this study will shed light on how children of a younger or older age alike mature in their empathetic development. Moreover, this study will improve understanding of emotional perception across varied ages, allowing for a deeper grasp on how children may express their own emotions based on environmental influences.

Oral Presentation **10:00 – 10:15 am, Langdon Room**

Exploration of Intermolecular Forces using Chromatography

Tristan Kreger (UW-Whitewater) – ACS Chemistry
Mentor: Kimberly Naber

The role of creating a chromatography lab for Chem 104 was to introduce students to chromatographic techniques and concepts - including mobile phases, stationary phases, and intramolecular forces in a laboratory setting. This goal was accomplished by designing a lab that utilizes FD&C food dye, 0.1% NaCl(aq), 70% isopropyl alcohol (C□H□OH), and acetone (C□H□O). Concentrations and formulations of solvents were optimized for clear laboratory separation within the time constraints of a standard lab period. This procedure is cost-effective and environmentally friendly, allowing for adaptation to an at home laboratory if necessary for future online course development. A beaker-based chromatography method was used to visualize the separation of FD&C food dyes based on the polarity of the mobile phase. Additionally, Rf values were used for the quantitative analysis of dye migration and unknown sample identification, reinforcing key chromatographic concepts. This method, in contrast to students relying solely on theoretical models and explanations, provides a clear visual representation of molecular behavior, intermolecular forces, and phase behavior, enhancing student understanding of chromatographic principles explored in subsequent curriculums. This research produced new material for students participating in Chem 104 Lab such as Excel sheets, report forms, and laboratory procedures. Student data and laboratory outcomes will be collected and used to continue research into improving this lab.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #29, Tripp Commons**

3D Organoids Employed to Study the Impact of Co-cultured Breast Adenocarcinoma Cell-line MCF-7 and Normal Ductal Epithelial Cell-line MCF10A in Artificial Tumor Tissue Model

Emily Kubicek (UW-River Falls) – Biology, Chemistry, Spanish
Mentor: Timothy Lyden

Breast cancer is the most common tumor in women today. The WHO reports that worldwide there were 2.3 million women diagnosed in 2022. The same year also saw 670,000 breast cancer deaths. Adenocarcinoma accounts for the majority (50-75%) of tumor types in the breast. These are tumors that arise from ductal cells lining the milk glands. Although far less common, the male breast can also develop adenocarcinoma. While early detection and treatments for breast cancer have greatly improved, if detected later or with certain subsets the prognosis remains poor or at least very difficult for the patient. In this study, we report on efforts in our laboratory to further develop a basic 3D organoid artificial tissue model to study tumor progression processes and development of metastasis. This model system is based on a simple “hanging-drop” plate that generates 96 identical tumor spheroids. These plates hold a drop of media containing precise numbers of cells suspended within it. The cells, lacking a matrix to adhere to, instead bind to each other and form clusters which eventually coalesce into a single tumor organoid. Our lab has used this approach for generating tumors using MCF-7 cells for several years. However, until now these have been exclusively monocultures of just one cell line, in this project we are seeking to define the effects of co-culturing MCF-7 with normal ductal cells, MCF10A. Since these cell types co-exist in-situ in the patient, it stands to reason that there will be an impact on our mono-culture model system. Preliminary experiments have established mono-cellular spheres with 5000 suspended cells. These control tumor organoids have displayed all the normally observed structures and details. In addition, 2D co-cultures of MDF-7 and MCF10A are also being studied to observe individual cellular interactions directly.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #44, Tripp Commons**

Refining the Autism Spectrum Disorder Attention Profile (ASDAP): Attention Assessment in ASD

Cadence Kuhn (UW-Eau Claire) – Speech, Language, and Hearing Sciences
Mentor: Lesley Mayne

The Autism Spectrum Disorder Attention Profile (ASDAP) is an unpublished protocol designed to measure 15 attention-related factors identified in research. Attention is a key behavioral phenotype affecting 50–70% of individuals with Autism Spectrum Disorder (ASD), yet it is not formally recognized as a defining trait of ASD (Hours et al., 2022). The original study aimed to develop a protocol for assessing attention and to determine which ASDAP factors consistently reflected attention across five participants. With IRB approval, participants with existing or probable ASD diagnoses were recruited and assessed through informal clinical observations at the UWEC CCD clinic and caregiver interviews. Observations took place during informal therapy sessions, and caregiver-reported data were integrated into the ASDAP for a more comprehensive assessment across different environments. Data analysis, completed in spring 2024, revealed key areas for improvement, leading to a full redesign of the protocol. These refinements aim to enhance the ASDAP's validity and increase its practicality. We are optimistic that our changes will result in more effective attention assessments in individuals with ASD. Future research will focus on testing the revised protocol in a larger sample to establish its clinical utility.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #12, Tripp Commons**

Neurodivergence in the Arts- How a Neurodivergent Brain Creates, Performs, and Designs

Elizabeth Lappano (UW-Milwaukee) – Theatre Production, Classical Civilizations
Mentor: Ralph Janes

The present study is exploring the ways neurodivergent artists create, perform, and design their work. It investigates the relationship between certain functions of the brain and how those functions affect artistic expression. By comparing neurodivergent and neurotypical people's coping mechanisms and their methods of creation we can draw conclusions about the different pathways taken by each artist to get the same result. Working with disability organizations on campus and beyond, we will be able to get firsthand insight on the different ways neurodivergent artists achieve their goals, and what extra steps might need to be taken. Through these organizations, we can also link certain behaviors and patterns together. Our research was inspired by our upcoming semester's show, "The Curious Incident of the Dog in the Night-time", a novel turned play by Simon Stephans, in which the main character, Christopher, displays many neurodivergent and autistic tendencies. This research will lead to better accommodations for neurodivergent actors and crew members. At our showing of "Curious Incident of the Dog in the Night-Time", there will be a presentation of famous performing artists with neurodivergence's as well as pre-recorded interviews done with students and faculty at our school who either identify as neurodivergent or who have worked closely with students on the spectrum. Beyond that, we hope to induce change on a wider level, providing artists with neurodiversity a better chance of success.

Oral Presentation **10:30 – 10:45 am, Langdon Room**

EA Comparison of Neighborhoods in the Madison Metropolitan Area

Brian Larson (UW-Stevens Point) – History and Social Studies Education
Coauthor: Liliana Irmsicher
Mentor: M. David Chunyu

There are great variations in the urban landscape of the United States. In this study, the researchers examined the spatial arrangements, cultural artifacts, and census data of two Dane County census tracts, one in Madison's Marquette neighborhood and the other in the Village of Cottage Grove, both within the Madison Metropolitan Area. Using Logan and Molotch's (1987) conceptual framework of political economy, the researchers analyzed the exchange value and use value of the two Madison neighborhoods. Our methodologies included analysis of census data from 2020 and ethnographic research, taking extensive notes and photographs of the two neighborhoods. Our observations showed that both neighborhoods are predominantly white (87% of total population), primarily between the ages of 20 and 50, and contain home valuations above $400,000 (Census Bureau, 2024). However, the spatial arrangements of the two neighborhoods vary greatly. The mixed-use zoning for Madison's Marquette neighborhood allows for a variety of businesses and services hence a stronger emphasis on the exchange value, while the Cottage Grove neighborhood focuses on residential developments and so prioritizes use value for residents. The conclusions from this study can be applied to other similarly sized urban areas, such as the Rochester, MN and Reno, NV metropolitan areas.

Oral Presentation **9:45 – 10:00 am, Capitol View Room**

Gene Editing to Investigate Tolerance to Nitrogen Starvation in the Alga *Chlamydomonas reinhardtii*

Andrew Lawson (UW-Parkside) – Biological Sciences
Coauthor: Nicholas Winter
Mentor: David C. Higgs

Nitrogen is essential for all living organisms. Under Nitrogen starvation, the model eukaryotic green alga *Chlamydomonas reinhardtii* has decreased growth but increased triacylglycerol (TAG) accumulation. TAGs are of interest as they are used to produce biodiesel. The goal of this research is to edit the genome of *C. reinhardtii* to increase TAG production for biodiesel. A strain of *C. reinhardtii* named tolerance-to-low-nitrogen (TLN1) and reported from our group grows better than wild type (WT) under nitrogen starvation and accumulates more TAGs than WT. We identified two candidate genes with mutations that may cause this TLN phenotype: *TAB2* (a chloroplast translational regulator) and a predicted *zinc-finger Transcription Factor* (*zf-TF*). Preliminary protein investigation suggests that the predicted *zf-TF* protein is a zinc finger – Transcription factor. Analysis of existing *TAB2* mutations shows phenotypes consistent with TLN. To further analyze these candidate genes, we are using CRISPR-Cas9 gene editing to introduce mutations into *TAB2* and *zf-TF*. In the Promoter region of *TAB2,* we have introduced mutations and tested their phenotypes, which are WT. To "knock-out" the coding regions of *TAB2* and *zf-TF*, CRISPR-Cas9 gene editing is being used to introduce the Paromomycin resistance gene in transformants. DNA from transformants are being PCR screened for *TAB2* and *zf-TF* edits. These data should help determine if the TLN phenotype of better growth in low nitrogen and increased TAGs is due to *TAB2* and/or *zf-TF* mutations. Future goals include testing the causative mutation in *Chlorella* algae that have more industrial uses than *C. reinhardtii*.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #18, Tripp Commons**

Metabarcoding of Bacterial and Fungal Communities in the *Sarracenia-Wyeomyia smithii* Microecosystem

Jelena Lee (UW-Madison) – Microbiology & Nutritional Sciences
Coauthors: Julia Kashuk, Aldo Arellano
Mentor: Kerri L. Coon

The tripartite *Sarracenia-Wyeomyia smithii* system consists of the pitcher plant mosquito (*Wyeomyia smithii)*, the carnivorous purple pitcher plant (*Sarracenia purpurea*) and their associated microbiota. Existing microbial research in this system focuses largely on bacteria, therefore this research aims to explore the role fungal communities play in ecosystem function over time. Metabarcoding of the bacterial and fungal populations was performed using paired high-throughput ITS and 16S amplicon sequencing of samples taken from pitcher plants in the field during primary succession. We characterized co-occurence patterns of bacterial and fungal taxa and correlated specific taxa and multi-domain networks with direct measures of enzymatic activities essential to plant host fitness. Our results suggest that cross-domain interactions within microbial communities affect essential ecosystem function.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #31, Tripp Commons**

The Arc of Grip Strength: Rate and Percentage Change Over the Lifespan NIH Toolbox

Cameron Lee (UW-Milwaukee) – Data Science, Public Health Certificate
Coauthor: Dawuud Abubakar
Mentor: Inga Wang

Grip strength (GS) is a potential biomarker of aging. This study examined (a) the rate of change and (b) percentage change in grip strength across the lifespan (ages 3-85), relative to a reference age (19-20 years). This is a cross-sectional, observational study used data 3,901 noninstitutionalized U.S. residents who participated in the NIH Toolbox study. We computed rate of change (kg/year) to track grip strength trajectories, and percentage change (%) to quantify variation across age groups, gender, and hand dominance. GS across sexes increase rapidly, peaking at age 14 for males (4.58 kg/yr) and age 11 for females (2.87 kg/yr). Afterward, the rate of change declined through adolescence and young adulthood, nearing zero at age 19–20 (-0.69 kg/yr in males, -0.06 kg/yr in females). A progressively decline followed, with rates of -0.35 kg/yr in males and -0.30 kg/yr in females by age 60. This decline stabilized at -0.35 to -0.37 kg/yr in males and -0.27 to -0.28 kg/yr in females from ages 66-85. Percentage change became positive at age 18 (0.30% in males, 0.45% in females), peaking at age 19 for males (0.60%) and age 23 for females (0.65%). Decline began at age 26 in males (-0.09%) and age 45 in females (0.99%), with percentage losses of -33.27% in males and -37.62% in females by age 85. These trends highlight a continuous and significant age-related reduction in muscle strength, particularly in older adults. The reference values for the rate of GS decline during normal aging are essential for distinguishing healthy aging from early signs of muscle dysfunction. These values are benchmarks to assess whether an individual's decline is within the expected range or indicates a higher risk of frailty, sarcopenia, or other age-related conditions.

