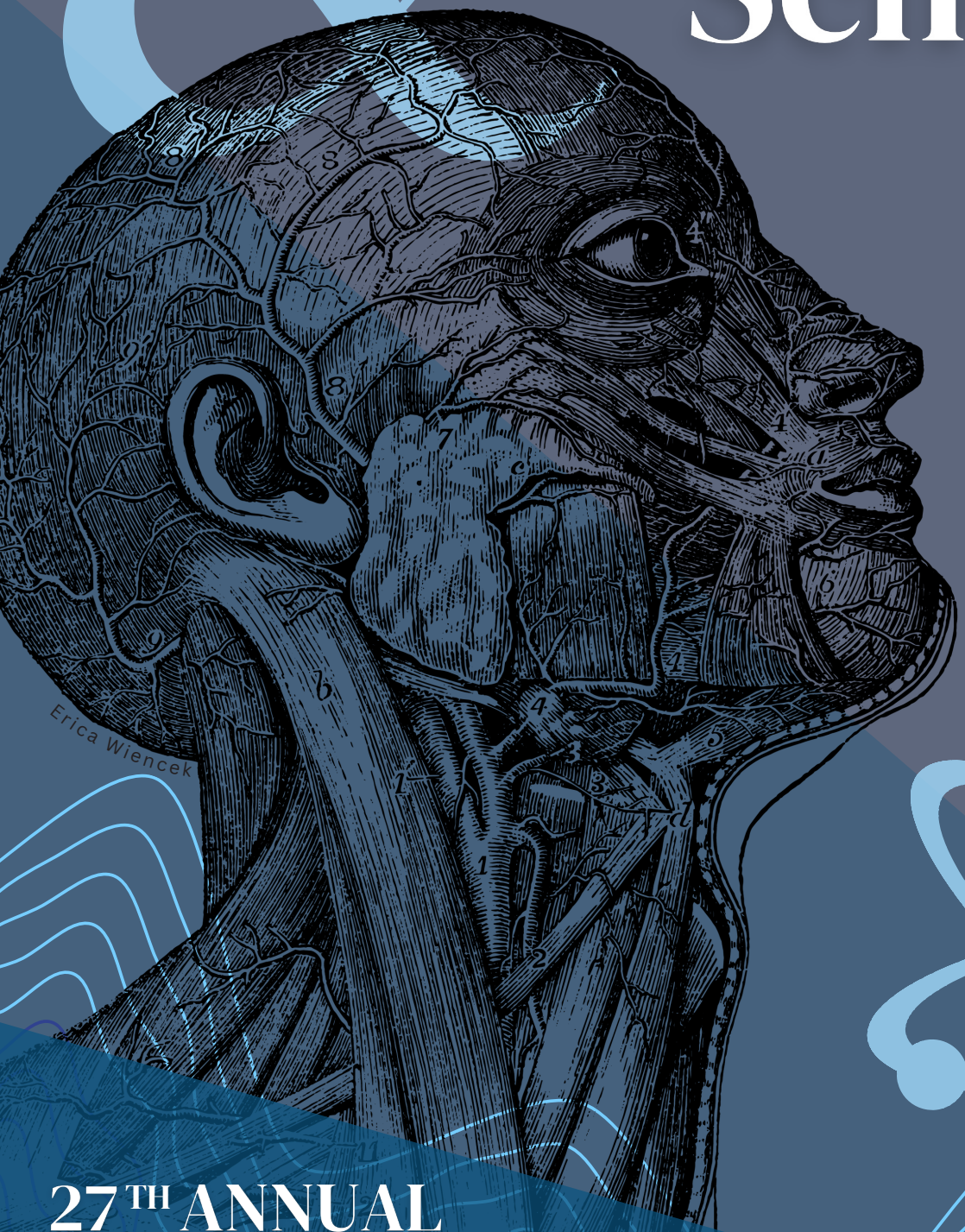
& Student Scholars Day



Erica Wiencek

27TH ANNUAL

APRIL 12, 2023

Grand Valley State University

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SSD Committee

Rene Ardila	Mathematics
Elizabeth Flandreau	Psychology
Teegan Galdeen	Office of Undergraduate Research and Scholarship
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Susan Mendoza	Center for Undergraduate Scholar Engagement
Debbie Morrow	Library
Ross Reynolds	Physics
Michael Scantlebury	Hospitality and Tourism Management
Courtney Sherwood	Center for Undergraduate Scholar Engagement
Shelley Sickrey	Center for Scholarly and Creative Excellence
Richard Vallery	Physics
Todd Williams	Psychology

Schedule of Events

Live Presentations
9:00 a.m. - 5:00 p.m.
See page 10 for detailed schedule and abstracts.

Recorded Presentations
Available on April 12, 2023
See page 106 for abstracts.

SSD Speaker Series
April 6, 4:00 PM; April 11, 4:00 PM
See page 6 for detailed schedule.

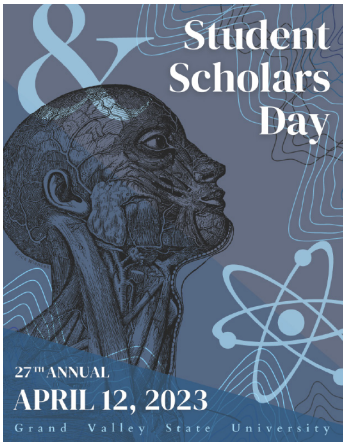
SSD and the Visual Arts at GVSU: Art Reception
April 13, 4:00 PM
Calder Art Center

Exhibitions of Art
April 10 - 28, 2023
See page 8 for details.

Statement from the Cover Artist

Erica Wiencek

After participating in last year's Student Scholars Day, I was inspired to create a design representative of the passionate and innovative work presented by students within the health sciences. I feel lucky to have worked with phenomenal faculty and staff from philosophy and ethics of health, to pure anatomy and physiology. This piece is dedicated to those contributing to the education of the exemplary health professionals graduating from Grand Valley, while continuing to enact meaningful change through research and scholarship.



History of Student Scholars Day

by Neal Rogness and Shelley Sickrey

In the summer of 1995, a small group of faculty members in the Science and Mathematics Division met to explore the feasibility of creating an event where students could present their findings from faculty-mentored research to a university-wide audience. P. Douglas Kindschi, Dean of Science and Mathematics, was enthusiastically supportive, thus Student Research Day (SRD) was born.

It was decided to hold the event on April 12, 1996, in conjunction with the dedication and celebration of the new Seymour and Esther Padnos Hall of Science. The first-time event was expected to draw about thirty student participants. All expectations were exceeded when the registration period ended with over 150 presenters committed to present almost 100 presentations. The first event was a tremendous success; however, it was unknown whether SRD could be a successful “stand alone” event. These fears were quickly allayed when the second annual Student Research Day was held in April of 1997 and proved to be a great success with a similar level of participation. The event became popular enough to get requests from students outside of science and mathematics majors who wanted to present their work. An effort began to make the event truly university-wide, which then Provost Glenn Niemeyer whole-heartedly supported.

Students from all majors were encouraged to present and/or exhibit their faculty-mentored scholarly work at the event. To help make the event more inclusive, its name was changed from Student Research Day to Student Scholarship Day. The first university-wide event doubled in size with nearly 300 students giving almost 200 presentations in 1998. The first SSD keynote speaker was Dr. Robert Powell, Professor of Biology at Avila College, who talked about “Student/Faculty Collaboration: Teaching and Scholarship.” Another name change occurred in the Fall of 2009, this time to Student Scholars Day. The name change was instituted to