Oral Presentation **10:15 – 10:30 am, Council Room**

Project Overview: Rapid *Salmonella* Detection

Yuxin Liu (UW-Stout) – Food Science
Coauthors: Sitong Liu, Xinyi Wan, Yuxian Jin, Zhuyi Gao
Mentor: Kim Tajeo

We often see news that food is recalled due to *Salmonella* contamination. This inspired our curiosity about *Salmonella* exploration. Under the leadership of our mentor Dr. Kim, we came up with the idea of developing a new kit that would allow *Salmonella* to be quickly tested and started our experiments. At present, we have determined the research method: *Salmonella* is cultivated and tested in the same test tube at the same time, and the characteristic of hydrogen sulfide (H2S) is used to determine whether *Salmonella* exists. Compared with traditional selective culture and ELISA testing, the new kit reduces the presence of false positives or false negatives. At the same time, compared with PCR technology that requires higher professionalism on operators, it only requires minimal training and equipment to be used, thus making it possible to be promoted to the public. To verify that the new kit is reliable and suitable for different environments, we have seasonally sampled and tested different vegetables, meats, campus, and its surrounding environments. Meanwhile, PCR experiments were performed on the samples to ensure the accuracy and reliability of the kit detection. We hope that this new kit can be used for testing and monitoring of food processing environments, helping processors prevent food from being contaminated by *Salmonella*. The purpose of this research were to: (1) Study the characteristics of *Salmonella* and develop a single-tube detection kit. (2) Provide research opportunities for undergraduates and improve problem-solving abilities. The rapid detection tube has a sensitivity of 96% and a specificity of 90%, detecting at least 100 *Salmonella* (CFU) per gram of food. This rapid detection method can be used to quickly, economically and conveniently detect *Salmonella* in food and other environmental samples.

Oral Presentation **10:00 – 10:15 am, Council Room**

Finding the Source of a Norovirus Outbreak at UWEC

Sarah Loecher (UW-Eau Claire) – Environmental Public Health
Coauthors: Aidan Margaret Jones, Cady Muelken, Sydney Walworth
Mentor: Crispin Pierce

Objectives: Norovirus is spread through exposure to contaminated food, water, or surfaces. Particles spread primarily through fecal-oral routes. Norovirus is highly transmissible with an exposure to 10-100 virions being enough to cause an infection. Additionally, Norovirus has a short incubation period of 12-48 hours. In our research we analyzed survey data to find the root cause of a Norovirus outbreak at the University of Wisconsin-Eau Claire. Methods: We obtained data from two surveys: one sent to students via email on Dec. 5, 2024, by the university's Dean of Student's Office and the other created and posted to a Snapchat story by a student on the same date. Using the data from both surveys, we are working to determine the root cause of the Norovirus outbreak on our campus. Results: Of the people surveyed (26%,), (100%,) were students, (16%)1(98%) two lived on campus, the Dean of Student's survey used chi square analysis and found a statistically significant association between eating sandwiches at the Hilltop deli area, [X2 = 31.1 ($p < 0.0001$), OR (95% CI) = 4.7 (2.7, 8.5)]. survey two also found that (48%) of respondents ate sandwiches. Conclusion: Students who ate sandwiches from the Riverview Café were most at risk for contracting Norovirus. Additionally, students living in residence halls were a highly impacted population. The source of the outbreak is likely in the Riverview Cafe during the first week of December.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #45, Tripp Commons**

The Effects of Parental Narcissism on Long-Term Social Cognition: An EEG Study

Samantha Loomis (UW-Green Bay) – Psychology
Coauthors: Emmalee Wilson, Brianna Bessler
Mentor: Jason Cowell

The adverse effects of parental narcissism on children have not yet been studied thoroughly. Parental narcissism is the use of positive and negative parenting tactics. Higher levels of parent grandiosity were associated with high levels of negative parenting, which was then associated with higher child internalizing and externalizing behaviors (Rawn et al., 2023). The entitlement/exploitiveness aspect of narcissism developing in children was linked to high quality paternal care and low-quality maternal care, and low secure attachment style (Jonason et al., 2013). Individuals scoring high on attachment anxiety elicited greater late positive potential (LPP) amplitudes to negative pictures than those low in anxiety (Zilber et al., 2007). Neutral and Negative interpretations for viewing unpleasant emotional pictures elicited higher LPP response that was associated with greater mood symptoms and worse parent-reported emotion regulation. Those results suggest that LPP may represent a neural marker for emotions regulations and mood disruptions (Dennis and Hajcak, 2009). Parental Narcissism leads to neural temporal differences in emotion regulation. In the present study, participants include approximately 85 college students 18-26 from a regional midwestern university from varying socio-economic backgrounds. Participants first completed a parental narcissism inventory, and the dirty dozen inventory on a Qualtrics document. They then come to the lab to complete an EEG while doing an empathy task. Empathic processing will be measured in the lab using a standard Chicago empathy task with mean judgments. LPP is classified from mean amplitudes 400-600ms post stimulus. LPP processing during the pain – no pain observation. EEG data will be processed offline using total factorial ANOVA with 2 (high – low parental narcissism) x 2 pain condition ANOVA, LPP amplitude as the dependent variable. Based on previous investigations, it is hypothesized that using EEG elicit higher LPP amplitudes while viewing negative/painful stimuli in subjects who experienced parental narcissism, leading to a development in emotion dysregulation.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #4, Tripp Commons**

Investigating Silicone Degradation and its Implications for Menstrual Cup Safety

Giulia Mattana (UW-Eau Claire) – Biomedical Engineering
Coauthor: Rachel Hettiarachchy
Mentor: Michaela Pfau-Cloud

Menstrual cups have become increasingly popular in recent years for their environmental benefits, cost-effectiveness, and user comfort. Most menstrual cups are made using silicone, taking advantage of its flexible and leak-proof material properties. However, there has been limited research on the hydrolytic degradation of silicone biomaterials, particularly in the acidic vaginal environment, raising potential safety concerns. The objective of this research project is to study the hydrolytic degradation of silicone under acidic conditions to better understand the safety profile of biomedical devices like menstrual cups. Our initial study tested 40 silicone samples over a 29-day period at 37 °C and 67 °C in a 1 M HCl solution. Results of this accelerated study indicated a maximum mass loss of 11.4 %. Upcoming studies will be performed using a vaginal fluid simulant (VFS) primarily composed of a lactic acid buffer system and will aim to characterize the toxicity of relevant degradation products. These studies will aid in developing a workflow for studying the degradation of polymeric biomaterials in a VFS that could be applied to other biomedical devices such as intravaginal ring (IVR) contraceptives in the future.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #11, Tripp Commons**

The Dual Impact of Mid-Century Household Innovations on Women

Giorgia Mattana (UW-Madison) – Computer Engineering
Mentor: Matthew Louie

This analysis argues that while household innovations were intended to uphold existing gender expectations through marketing choices that defined domestic labor as women's labor, they also inadvertently liberated women from some household chores which strengthened gender equality movements. On the surface, innovations like electric appliances negatively impacted women by reinforcing traditional gender roles via marketing. Archival analysis of advertisements sourced from the UW-Archive and various collectors sites highlight the implications of domestic products blatantly marketing to women. Some go as far as referring to their products as "wife-savers." Ads also promised housewives that their products could "free them from the kitchen," but often encouraged using their new "freedom" for additional domestic tasks. Since men held the purchasing power, ads also portrayed how grateful wives would be to their husbands for such luxuries. Although these ads reinforced gender norms, the time-saving appliances themselves benefited women by reducing the burden of household labor and creating free time for other pursuits. Secondary research of Mid-Century studies done by appliance companies to prove the practical benefits of their products reveal significant impacts. Modern appliances could save a family l8.5 hours of labor per week. This impact made it more feasible for women to pursue educational or part time opportunities. In the 1950s and 1960s, women's college enrollment increased 5 and 9 percent respectively. This combined with results of WWII's introduction of women into the workforce shifted societal expectations and laid groundwork for equality movements. This paradox of simultaneously reinforcing and challenging gender roles clearly demonstrates how household advancements served as both barriers and catalysts. This analysis illustrates that while mid-century cultural norms perpetuated domestic roles, women's agency disrupted these expectations, paving the way for greater gender equality.

Oral Presentation **10:00 – 10:15 am, Beefeaters Room**

Investigating PPD Levels in Hair Dyes, Henna, and Tattoo Inks

Tyler McGinnis (UW-Stout) – Applied Science
Coauthor: Natalie Chartrand
Mentor: Ana Magdalena Vande Linde

Para-phenylenediamine (PPD) is an aromatic compound commonly found in permanent and semi-permanent hair dyes, as well as in henna and sometimes in tattoo inks. However, the FDA has not approved the use of PPD in henna or tattoo inks. Its presence with these products has been linked to an increased risk of allergic reactions and dermatitis. Additionally, cases of hair dye poisoning involving PPD have been associated with severe health effects, including renal failure, respiratory failure, and rhabdomyolysis. Due to the potential risks associated with prolonged exposure, monitoring PPD levels in these widely used products is essential. The objective of this study is to determine the concentration of PPD in hair dyes, henna, and tattoo inks using High-Performance Liquid Chromatography. Seven brands of henna, three brands of tattoo ink, and three brands of hair dye were selected for analysis. The preliminary results show no PPD in tattoo inks. The levels of PPD in henna was detected to be higher than in hair dyes. In henna the concentrations of PPD range from 34.8 ppm to 3180 ppm; in hair dyes, it ranges from 33.7 to 40.1 ppm. These concentrations are within the allowed maximum concentration of PPD according the Cosmetics Regulation.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #5, Tripp Commons**

Conflict Over the Establishment of the Apostle Islands National Lakeshore

Alison Mehling (UW-Stevens Point) – History and Social Studies Education
Mentor: Brett Barker

The Apostle Islands National Lakeshore in Lake Superior was established in Wisconsin back in 1970. However, many do not know the lengthy conflict conservation pioneer Gaylord Nelson, Wisconsin U.S. Senator, faced over such a proposition. Many citizens brought their thoughts to light and became very vocal in the matter. Archival materials reveal that those who supported the establishment took stances relating to the economic benefits from tourism as well as conservationists who wanted to see the islands protected. Archival materials also reveal that those who were against the establishment took stances that were more personal based and evoked a lot of emotion. Private landowners did not want to be forced to give up their property while the Ojibwe bands of the Red Cliff and Bad River tribes did not want to cede their reservation land. To truly understand the establishment, having knowledge about why the conflict existed, and how it was navigated, is necessary. Conflict is a significant component to history since it represents a force of change or continuity which has the ability to transform societies. In this historical event, conflict was a force of change amidst continuity because Gaylord Nelson wanted to change the islands' status so that they would be preserved, or continued, for the future. Through conducted research, it is revealed how compromise was reached in an effort to appeal to all sides. Only by listening to all perspectives can one truly reflect and make an informed thought about the past if one was not there for it. The establishment of the Apostle Islands National Lakeshore is a true testament to how Gaylord Nelson was able to navigate the impasse so that he could preserve and protect the immense beauty, nature, and historic Apostle Islands for generations to come.

Oral Presentation **10:00 – 10:15 am, Multicultural Greek Council Room**

Bumblebee Metapopulation Monitoring in Southeastern Wisconsin

Natalie Meyer (UW-Parkside) – Biological Sciences
Coauthor: Xenia Montgomery
Mentor: Jessica Orlofske

Bumblebees are efficient pollinators and vital contributors to a healthy ecosystem. In Wisconsin, the University of Wisconsin-Parkside lies within the distribution range of nineteen native bumblebee species, including the federally endangered Rusty-Patched Bumblebee (*Bombus affinis*). Bumblebee activity on campus has been monitored for three years to document species diversity and frequency in relation to land restoration efforts. Yet, the long-term survival of this protected species, and other bumblebees, requires a network of populations that can persist through natural variation and anthropogenic pressures. Thus, the scope of bumblebee monitoring in 2024 was expanded to off-campus sites in surrounding counties. Surveys lasting approximately one hour were conducted under appropriate conditions twice per month from 23 May to 29 September 2024. Sites were established in six off-campus natural areas within Kenosha, Racine, and Milwaukee counties. Data was also collected from several areas on campus which correspond to different stages of restoration. Relevant information was recorded including environmental conditions and the number of bumblebees tallied or photographed for later identification. In 2024, 38 surveys resulted in images sufficient for analysis, with a total of 483 bees identified. Eight total species were observed in 2024 across all survey sites. *Bombus affinis* was recorded both on campus and at three of the six off-campus sites. As a long-term monitoring site for *Bombus affinis* in the region, UW-Parkside continues to provide relevant information about the distribution and dynamics of all our resident bumblebee species. Our current work informs the metapopulation context for *Bombus affinis* as it expands to represent a larger portion of the species distribution range in Southeastern Wisconsin.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #41, Tripp Commons**

Gustatory Plasticity in *C. elegans* after Exposure to Nanoplastics

Emma Middleton (UW-Whitewater) – Environmental Science
Mentor: Daniel Zamzow

Nanoplastics have been proven to be detrimental to various forms of life on our planet. With memory being an essential part of life, it's crucial for us to know the impacts from nanoplastics. The objective of our study was to determine the effects that nanoplastics have on the memory of *C. elegans* at different stages of life. We conducted behavioral assays to compare gustatory plasticity, a way to test memory utilizing NaCl, between young and old *C. elegans*. After hatching, *C. elegans* were split into two groups, control and treatment. The control group was placed onto an agar plate and the treatment group was placed onto an agar plate containing plastic. Once they developed to the age we wanted, we took the *C. elegans* off the plates and split them into four tubes. Half of the control group were exposed to M9 buffer, high NaCl, and the other half were exposed to a chemotaxis buffer, low NaCl. The same thing was done with the treatment group. The *C. elegans* were then starved in the four tubes for two hours. Our test plates had a control plug on one side and a NaCl plug on the other. After starvation, *C. elegans* were placed in the middle and then monitored every 15 minutes for one hour. Our results for the young *C. elegans* were statistically significant, while not statistically significant for the old. This tells us that nanoplastics may have the ability to impair memory at a young age, but not older.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #24, Tripp Commons**

Microgrid Testbed for Cybersecurity Studies: A Platform for Testing Attacks and Resilience

Joseph Mikkelson (UW-Platteville) – Cybersecurity
Coauthor: Dominic G. De La Cerda
Mentor: Yanwei Wu

A microgrid is a localized distribution network of electricity users who have access to local renewable and other energy sources. Typically, it is connected to a utility distribution grid but can also function independently. The utility grid plays a crucial role in the nation's economy and security, as well as the well-being of its residents. However, connecting different microgrids to a wider network through a utility's substation can expose them to significant cyber threats. To address these challenges, our industry partners, ABB and Moxa, have generously donated equipment for a microgrid testbed. This study investigates cybersecurity vulnerabilities within this testbed. In our microgrid testbed, we utilize ABB's PCM600 software to establish the GOOSE protocol. Within this setup, a relay called the REF620 sends GOOSE messages to another relay, the REF615. This transmission prompts the circuit breaker linked to the REF615 to activate. To capture these GOOSE packets within the microgrid network, we employ a SPAN (switched port analyzer) to mirror the network traffic and connect the mirror port to a computer equipped with Wireshark software. This setup allows us to effectively capture the network packets and analyze various potential attacks within the microgrid infrastructure. We are developing Python programs to explore various GOOSE-based attacks, including Denial of Service (DoS), Manufacturing Message Specification (MMS) spoofing, and Man-in-the-Middle (MITM) attacks. Our research examines their feasibility within a microgrid context and expands into additional attack vectors. Our investigations have demonstrated critical vulnerabilities. We successfully executed GOOSE spoofing attacks to trip IEDs, spoofed MMS messages to enable remote control of devices, and launched TCP-SYN-RECV flood attacks that disrupted device communication. Additionally, we confirmed the microgrid's susceptibility to MITM attacks. Our findings highlight significant weaknesses in the communication infrastructure and provide insights into designing microgrids that can address cybersecurity challenges in real-world industrial utility networks.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #9, Tripp Commons**

Mysterious Mississippi Mycoloop: Effects of Temperature and Nutrient Availability on Chytrid-Algae-Zooplankton Interactions

Blair Miller (UW-La Crosse) – Environmental Science
Mentor: Arthur Grupe II

The mycoloop is an essential pathway in aquatic food webs, facilitating nutrient transfer from large, inedible phytoplankton to zooplankton through parasitic chytrid fungi. This research investigates the presence and function of the mycoloop in the Mississippi River, focusing on how temperature and nutrient availability affect chytrid-diatom-zooplankton interactions. Stage 1 established stable zooplankton populations from a backwater channel sample of the Mississippi River. The main channel population collapsed midway through the process, while the backwater population thrived, providing a consistent source of zooplankton. Stage 2 attempted to isolate and identify chytrids by baiting river samples; however, the results were inconclusive, highlighting the need for reference cultures. Stage 3 involves a controlled mesocosm experiment that introduces known chytrid species capable of infecting Navicula sp. diatoms, alongside zooplankton from the established parent population. Each mesocosm will be maintained under three temperature regimes corresponding to the Mississippi River's coolest, average (mode), and hottest summer water temperatures. Half of the mesocosms will receive fertilizer to assess the impact of elevated nutrients on diatom populations and chytrid parasitism. Diatom, chytrid, and zooplankton densities will be monitored via light microscopy. The incidence of parasitism will be estimated by quantifying sporangia densities, and the resulting data will be analyzed using a multivariate ANOVA.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #51, Tripp Commons**

Making It

Benjamin Mohr (UW-Stout) – Master of Fine Arts in Design with concentration in Digital Cinema
Mentor: Jonathan Wheeler

"Making It" aims to document the underground music scene in London through digital cinema. I will produce a film that follows the story of saxophonist Declan Coker and features other London musicians from diverse backgrounds and worldviews sharing their unique stories to explore the common thread of why and how they play music - what was their inspiration to start and what motivates them to push through the struggles of low pay and limited exposure to continue developing their craft. To this end, the film will showcase the lengths that people will go to share their art and demonstrate that musical success looks different to different people. Additionally, the documentary will feature interviews with venue organizers within London, sharing their mission and perspective on the cultural value of providing forums for up-and-coming musicians. London is the perfect place to make this documentary because it is a cultural hub, drawing musicians from many nationalities, ethnicities, demographics, and backgrounds to pursue their passions.

Project Display **Poster/Project Session II (1:45 – 2:45 pm), Poster #53, Tripp Commons**

MED-T; A Response to Declining Male Involvement in Healthcare Careers

Mason Musack (UW-Platteville) – Biology
Coauthors: Brady Elvers, Ryan McCartney
Mentor: Richard Dhyanchand

In 2021, Wisconsin Council on Medical Education and Workforce (WCMEW) published "THE FUTURE OF WISCONSIN'S HEALTHCARE WORKFORCE", which provided a review of Wisconsin's healthcare workforce across a broad spectrum of professionals. The report included projections of supply and demand of workers in 2035 and concluded that an overall shortage of 19% (~25,000 workers) was likely unless aggressive actions were taken. Recently, male representation in healthcare has been declining. Examples include: (1) the recent 8 years of declining male medical school enrollment (2016 to 2024), according to the AAMC, (2) the 48% to 22% drop in male psychologists from 2000 to 2020, and (3) that fewer the one in five social workers are male (down from ~50% in 1980). To both promote a more diversified and representative population and combat an aging workforce, male involvement in non-physician healthcare roles

should be promoted in a similar fashion to the Women-in-STEM movements of recent years. To combat shortages in professional healthcare roles and provider availability in rural Wisconsin; Project MED-T exposes pre-college students to hands-on activities found in healthcare roles to invite further interest and involvement of teens in the healthcare. Activities created include laparoscopic surgery simulator, electrocautery simulation, blood typing labs, splinting, TENS machine therapy, and more. The project was run with a pilot group, with success in engagement and feedback from the students. As Project MED-T continues to grow, projects and partnerships have also arisen. Continuing research and development in a 3-D knee model for arthroscopic surgery is being developed, with a successful prototype. Lastly. Project MED-T has also partnered with Scenic River Area Health Education Center to run focus groups with male high school students to engage in discussion about possible barriers and stigmas surrounding men in healthcare.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #24, Tripp Commons**

Interaction of FTT-2 and DAF-16 in the Parasitic Nematode *Brugia malayi*

Libby Nabham (UW-Whitewater) – Biology Pre-Medicine Emphasis
Mentor: Kirsten Crossgrove

Lymphatic filariasis is a human disease caused by *Brugia malayi*, a filarial nematode (roundworm) that is transmitted by mosquitoes. This disease causes swelling in legs due to the parasite infecting the lymphatic system of the host. The goal of this research is to learn about the infective stage of *B. malayi* by using *Caenorhabditis elegans* as a model organism, as they have similar larval stages in their life cycle. Specifically, the infective stage (iL3) of *B. malayi* and the dauer stage of *C. elegans* are similar. Dauer is an alternative version of the L3 stage that occurs in *C. elegans* when the environmental conditions are 'unfavorable'. Dauer is regulated by the insulin/insulin-like growth factor signaling (IIS) pathway. Insulin-like peptides will bind to DAF-2, and this activates a series of kinases that result in phosphorylation of the transcription factor DAF-16. Phosphorylated DAF-16 is bound by FTT-2, which keeps DAF-16 in the cytoplasm. Dauer occurs when DAF-16 is in the nucleus, and dauer recovery occurs when FTT-2 binds to DAF-16. Previous students generated plasmids that allowed expression of *Bma*-FTT-2 and *Bma*-DAF-16 in mammalian cell culture. We are testing to see if *Bma*-FTT-2 alters the ability of *Bma*-DAF-16 to activate a reporter gene to see if the *B. malayi* proteins act similarly to the *C. elegans* proteins. Knowing if these mechanisms are similar between the two organisms will help to understand the parasite life cycle, and may lead to ideas on how to control parasite infections.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #27, Tripp Commons**

An Analysis of Hail Events to Determine the Location and Vulnerability of "Hail Alley"

William Nerad (UW-Whitewater) – Geography
Mentor: John Frye

Hail storms heavily contribute to the significant amount of damage caused by natural disasters. With severe hail events rising, this topic's importance also rises. Historical hailstorm data was collected from the Storm Prediction Center for the U.S. and Environment Canada for Canada. Using this data, analysis was performed to try to identify the location of "Hail Alley", which is believed to be a region of North America where hail is more frequent and is also more severe (i.e., larger size). It is hypothesized that "Hail Alley" will closely align with Tornado Alley. This is due to the conditions leading to thunderstorms that are capable of producing large hail and can also produce tornadoes. The second part of this research examines and provides details about the vulnerability of this area. This examination will be an analysis of the various types of damage from hail storms where data is available to determine the most common occurring type of damage and the typical dollar amounts associated with them. Other factors that can determine vulnerability can include crop type, crop damage, and building material. The intended outcome of this project will allow many different groups of people (e.g. general public, insurers, meteorologists, etc.) to better prepare for hailstorms and create mitigation efforts.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #25, Tripp Commons**

Signal Transduction through MHC Class I Proteins in Transplant Rejection

Zhu Lan Ness (UW-La Crosse) – Clinical Laboratory Science and Biology
Coauthors: Lily Radue, Brody Dion, Damion Cherney
Mentor: Zachariah Tritz

MHC Class I molecules are a family of proteins that are coded by some of the most diverse genes among humans; the abundance of different forms, or alleles, of these genes often make this protein a target of immune attack during graft rejection. The process of "finding a match" for a transplant is finding someone with similar enough MHC alleles in addition to matching blood type. Antibodies, immune system proteins generated in response to novel threats, can be created against mismatched MHC molecules. It is known that the binding of these antibodies to MHC-expressing cells on grafted tissue is an early step in graft rejection—with antibodies serving as a sort of "flag" or marker to recruit more immune cells. What has remained unexplored is whether these MHC Class I proteins are functional signaling proteins – we do not yet know whether antibody binding to these MHC Class I proteins send signals into the MHC-expressing cells to change their behavior and, perhaps, contribute to the process of graft rejection. We used a macrophage cell line to better understand the impact that MHC Class I signaling has on cell communication. Our preliminary findings suggest that MHC Class I signaling negatively regulates inflammation, dampening the phagocytic function and costimulatory molecule expression of these cells in vitro. My project has been tying these functional outcomes of MHC Class I ligation to particular signaling pathways – attempting to figure out exactly what signals get sent into the cell when MHC Class I is bound by antibody so that we can better understand how MHC Class I-specific antibodies against transplanted tissue drive graft rejection.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #9, Tripp Commons**

MCF-7 Breast Adenocarcinoma Cells display a form of "Blebbing" or Ameboid Motility Involving Rapid Bleb Structure Rotation through Pleomorphic Processes

Nhi Nguyen (UW-River Falls) – Biomedical and Health Sciences
Mentor: Timothy Lyden

Breast cancer is the most common cancer in women worldwide and second most common in the United States, with 670,000 deaths reported globally in 2022 and 42,250 estimated U.S. deaths expected in 2024. Breast cancers result from complex interplay between genetic backgrounds and microenvironments but are fundamentally a disease of tumor cell behaviors. Therefore, defining cancer-related behaviors and phenotypes provides an approach to understanding and addressing this important disease process. Here we present preliminary results from studies of breast ductal adenocarcinoma cells, examining motility behaviors of these cells in both 2D and 3D culture conditions. "Normal" ductal epithelial cells (MCF10A) were used as controls. This work has focused on time-lapse photomicroscopy of 2D cultures seeking to correlate observed cell behaviors with well-known cellular motility features such as filopodia and lamellipodia. Additionally, we have also used scanning electron microscopy (SEM) data from an earlier study of 3D bone matrix model of cancer metastasis to seek evidence of similar motility features at the ultrastructural level and to correlate these to observations from the timelapse study data. Results to date in these studies show the following points: 1)The MCF7 cells use a recently described form of cellular motion referred to as "blebbing" motility, whereas MCF10A ductal epithelial cells use more classic lamellar motility; 2)In less dense and "younger" passage cultures, we have observed a pattern of apparent cycling of bleb structures starting in or at the cell body and passing through the extended bleb-process in rapid "conveyor-belt" fashion; 3) In the ultrastructural studies of MCF7 cells in 3D models on bone scaffolds, similar blebbing structures are observed along with various other membrane processes. These studies illustrate that MCF7 breast cancer cells display different motility patterns from normal MCF10 ductal cells and that this distinct form of cellular behavior is present in multiple culture microenvironments.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #39, Tripp Commons**

RAGE Signaling in Pancreatic Beta-Cells

Aashvi Pandey (UW-Green Bay) – Human Biology
Coauthors: Dylan Cloud, Hal Schnell, Luliia Aleks
Mentor: Carly Kibbe

The prevalence of Type 2 Diabetes Mellitus (T2DM) continues to rise in the United States and worldwide. The progression of T2DM leads to pancreatic beta-cell dysfunction due to glucotoxicity, oxidative stress, and inflammation. Elevated levels of advanced glycation end-products (AGEs), produced both endogenously under hyperglycemic conditions and exogenously during food preparation, have been linked to the risk of developing T2DM and its associated complications. AGEs activate the receptor for advanced glycation end-products (RAGE), which has been shown to be associated with beta-cell dysfunction and death. However, the precise mechanisms through which RAGE signaling affects beta-cell survival remain unclear. In this study, we examined RAGE expression and signaling pathways in pancreatic beta-cells. Our findings indicate that RAGE transcript and protein are present in the INS-1E beta-cell line and are upregulated by treatment with the RAGE ligand HMGB-1. Interestingly, we observed that high glucose levels may reduce RAGE expression. Additionally, HMGB-1 treatment appears to decrease the expression of the pro-apoptotic protein TXNIP under high glucose conditions. Further research is necessary to confirm these results and explore the RAGE signaling pathways involved in beta-cell apoptosis. Such studies will be critical for improving our understanding of the pathogenesis of T2DM and related diseases.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #27, Tripp Commons**

Endosymbiont Genetic Typing of Soft Coral, *Ricordea florida*

Abby Panier (UW-Whitewater) – Biology-Freshwater Ecology and Marine Biology
Mentor: Nicholas Tippery

With the increasing severity and frequency of environmental changes, nothing lies untouched by our shifting world, from biospheres to bacteria. The rampancy of mass bleaching events has only spread in the oceans as both hard and soft corals struggle with heightened temperatures. Some of these corals have relationships with photosynthetic endosymbionts, which provide the host with vital nutrients and energy services. A bleaching event occurs when the host coral expels the endosymbiont under stress, severing the relationship and losing access to resources vital to its survival. This leads to a loss in photopigmentation, starvation, and at times, the eventual death of the animal. There are a variety of organisms that serve as endosymbionts to different coral species; the host's sensitivity to bleaching could depend on the endosymbiont type. Previous studies have discovered three major groups of dinoflagellate that can function as endosymbionts, often referred to as Clade A, Clade B, and Clade C. Few of these focus on the soft coral *Ricordea florida* and its endosymbiont(s), but it has been associated with Clade C in the past. Our prediction was to find solely Clade C after sequencing the ribosomal RNA genes and spacers. In the preliminary execution of this study, I utilized PCR and DNA sequencing techniques on samples of *R. florida* and found endosymbionts in the Clade B group. We hypothesize that this could be due to the location and differing habitat depths where the coral was collected. Further identifying the endosymbiont species would help to define a relatively unknown variable in the relationship between *R. florida*, the symbiotic dinoflagellate, and the recovery rate of the organisms after bleaching.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #48, Tripp Commons**

Rheology of Basaltic Lava Flows from Pacaya with Stress-Strain Steps: A Laboratory Approach

Heriberto Patiño Luna (UW-Whitewater) – Physics and Geography
Mentor: Tushar Mittal

Understanding the rheology of volcanic rocks, i.e., the relationship between stress (applied load) and strain (resulting deformation), is crucial for inferring magmatic system behavior from observations like ground deformation and predicting hazards such as flank collapse. For instance, Pacaya Volcano in Guatemala is prone to flank instability. Magmatic systems and flank stability models typically assume an elastic rheology model with stress/strain/damage independent material properties. However, lab experiments for other rocks like granite and sandstone suggest that damage and compaction can significantly alter material properties. We conducted uniaxial deformation experiments on Pacaya lava flows with samples representing different parts of a lava flow (base, core, and crust) with multiple stress-strain steps (stress-controlled and strain-controlled setups) to assess if the existing models are sufficient. Also, active acoustic data was collected to probe the rock's internal structure evolution (analogous to ambient noise tomography). Using a Maxwell viscoelastic model with the experimental strain rate, we found a significant mismatch between the data and the model, even after optimizing elastic modulus and viscosity parameters. By allowing the elastic properties to be strongly stress-dependent by a factor of 30 (change in elastic modulus between 10 to ~100 MPa), we get a better model fit, but it still doesn't fully represent the samples' mechanical behavior. We describe the results of new rheological model fits using fractional visco-elastic models coupled with acoustic waveform features (wave velocity, frequency, coda structure) to parameterize the experimental data and provide insights into the sample's microstructural evolution. Our results emphasize the importance of using lab-validated rheological models for understanding magmatic processes and improving hazard modeling.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #46, Tripp Commons**

MCF-7 Breast Adenocarcinoma Cells display a form of "Blebbing" or Ameboid Micrometeorites and Micrometeor-Wrongs: Two Wrongs Don't Make a Rite

Isabelle Peterson (UW-River Falls) – Chemistry and Geology
Coauthor: Andrew Lundeen
Mentor: Kevin Thaisen

Micrometeorites are meteorites that are below two mm in diameter. Approximately 2,000 to 4,000 tons of these micrometeorites reach Earth's surface each year. These micron sized particles are found everywhere on Earth and are being used to determine parent bodies of meteorites and our planet's extraterrestrial material flux. Unfortunately, there are similarly small particles generated on Earth that can also reach anywhere and everywhere. Our research has identified several of these terrestrial particles that could contaminate samples of micrometeorites. Contamination of these samples has been acknowledged in micrometeorite publications, but no serious effort has been made to create a list of identified terrestrial particles, we term micrometeor-wrongs, that could be mistaken as micrometeorites. One of these terrestrial particles is fly ash, which is produced when coal combustion takes place during coal power production. Based on the period humans have been burning coal for power, fly ash has covered much of the globe including Antarctica where samples of fly ash have been found in ice cores dating back to 1936. This is a problem as Antarctica is one of the primary sites' micrometeorites are collected from. We used the UWRF Hitachi SU3800 Scanning Electron Microscope to image and elementally analyze our micrometeor-wrongs, where we plan to create a database of this data to share with the greater scientific community in the endeavor to correctly identify micrometeorites.

Oral Presentation **10:45 – 11:00 am, Council Room**

The Effect of Substrate on the Isopod Growth

Samantha Peterson (UW-Parkside) – Biological Sciences
Coauthor: Lily Reaume
Mentor: Jessica Orlofske

Isopods (*Oniscidae*) are important organisms that contribute to nutrient recycling by converting debris into bioavailable compounds. This ecosystem function is essential for soil health and needs to be considered as humans explore life in extreme environments, including other planets. The purpose of these experiments was to evaluate the performance of Isopods, specifically sowbugs (*Porcellio scaber*) and pillbugs (*Armadillidium vulgare*), inhabiting Martian simulant soil (MSS). The first set of treatments established the appropriate controls for later trials involving MSS. Sowbugs were raised with diet treatments that included white potato with either whey or calcium powder, watermelon with whey or calcium powder, carrot with whey or calcium powder, and a control of carrot and cat food. Once a week isopod lengths and weights were measured in centimeters and grams respectively. After five weeks, data were evaluated using ANCOVA with initial mass or length as the covariate. Test results confirmed that isopod size was higher in the group given carrots with calcium powder. Thus, this diet would be applied in our second experiment investigating the proportion of MSS in the isopod's substrate. The second experiment included both sowbugs as well as pillbugs and the following treatment array: control of 100% coconut mulch, 25% coconut mulch and 75% MSS, 50% coconut mulch and 50% MSS, and 75% coconut mulch and 25% MSS. Growth measurements consistent with the first experiment will be obtained and treatments will be compared for each isopod species using additional ANCOVA tests. Determining how to ensure the survival of these valuable decomposers could help develop methods for creating sustainable soil on Mars. This experiment can also inform future research into the requirements of soil organisms in extreme conditions.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #26, Tripp Commons**

The Gangster Buffs of Charleston: Jewish Safety in a Southern City

Oli Pierce (UW-Milwaukee) – History
Coauthors: Justin West, Gwyn Parker, Javier Perez
Mentor: Rachel Ida Bluff

This project revolves around understanding and closely examining the history of Jewish refugee trauma and immigrant search for safety and kinship within the racial and capitalistic community in Appalachia. Our aim is to better understand how the Ashkenazi Jewish community came to the Appalachian region, specifically the small city of Charleston, West Virginia, USA, and how they adapted to life there. Our primary methods in doing so revolve around genealogical research pertaining to the family of Dr. Rachel Buff and exploring the history of West Virginia, which includes studying the Native tribes of the area and impactful events that would have affected the Buff family in this region, such as Coal Miners Unions and the KKK.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #3, Tripp Commons**

Embryonic Deoxycorticosterone Exposure Affects the Development of Larval Zebrafish Swim Behavior

Hailey Pucillo (UW-Eau Claire) – Biology – Ecology and Environmental Biology Emphasis
Coauthors: Kiera Rosenberg, Emily Sanborn
Mentor: Brad Carter

Glucocorticoids are steroid hormones vital to development and many physiological responses. The body's primary glucocorticoid, cortisol, is released in response to stress and binds to two receptors: mineralocorticoid (MR) and glucocorticoid receptors (GR). Excess prenatal exposure to glucocorticoids has been linked to adverse effects on neurodevelopment. Previous work in the lab found that an increase in embryonic exposure to cortisol resulted in decreased swim behavior in zebrafish larvae 5 days post-fertilization (dpf). The goal of this study was to identify how selective MR exposure would affect behavior in larval zebrafish using deoxycorticosterone (DOC), a natural precursor to cortisol that binds to MR. Zebrafish embryos were treated with decreasing concentrations of DOC (1 μM, 0.3 μM, and 0.1 μM) at 4-6 hours post-fertilization (hpf) in a 12-well plate. Larvae were transferred at 5dpf to a 96-well plate and assayed using a commercial motor tracking system (Noldus DanioVision). Initial results indicate that the swim velocities for larvae exposed to 0.3 μM DOC were higher than control groups in the first dark cycle, but no other significant differences were observed. By investigating how DOC affects neurodevelopment in zebrafish, these results can inform future studies on the role of MR agonists in development.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #13, Tripp Commons**

Characterizing mCAs by Age, Sex, Ancestry, and Genomic Location to Predict Hematologic Malignancy

Kali Quade (UW-Milwaukee) – Biochemistry
Mentor: Paul Auer

Hematopoietic stem cells are precursors for all blood cell types, which, during the maturation process, may accumulate genetic mutations. While many of these mutations have minimal impact, some confer a competitive advantage, leading to the formation of large colonies—a phenomenon known as clonal hematopoiesis. This process has been linked to several diseases, including heart disease, arteriosclerosis, and hematologic malignancies. Notably, by the age of seventy, approximately 10% of the healthy U.S. population exhibits clonal hematopoiesis, with prevalence escalating with age. One significant mutation type contributing to clonal hematopoiesis is mosaic chromosomal alterations (mCAs), where substantial portions of somatic DNA undergo alterations. Importantly, certain mCAs have an increased association with the development of hematologic malignancies, and their prevalence varies across demographic groups. To explore these relationships, we utilized the All of Us database, which offers comprehensive health records from a diverse set of individuals which previous studies often lack. We found that frequencies and chromosomal locations of autosomal mCAs differ based on age, sex, and ancestry, with implications for predicting both hematologic and non-hematologic malignancies. This conclusion came after we analyzed mCA frequencies across individuals of varying demographics, identified chromosomal loci harboring the most mCAs within these groups, and finally, assessed whether the identified mCAs can predict the onset of blood cancers. Recent findings found across four large-scale biobanks include identification of novel risk loci that modulate mCA risk, associations with other diseases with emphasis blood cell count abnormalities. Future analysis involves characterizing and finding associations between blood pressure and mCAs in the UK Biobank. By uncovering demographic-specific patterns of mCAs, we aim to tailor personalized cancer prevention and treatment strategies, recognizing the diverse genetic variability underlying hematologic malignancies.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #20, Tripp Commons**

The Impact of Traumatic Childhood Experiences on the Likelihood of Future Arrest

Hailey Repka (UW-La Crosse) – Sociology
Mentor: Nicholas Bakken

Existing research has explored various factors associated with criminal justice involvement, yet less is known about how childhood trauma mediates this risk. This study examines the relationship between adverse childhood experiences (ACEs), socio-structural factors, and the likelihood of future arrest. Using data from five waves of the National Longitudinal Study of Adolescent to Adult Health (Add Health), we analyze a sample of 20,000 youth to assess these relationships. Bivariate and multivariate analyses indicate that traumatic childhood events and negative structural factors significantly increase the risk of arrest, whereas educational attainment serves as a protective factor. These findings highlight the need for policy interventions, particularly expanded access to secondary education that integrates trauma-informed support to mitigate justice system involvement.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #50, Tripp Commons**

Mugwort Extract Rescues Acute Heart Failure in a Zebrafish Model

Autumn Roskowiak (UW-River Falls) – Biomedical Health Science
Mentor: Cheng-Chen Huang

Inflammation is an intricate immune response which can be both beneficial and harmful. Many environmental factors can induce or regulate our inflammation. Chinese mugwort is a herbaceous plant native to Asian countries. In Chinese medicine, mugwort has been used as an antiseptic. The UWRF biology department has tested several mugwort extracts on leukemic T cells and identified one that activates a pro-inflammation pathway, NFkB. The purpose of this research is to determine if the mugwort extract also activates the NFkB pathway in developing zebrafish embryos and to see if the extract causes any birth defects in developing embryos. Along with this, we are interested in learning if this extract can cause negative effects on acute heart failure. In order to determine if the NFkB pathway is activated in the embryos, we incubated 24-hour old embryos in the mugwort extract, extracted the proteins and used immunoblotting to observe the activation of different pathways. Long term inflammation can cause severe damage to tissues and organs. To understand mugwort's role in inflammation on tissues, we used a zebrafish acute heart failure model. The heart failure conditions cause inflammation levels to be elevated. Certain drugs can slow down or rescue heart failure. We were able to determine that the Cox-2 gene is expressed at a higher level which indicates that inflammation is induced in the zebrafish embryo by a particular fraction of the mugwort extract. There were no physical birth defects observed in the developing embryos. Interestingly, another mugwort fraction showed rescue of acute heart failure. Our results indicate mugwort, although induced Cox-2 expression, might be beneficial to acute heart failure.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #35, Tripp Commons**

Characterizing the Effects of Sugar Transport and Metabolism Genes on the Growth of *Escherichia coli* During Glucose-Phosphate Stress

Valentina Rovella (UW-Parkside) – Biological Sciences
Mentor: Gregory Richards

Every organism needs to respond to nutrient stresses by regulating metabolic functions. *Escherichia coli* and other enteric bacteria found in the mammalian intestinal tract experience glucose-phosphate stress, a form of growth inhibition that occurs due to a block in the glycolytic pathway. *E. coli* overcomes this stress through the regulatory actions of the small RNA SgrS, which restores growth in part by blocking the uptake of stress-inducing sugar-phosphates. Although the mechanism of regulation by SgrS well-characterized, there is less known about the metabolic pathways that provide alternative carbon sources to bypass the block in glycolysis. Here, we screen a variety of deletion mutants defective in alternative carbon metabolism pathways to assess their role in the recovery from glucose-phosphate stress. Genes involved in metabolism of the sugar N-acetylglucosamine affect growth during stress. Deleting the gene *nagE* (which encodes a transporter that brings N-acetylglucosamine into the cell) slightly improves growth during stress. In contrast, deleting *nagC* (which encodes a regulator of N-acetylglucosamine metabolism) or *nagB* (which encodes an enzyme that converts N-acetylglucosamine into the glycolytic intermediate glucose-6-phosphate) appears to worsen growth during stress. Current and future research includes further characterizing the role of N-acetylglucosamine metabolism in the recovery from glucose-phosphate stress as well as identifying additional metabolic pathways involved in the response to stress.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #33, Tripp Commons**

Examining the Evolutionary Divergence of Duplicated Genes that Regulate Yeast Sulfur Metabolism

Emylya Sanders (UW-Parkside) – Biological Sciences
Coauthors: Safia Amtulbaseer, Abigail Dhaher
Mentor: Traci Lee

Transcription, in which RNA copies of a gene is made, is a critical step in gene expression. We chose *Saccharomyces cerevisiae*, or budding yeast, as a eukaryotic model to study two proteins (Met31 or Met32) that allow the protein Met4 to activate the transcription of sulfur metabolism genes. Met4 can recruit transcription machinery, but it cannot directly bind to the DNA of its target genes. Met4 must interact with either Met31 or Met32, which can bind to the target gene DNA. The MET31 and MET32 genes evolved through duplication and divergence. Although both Met31 and Met32 bind to the same DNA sequences in promoters (regions located in front of the gene that control when and how much that gene is expressed), Met31 and Met32 perform different roles in their ability regulate expression of sulfur metabolism genes. These differences are detected when we compare the growth properties of yeast strains in which either MET31 or MET32 is deleted (*met31Δ* or *met32Δ*). If Met31 and Met32 performed identical functions, the *met31Δ* and *met32Δ* strains would have identical growth properties. We have discovered that *met31Δ* and *met32Δ* strains differ in their ability to use certain sulfur compounds as sole sulfur sources. We also discovered that Met31 and Met32 have different expression profiles under inducing conditions. To assess whether the differences in Met31 and Met32 expression dictates their functional roles, we evaluated the effect of swapping the MET31 and MET32 promoters in the single delete strains. Will the promoter swap cause a *met31Δ* strain to behave like a *met32Δ* strain? Using a coulter counter, we evaluated growth rates and cell sizes of promoter swap and control strains in defined minimal media using with sulfate, sulfite, homocysteine, methionine, cysteine, glutathione, cysteate, isethionate, and taurine as sole sulfur sources.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #32, Tripp Commons**

Silicon-Based Nozzles for Controlled Fiber Alignment in Composite 3D Printing

Nick Scharschmidt (UW-Platteville) – Engineering Physics
Coauthors: Luke Diljak, Tyler Hendee, Max Konop
Mentors: Gokul Gopalakrishnan and John Obielodan

3D printing is often constrained by the properties of traditional filament materials like PLA. While fiber-reinforced composites improve performance, fiber orientation control during printing requires expensive equipment. Using inexpensive techniques developed for fabricating microsensor devices, we produce silicon chips that encourage passive alignment of fibers in any chosen direction. A single crystal silicon wafer, processed through photolithography and anisotropic etching, creates a nozzle with a non-circular interior cross-section that induces fiber rotation as the filament is extruded through it. Through the ability to control and vary the fiber orientation in different parts of a 3D printed component, our method could enhance electrical, thermal or mechanical performance. Compatible with materials like glass and carbon fibers, this technique enables stronger, more functional 3D-printed parts at affordable costs.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #19, Tripp Commons**

Vitamin D and Cancer: Shedding Light on Gene Polymorphisms in Ovarian Cancer Cells

Josephine Schmitt (UW-Green Bay) – Human Biology, Health Science Emphasis
Mentor: Georgette Heyrman and Debra Pearson

Ovarian cancer, though rare, is one of the deadliest gynecologic malignancies due to its late-stage detection and high recurrence rate. Dietary habits influence cancer risk due to increased or decreased nutrient intake. Nutrients including vitamin D have been shown to influence cancer development, including ovarian cancer. Calcitriol is the bioactive form of vitamin D and has potential anti-cancer properties, including its ability to regulate cell proliferation, apoptosis, and invasiveness, which makes it a promising candidate for further study. Its effects are mediated through the vitamin D receptor (VDR), whose function can be influenced by single-nucleotide polymorphisms (SNPs) in the VDR gene. Genetic variation of SNPs in the VDR gene may impact how the body absorbs and utilizes vitamin D, potentially affecting ovarian cancer outcomes. Past research in the lab demonstrated the ovarian cancer cell lines, OVCAR3 and OVCAR4, have distinct growth response profiles to calcitriol. We hypothesize the difference in growth response in these two cell lines could be influenced by variation in the VDR gene. To elucidate the VDR gene alleles present in OVCAR3 and OVCAR4 cell lines, we employed a restriction fragment length polymorphism assay of 4 SNP sites in the VDR gene; the Fok-I, Taq-I, Apa-I, and Bsm-I. Genetic variation was detected between the ovarian cancer cell lines. Correlations between SNP alleles and calcitriol responsiveness reveal OVCAR3 has a heterozygote genotype at the Fok-I SNP, which is consistent with the increased responsiveness to calcitriol compared to OVCAR4. Future studies will investigate the expression of VDR in the cell lines and further genetic analysis of additional genes responsible for metabolizing vitamin D to understand how genetic variation can influence nutrient metabolism and cancer in cells.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #12, Tripp Commons**

Doing "Other Stuff": Negotiating Sexual Identities in Christian Communities

Mickie Schommer (UW-Green Bay) – English, German
Mentor: Valerie Murrenus-Pilmaier

This study explores how individuals within Christian communities negotiate their sexual identities through language. The research focuses on the use of metaphors, euphemisms, and conjunctions when discussing sexual experiences among heterosexual and queer individuals to discern underlying ideologies of sexual superiority or inferiority. The analysis examines how these linguistic choices reflect and reinforce cultural conceptions of sex, often rooted in heteronormative and phallocentric ideologies. The study draws on interviews with participants from diverse Christian denominations, analyzing their experiences and the language they use to describe their sexual identities and practices. Key findings indicate that queer individuals often leave Christian communities to reconcile their sexual identity due to feelings of invalidation and ostracization, leading them to use less euphemistic language. In contrast, heterosexual participants, whether currently or formerly active in their Christian communities, tend to use more euphemisms and conjunctions, reflecting a sense of sexual superiority through culturally sanctioned norms. The research underscores the complex interplay between language, religion, and sexual identity, revealing the broader implications of sociocultural Christian constructs and how individuals navigate these challenges to affirm their sexual selves.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #1, Tripp Commons**

Development of Internet-of-Things Button for Disability-Adapted Toys

Nickolaus Shaw (UW-Platteville) – Electrical Engineering, Engineering Physics
Mentor: Harold Evensen

Toys play a major role in the development of children, especially children with disabilities. Electronic toys can be modified for control with external buttons, but these are costly, creating a need for affordable, simple solutions. Commercially modified toys can cost three to five times that of an unmodified toy. The buttons are similarly expensive. Several charitable groups and efforts exist to help fill this need, but primarily cater to toys, not the buttons needed to use them. We previously developed a mechanical button and a capacitive touch (proximity) button for open-source dissemination and field-tested. Given the prevalence of touchscreen devices in the world, a means for wireless, smart device activation of toys was requested by our collaborating therapists. Previous similar products required proprietary apps with constant developer-side maintenance, so it was important that any product developed be open-source and require no developer input. Internet-of-Things technology enables devices to communicate wirelessly, enabling applications that would otherwise not be realized. Combining the need for alternatives to expensive commercial buttons and the power of Internet-of-Things technology, a button controlled by any device with a web browser was created. The prevalence of touchscreen devices among individuals with disabilities allows for easy integration of the button with daily life. The button was created using a Wi-Fi enabled microcontroller, a custom printed circuit board, and 3D printing technology. The button device connects to the local Wi-Fi network or broadcasts its own and serves the user a custom webpage with graphical buttons. Plans and detailed instructions will be published, oriented towards clinic-based maker spaces who can fabricate the device in-house. This button enables individuals with disabilities to interact with toys in a way that is integrated with their daily lives, elevating the user experience.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #25, Tripp Commons**

Literature Review of the Role of Nursing Students, Registered Nurses, and Nurse Practitioners Within Advance Care Planning

Aaron Shue (UW-Eau Claire) – Nursing
Coauthor: Brandon Voelker
Mentor: Mel Skoff, Miriam Sward, and Emma Pothen

Background: Advance care planning (ACP) is critically important to providing consistent patient care. Registered nurses (RN) and Nurse Practitioners (NP) are relied upon to lead ACP discussions with patients; however, they often struggle due to lack of confidence in their abilities to have these discussions, lack of time, and concerns that ACP is outside their scope of practice. Incorporating ACP training into school curriculum would bolster preparedness in leading ACP discussions. Methods: A literature review examined 16 articles that addressed the roles, confidence levels, and training needs of NSs, RNs, NPs in ACP. Key words searched included: ACPs, ACP training programs. The databases CINAHL, MEDLINE, UpToDate, Web of Science, and PubMed were searched. Results: Sixteen articles were identified as eligible for the subject matter. The core theme of improving ACP education was highlighted throughout these articles. Conclusion: Current attitudes of NSs, RNs, and NPs reflect feelings of uncertainty about their role within ACP, how to initiate conversations, and improving confidence in leading these conversations. It was found that ACP training programs have been effective in increasing the number of ACP conversations as they help train NSs and NPs to facilitate these conversations.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #11, Tripp Commons**

FTIR Analysis of Environmental Effects on Pyridine-SO2 Complexes

Danielle Siewert (UW-Eau Claire) – Chemistry, A.C.S., Biochemistry
Mentor: James A. Phillips

This research looks at the effect of inert environments on the structures of pyridine-SO2 complexes. These effects were able to be observed both experimentally through low temperature FTIR as well as computational models. Experimental FTIR data illustrates environmental effects through measured vibrational frequency shifts between the fragments and the complex. Computational models provide detailed structural information as well as predicted frequencies that can be compared to experimental data. At this point we have observed the spectra of both pyridine-SO2 and 3,5-Difluoropyridine-SO2 in solid Ne at 6K, and we note no difference between most of these data and the predicted values. The exception is the SO2 asymmetric stretching vibration, and the discrepancy here may indicate a solvent effect on the structure, or a failure of the theory to accurately predict the gas-phase structure. In the 3,5-Difuoropyridine-SO2 spectra, this peak is observed at a slightly higher frequency, consistent with a weaker interaction upon addition of the fluorenes. Collection and analysis of spectra in solid N2 are in progress.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #51, Tripp Commons**

Delineating Transcriptional Regulators Mediating the il11-Triggered Heart Regeneration Program

Isabella Silaban (UW-Madison) – Genetics & Genomics
Mentor: Junsu Kang

Zebrafish exhibit remarkable regenerative capacity in heart tissue, contrasting with limited regenerative abilities observed in mammals. We identified that induction of interleukin 11 in adult zebrafish hearts can initiate cardiac regenerative programs, including cardiomyocyte proliferation, even in the absence of injury. Our transcriptomic analysis found that i11a induction upregulates transcription factors foxm1 and znf367 expression in cardiomyocytes, suggesting its potential roles in cardiomyocyte proliferation. To investigate transcriptional regulators mediating il11-triggered heart regeneration programs, we establish a genetic model employing CRISPR-del to create targeted foxm1 and znf367 knockout lines. Established lines will allow us to identify expression patterns, protein binding sites and target genes, leading to the discovery of new targets for heart repair.

Oral Presentation **10:30 – 10:45 am, Council Room**

The Ethical Concerns of Using AI in Mental Health in Social Work

Gabrielle Siudzinski (UW-Green Bay) – Social Work
Coauthors: Anna Wink, Regin Hoffman, Taylor Long, Lexi Weeber, Dani Challe, Mo Brandt
Mentor: Jen Schanen-Materi and Emma Martin

AI is such a rapidly growing topic, honestly what even are the ethical implications that come with it? When it comes to mental health and social work, that question often arises. This study delved deeper into the ethical implications that arise in mental health social work. This study sought out the answer to the question: what impact does AI have on mental health throughout different age groups and how do social work professionals feel about that impact? The first step was to conduct multiple literature reviews of scholarly articles. In search of how AI impacts the mental health of individuals. After that, the findings were discussed to then create a survey to send out to Wisconsin social workers, social work educators, and UWGB BSW students based on our findings. The purposive sampling survey was sent out to Wisconsin social workers, Wisconsin social work educators, and UWGB BSW juniors. Once the survey results returned, the results of the survey and literature review were combined to ultimately find the answer to what are the ethical concerns that arise when using AI with mental health in social work. AI is an amazing tool, but how well can it truly compete with a real human when it comes to the genuine human connection?

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #19, Tripp Commons**

Characterizing Locomotor Behaviors in Different Strains of Mice

Holly Skinner (UW-Parkside) – Biological Sciences
Coauthors: Annette Barzano, Tysly Butler, Mykaela Grube
Mentor: Fabien Preuss

Circadian (daily) rhythms are essential biological processes that regulate daily physiological cycles, including sleep-wake patterns, metabolism, and hormone production. Most circadian systems are cell-autonomous, involving highly conserved transcriptional-translational feedback loops across plants, invertebrates, and vertebrates. In humans approximately 30% of all transcripts undergo circadian oscillation, highlighting the extensive influence of these intrinsic clocks. Disruptions to circadian rhythms have been linked to various health issues, including sleep disorders, metabolic dysfunction, and mood disorders. This study aimed to compare the locomotor activities between two different inbred mouse strains, C57BL/6J and 129S1, to investigate strain-specific behaviors under controlled conditions. To establish baseline activity, mice were initially placed on a standard 12-hour light 12-hour dark cycle: Zeitgeber Time (LD12:12), where lights were on for beginning of the day and off during the evening and night. Following this entrainment phase, the mice were subjected to constant darkness (DD) allowing their intrinsic clocks to express free-running behavior without external cues revealing their Circadian Time (CT). Finally, the animals were subjected to constant light (LL),

where the lights continuously reset their internal clocks and affects their ability to keep time. Free-running behavior was assessed by comparing amplitude, defined as the number of wheel revolutions, and period length, measured in minutes between activity peaks. These variables revealed differences in locomotor activity patterns between the strains, which are only apparent under free-running conditions. Understanding how genetic variations influence intrinsic circadian rhythms provides insights into broader research areas, including chronotherapy, metabolic regulation, and treatment strategies for circadian-related disorders.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #38, Tripp Commons**

Engineering Nanofluids for Electrochemical Applications: Thermophysical Properties of Surface Modified Silica Nanoparticle Suspensions

Sam Stenberg (UW-La Crosse) – Chemistry
Mentor: Sujat Sen

Colloidal suspensions of nano-sized particles (NP) in aqueous media have been historically investigated for their superior thermal properties i.e., as heat-transfer fluids in industrial and automotive cooling applications. More recently, multi-functional suspensions of nanosized particles (referred to as nanofluids) have also been investigated as catalytic media for chemical reactions, solar harvesting, and electrochemical energy storage (battery) applications. Complex and novel behaviors exhibited by such fluids have resulted in many theories proposed to explain their thermophysical properties such as viscosity and thermal conductivity, but their use in electrochemical systems remains relatively novel. Here, we report on the use of silica-based NPs and their surface modification using functionalized silanes to prepare stable nanofluids using aqueous base fluids. Particle size, morphology, grain size, and crystallinity of the nanoparticle were confirmed through various analytical methods such as electron microscopy (SEM), dynamic light scattering (DLS), and X-ray diffraction (XRD). The surface modification aims to decrease the intermolecular attraction between individual NPs by introducing the silane graft which includes a combination of charge and steric-based elements. Presence of the graft is expected to minimize the formation of aggregates after sonication and for the suspension to not settle under gravity over time. The surface modification was assessed through multiple analytical techniques such as thermogravimetric analysis and Infra-red spectroscopy (FTIR) for quantitative and qualitative information. Furthermore, we report on the preparation of nanofluids using both pristine and surface-modified NPs using a temperature-controlled high-intensity horn sonicator, which uses ultrasonic waves to separate aggregates of NPs present in solution. The colloidal stability of the resulting nanofluids were measured over extended durations through both sedimentation tests and regular DLS measurements. We report on these efforts with model silica-based NPs and preliminary efforts to adapt these to redox-active NPs.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #52, Tripp Commons**

A Systematic Review of SMART Recovery, LifeRing, and Women for Sobriety Mutual Help Groups for Alcohol Use Disorders: Outcomes, Moderators, and Mechanisms of Change

Samuel Stumo (UW-Eau Claire) – Neuroscience and Psychology
Coauthors: Averi Garscia, Christopher Hammond, Samara Jinks-Chang, Jennifer Schram
Mentor: Douglas Matthews

Alcohol use disorders (AUD) are a critical public health issue in the United States linked to elevated morbidity and mortality. Mutual help groups (MHGs), which provide peer advice and support, are among the most widespread forms of treatment for individuals with AUD. Twelve-step MHGs like Alcoholics Anonymous (AA), are the most utilized and evidence-based interventions for AUD. In recent years, several secular 12-step/AA alternative MHGs have emerged, including Self-Management and Recovery Training (SMART) Recovery, LifeRing, and Women For Sobriety (WFS). The outcomes and mechanisms of these 12-step alternative MHGs are poorly understood. In the present study, we conducted a systematic review with the goal of updating the scientific literature on outcomes, moderators, and mechanisms of change of SMART Recovery, LifeRing, and WFS for alcohol use problems in adults with AUD. Our review was pre-registered with PROSPERO and followed PRISMA guidelines. The literary search was completed in Medline, Embase, PsychINFO, and PubMed using a combination of controlled vocabulary and keywords. Alcohol-related outcomes, such as alcohol abstinence/reduction in alcohol use, heavy drinking, and other negative consequences were examined. Additionally, we included analysis of engagement-related outcomes, like membership characteristics, moderators of engagement/involvement, and mechanisms of change for MHOs. Preliminary Results from our qualitative review suggest differential alcohol-related and engagement-related outcomes by MHG. These findings highlight the importance of defining similarities and differences between MHGs, as individual differences in patient history and/or ideology disprove notions of universal MHG suitability. Study findings provide valuable insights into the different mechanisms and moderators of 12-step alternative MHGs that may inform future precision medicine strategies.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #15, Tripp Commons**

Investigating the Effect of pH on Alpha Acid Isomerization Rates in Beer: An Inquiry-Based Analytical Chemistry Approach

Sarah Thomaschefsky (UW-Madison) – Biochemistry
Mentor: Amanda Buchberger

Inquiry-based projects in analytical chemistry courses at UW-Madison simulate the research experience. Fall 2024 semester's research project focused on determining the isomerization rate and order of alpha acids for controlling the bitterness of beer and understanding the brewing process. Using a recent literature article as reference, students developed a modified control procedure that accounted for the alpha acid source, equipment available and proposed a variable to introduce or change to test a hypothesis. Our group hypothesized that a more basic pH (5.5 vs. 5.2) would increase the isomerization rate. Ultra-high-performance liquid chromatography (uHPLC) was used to determine the iso-alpha acid concentrations and monitor changes over time. A filtered (n=7) control data set (i.e., replicates from other groups completing the control procedure) was compared to data from the literature article for statistical analysis of alpha acids cohumulone and N-adhumulone. Cohumulone (0.098±0.018 mg) and N-adhumulone (0.0064±0.0020 mg) were both found to be statistically different from what was found in the literature (0.01141, tcalc>>ttable at 95% confidence level at 95% confidence level). The rate order for cohumulone was consistent with the literature (first-order), while N-adhumulone showed an inconsistent result, a zero-order rate constant. For the variable data, the cohumulone (0.09897±0.01952 mg, first order) showed no statistical change in their rate constant, but N-adhumulone (0.005694±0.003124 mg, zeroth order) was observed to be statistically different due to pH change. We concluded that the hypothesis that a more basic pH (5.5) increases the isomerization rate was supported for cohumulone but not N-adhumulone. This suggests that pH affects the isomerization rate for some, but not all, alpha acids. Future research could explore a broader range of pH values, and consider additional factors such as temperature and time, to determine optimal conditions for isomerization in beer.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #2, Tripp Commons**

Cultural Resources at the UWM at Waukesha Field Station: Archaeological Perspectives on Past Human Behavior, Adaptations, and Land Use

Jadon Thornton (UW-Milwaukee) – Anthropology, Classics
Coauthors: Sage Schmidt, Toby Janssen, Avantika Tandon, Xavier Arbelo
Mentor: Gregg Jamison

Since 2021, UWM students and faculty have conducted archaeological research at the UWM at Waukesha Field Station. This work has provided over twenty students with experiential learning opportunities in archaeological field and lab methods as well as public outreach with the communities we serve. Our research has also provided new insights into past human behavior and adaptations at the Field Station through the discovery of archaeological sites. Recovered archaeological materials represent thousands of years of human occupation there, representing the activities of past inhabitants at the Field Station. Archaeological research at the UWM at Waukesha Field Station has helped us explore cultural landscapes on the property, provided training to students, and helped us engage with the public. All these support the mission and goals of the UWM at Waukesha Field Station, the College of General Studies, UW-Milwaukee, and the Wisconsin Idea.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #30, Tripp Commons**

Phosmet and Its Derivatives in Blueberries

Mike Tschida (UW-Stout) – Environmental Science
Coauthor: Hunter Neumann
Mentor: Ana M.Q. Vande Linde

Consumption of blueberries in the U.S. has tripled since the early 2000's. Studies conducted by the Department of Agriculture consistently identified blueberries as one of the fruits and vegetables that are most contaminated with pesticides. Phosmet, an organophosphate insecticide, is one of the pesticides found in some blueberry samples used in the studies. Exposure to phosmet can cause cancer and other serious negative health effects including neurodevelopment disorder and reproductive toxicity. This study will report the concentrations of phosmet, phthalic acid and phthalamic acids detected in blueberry samples using Gas Chromatography-Mass Spectrometry. Phthalic and phthalamic acids are breakdown products of phosmet. Samples of organic and non-organic blueberries produced in the U.S. and exported from Argentina, Peru, Turkey and Chile are being analyzed. The information from this study is critical in evaluating the safety of consuming fruits and vegetables that are labelled as organic.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #46, Tripp Commons**

Growth and Experimental Measurements on Superconducting Thin Films and Heterostructures

Riley Tucker (UW-Parkside) – Physics
Coauthors: Stevan Jovanovic, Isabella SanFelippo
Mentor: Hom Kandel

Our research focuses on the growth, experimental measurements, and analysis of high-temperature superconductor YBCO-based thin film heterostructures for their integration into a wide array of superconducting electronic devices. These devices include sandwich-type Josephson junction devices, superconductor quantum interference device (SQUID) magnetometers, rapid single flux quantum (RSFQ) circuits, and terahertz (THz) frequency devices. The YBCO-based heterostructures' structural and electrical transport properties were investigated through Raman Scattering and various X-ray diffraction techniques such as X-ray profile, x-ray reflectivity, pole figure, and reciprocal mapping. The structural investigations showed (110)-oriented epitaxial growth with a preferred c-axis-in-plane orientation, while the electrical transport measurements showed superconducting critical temperature (Tc) above 77 K and a minimal proximity effect due to the interfacial contact of the YBCO superconducting layers with the middle insulating layer of the heterostructure. Here, we present our recent results demonstrating the possibility of integrating these heterostructures into various superconducting electronic devices to provide low-cost and higher-efficiency solutions.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #15, Tripp Commons**

"Just Go Outside": Observation of the Amplifying Effect Nature Has on Mindful Mediation

Margaret Urbas (UW-Whitewater) – Psychology
Mentor: Elizabeth Olson

Mindfulness, or the amount one is oriented to the present moment rather than the past or future, has been used in therapeutic settings relating to physical and mental distress since the 1960's. People who are trained in being mindful show better physical, emotional, and mental health outcomes (Panno et al., 2018) because of their willingness to accept and confront immediate stressors rather than ruminate over them (Kao et al., 2024). There is also a certain benefit of nature's presence on mental and physical health outcomes. Viewing natural landscapes or flora has been shown to evoke feelings of creativity, relaxation, and positive affect (Schertz et al., 2022), and people that indicate higher connection to nature display more environmentally friendly behaviors and better mental health outcomes (Oh et al., 2021). Increasing rates of urbanization and pollution pose a threat to both physical and mental health, but can be combated by widespread pro-environmental behaviors and biophilic architecture (Ulrich 1983). Participants take an online pre-test survey asking about anxiety, mindfulness, and connection to nature. Participants are then tasked with either a mindful (a guided meditation session; Mindful condition) or mindless (completing paper word searches or sudoku; Mindless condition) activity in either the campus greenhouse (Nature condition) or an empty classroom (Built condition). After completion of the trial, participants are instructed to fill out a second survey on their nature connection, mindfulness, and state anxiety. Participants in the Mindful-Nature are projected to experience an improvement in state mindfulness, anxiety, and nature connectedness, while participants in the Mindful-Built and Mindless-Nature conditions are expected to experience an insignificant improvement in these measures. Participants in the Mindless-Built condition will show no change in any measures. Results can help assess the efficacy of nature presence in a therapeutic environment.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #48, Tripp Commons**

Escalation in an Emotional-Language Matching Task

Margaret Urbas (UW-Whitewater) – Psychology
Coauthor: Hannah Logan
Mentor: David Havas

Escalation of emotional language is prevalent and reflexive. Why does escalation in emotional language arise? In motor control, force escalation arises from anticipatory processes attenuating one's own actions. Using embodied cognition theory, we hypothesized the same principles that govern motor interaction apply in emotional language exchanges. Participants read sentences containing an emotional 'stimulus' word one at a time on a computer. Each sentence was accompanied by a second sentence written to provide a sensible context for the stimulus word, but with the emotional word missing. Participants' task was to complete the second sentence of each pair with a new 'response' word that gave the two sentences the same emotional strength. Stimulus words were chosen from an emotional word database to be moderately emotional in three dimensions: valence (positive to negative), arousal (excited to calm), and dominance (in control to controlled). We compared emotionality of stimulus and response words and found participants returned words significantly more positive, less excited, and more in control than stimulus words. Differences in the valence and arousal dimensions can be explained by the Pollyanna hypothesis (Boucher & Osgood, 1969): there are more positive and relaxing, than negative and exciting, words across languages (Warriner & Kuperman, 2014). Escalation in dominance, however, supports our hypothesized escalation of emotional force. Our results ground emotional language dominance in principles of motor control and point to a general cognitive bias in which we underestimate our own linguistic strength.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #29, Tripp Commons**

The Role of Midkine in Pancreatic Cancer Liver Metastasis

Seyedeh Parnian Vakili (UW-Milwaukee) – Cell and Molecular Biology, Neuroscience
Coauthors: Priyanga Jayakrishnan, Michael B. Dwinell, Victor X. Jin
Mentor: Nikki K. Lytle

Pancreatic cancer is the third leading cause of cancer deaths in the United States, with metastasis, the spread of cancer cells beyond the original tumor, being the primary cause of mortality. Patients with advanced metastatic disease have a 5-year survival rate below 5%. Studies show that the metastatic tumor microenvironment, which includes surrounding non-cancerous cells, blood vessels, immune cells, and signaling molecules, plays a key role in the progression of metastasis. Midkine (MDK) is a protein involved in various cellular processes and has been studied for its potential involvement in cancer progression. Our lab demonstrated that in a mouse model with accelerated pancreatic metastasis in the liver, MDK expression is increased in liver cells. It remains unknown if MDK contributes to pancreatic cancer metastasis. To address this gap, we aimed to determine whether liver-derived MDK influences tumor cell behavior. Since MDK can bind to several receptors, we assessed which receptors are expressed by human and mouse pancreatic cancer cell lines, as well as whether the cancer cells themselves express MDK. We show that pancreatic cancer cells express and secrete MDK and also express its associated receptors SDC1 and PRKCZ. Further, analysis of publicly available datasets from pancreatic cancer patients reveals that high MDK expression is associated with more aggressive pancreatic cancer, and MDK levels are elevated in liver metastases compared to primary cancer sites. These findings suggest a potential pathway for therapeutic intervention, as we aim to test whether targeting MDK may effectively prevent metastatic progression and improve patient outcomes.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #44, Tripp Commons**

Foam and Flow: The Aesthetic Potential of Low-Fire Glazes

Ang Van Den Eeden (UW-Milwaukee) – Ceramics and Sculpture
Mentor: Geryn Roche

Low-fire glaze chemistry creates a unique environment for ceramic surface development that offers a broad range of aesthetic opportunities. This study is an investigation of the interplay between fluxes and glaze additives and their effects on visual depth (transparency and color), and textural movement (foaming and puffing). A series of glaze tests using line blends and triaxial blends were made to evaluate these effects. Applied to ceramic test tiles, and later on, sculptures, the glazes were then fired in an electric barrel kiln at cone 04 (approximately 1922 - 1945°F). The finished surfaces were evaluated for transparency, color, and texture through visual and physical inspection. By experimenting with different additions of Boron, Lithium and alkaline earth fluxes, it was apparent that Boron-based glazes created transparent glossy finishes that showed excellent color retention while glazes with Calcium or Magnesium fluxes created semi-matte surfaces and diffused color. To achieve a foaming glaze, a line blend was made with the introduction of a burnout material, Silicon Carbide, which starts burning out around 1830°F. With each incremental addition of the Silicon Carbide the glaze would become more sculptural, creating a texture that grew unpredictably and produced a range of foaming to cratering textures. By honing in on specific material selections and glaze compositions, the findings from this research further develop the incredible aesthetic potential of low-fire glazes. Ceramic artists can apply this research to help create a versatile low-fire glaze system to develop distinctive color blends and expressive sculptural effects to visually emphasize key themes and components in their art.

Art Display **11:00 – 12:00 pm, Profile Room**

Chemical and Textual Differences in Two Recently Erupted Volcanoes in the Reykjanes Peninsula of Iceland

Andrew Veroeven (UW-Whitewater) – Environmental Science: Sustainability Resource Management Emphasis
Mentor: Prajukti Bhattacharyya

Observing chemical characteristics of Icelandic basalts from different eruptions across the Reykjanes Peninsula in Iceland can help us understand more about the magma characteristics. The Sundhnúkur and Fagradalsfjall volcanoes on the Reykjanes Peninsula are on separate fissures but share similarities in the basaltic magma composition. Using data from Powder X-ray Diffraction (PXRD), Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES), and observing petrographic thin sections, we can observe the similarities and differences between the lava flows from these two eruptions. Four different samples of Icelandic basalt were analyzed in the PXRD—two each from the 2024 Sundhnúkur eruption and the 2021 Fagradalsfjall eruption. Preliminary results suggest all four samples have similarities in their mineral content with some slight differences, showing the Fagradalsfjall basalt to be more mafic than the Sundhnúkur basalt. Preliminary textural data from petrographic microscope observations suggest a difference between the cooling rate and mineralogy of the lavas, with Sundhnúkur lava showing a more cumulative texture than that from Fagradalsfjall. Observing thin sections from Sundhnúkur lava shows larger olivine, pyroxene, and plagioclase crystals to be more aggregated. For future work, I will use ICP-OES to collect and analyze chemical data from these samples, do a more detailed analysis of the preliminary PXRD data, and study more thin sections from both eruptions. More detailed observations of the data can provide a better understanding of the characteristics and source of the magma for both volcanoes.

Poster Presentation **Session I (11:00 – 12:00 pm), Poster #16, Tripp Commons**

Plaza de las Americas

Sophia White (UW-Green Bay) – Environmental Policy and Planning
Mentors: Daniel Roarty and Marcelo Cruz

Green Bay, Wisconsin has long been a city lacking in diversity, with a majority White population. However, it has been experiencing a transformative cultural shift over the past two decades. Since 2000, the Latino population in the Green Bay area has more than doubled and continues to grow exponentially. They have largely settled on the near East side of the city. From businesses to local art, the Latino influence is on display, enriching the city's cultural tapestry. Recognizing this, the city has initiated the creation of a formal cultural district, Plaza de las Américas. This project aims to establish the district's main plaza, guided by three goals: (1) to celebrate and authentically represent Green Bay's Latino community and its cultural diversity, (2) to design a flexible space capable of hosting a multitude of events, and (3) to revitalize an existing structure. These objectives were achieved through collaboration with residents, local business owners, and non-profits to identify community needs. The site chosen was a now vacant, bank building. It was then transformed into a dynamic pavilion structure and community center. The design integrates classical elements of a traditional plaza with artistic influences rooted in Latino heritage, creating a vibrant, flexible, and inclusive public space.

Project Display **Poster/Project Session I (11:00 – 12:00 pm), Poster #53, Tripp Commons**

Effects of Hydrothermal Vents on Chemistry and Mineralogy of 2021 Fagradalsfjall Eruption

Dean Wink (UW-Whitewater) – Geography – Geology Emphasis
Coauthor: Gwenyth Heidinger
Mentors: Prajukti Bhattacharyya and John Ejnik

Beginning with the first eruption at Fagradalsfjall in 2021, the Reykjanes peninsula of Iceland has been undergoing an intense period of volcanic activity. Recent studies done by Francesco Sauro indicate rare minerals and signs of extremophile life have been found in lava tubes created during the 2021 Fagradalsfjall eruption. Rock discoloration near the vents indicates chemical changes. These changes could be similar to those within the lava tubes. Our goal is to understand the effect of hydrothermal vents on nearby basalts. We collected and analyzed samples of altered and unaltered basalt. We are using powder X-Ray Diffraction (pXRD) for mineralogical analyses. Preliminary results from unaltered samples showcase magnesium-rich olivine and calcium-rich plagioclase. From vent altered samples we found zeolites such as Hydromagnesite, Hydroxyl Clinohumite, Mordenite, and Laumontite and other layered silicates that are not present in unaltered samples. We are also using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) for chemical analysis. We did two separate closed vessel digestions, one in 70% v/v nitric acid and one in 70% v/v hydrofluoric acid in order to get a complete chemical signature of the sample. Changes in basalt chemistry and mineralogy due to hydrothermal reactions can provide important information about conditions of early life formation and can also create new and rare minerals. Therefore it is important to conduct detailed chemical and mineralogical analyses of samples altered by reactions with fresh lava. Overall, this study aims to find any existing relationship between reactions taking place around the vents found on the surface of the lava field and the lava tubes created during the eruption. This presentation will cover our analytical methods, data, and implications of our findings.

Oral Presentation **9:45 – 10:00 am, Council Room**

Integration of Ignition in an Industrial Research Testbed

Christian Wirtz (UW-Platteville) – Engineering Physics
Mentor: Harold Evensen

Applications of Industry 4.0 within laboratories, manufacturing facilities, and educational curricula are becoming increasingly valuable as digital circuitry becomes more accessible and artificial intelligence more advanced. At the University of Wisconsin–Platteville, industry advisors have recommended integrating Ignition by Inductive Automation into the campus's Industry 4.0 (I4.0) Lab due to its powerful capabilities in tracking and recording data, scripting, creating visual elements, and connecting with the Internet of Things (IoT). However, the complexity of Ignition poses challenges when incorporating it into educational curricula. To address these challenges, a structured approach is needed to present Ignition in a way that fosters understanding and creativity. This involves first defining the scope of Ignition's capabilities and then isolating its relevant components. By researching Ignition and applying that knowledge to a production line within the I4.0 Lab, a clear and repeatable example of its implementation can be established. The production line used in this research consists of several networked programmable logic controllers (PLCs), a robotic arm, and a variety of sensors and actuators, all designed to serve as a "testbed" for teaching advanced manufacturing concepts. Integrating Ignition to record, store, and visualize data from this system enables more thorough analysis and redesign of the production line. Additionally, by developing a tutorial on using Ignition in this context, the software becomes more accessible and can be applied to other projects, fields, and industries.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #31, Tripp Commons**

Comparison of Vegetation Indices to Identify Phenological Events in Deciduous Forests

Sabrina Wolf (UW-Whitewater) – Environmental Science
Mentor: Rocio Duchesne

Phenology is the study of plant and animal life in relation to seasonal climatic changes. Historically, plant phenology studies were physically limited in extent, but remote sensing overcomes those limitations by utilizing satellites to acquire regular intervals of images of the Earth. We combined NASA's HLS product, NDVI, and EVI to characterize phenological changes in deciduous forests from 2016 to 2024, choosing two dense forest locations in Wisconsin. One area is in Devil's Lake State Park in Sauk County. Second is northeast of Antigo, in Langlade County. HLS data offers high spatiotemporal resolutions. EVI/NDVI, indicators of greenness, identify the vegetation stages. We removed contaminated pixels from the imagery and extracted NDVI/EVI values for deciduous forest pixels according to the National Land Cover Database maps. Through analysis, we identified the growing season start, end, and total length. Our study aims to understand whether Wisconsin is experiencing a change of season length.

Poster Presentation **Session II (1:45 – 2:45 pm), Poster #52, Tripp Commons**

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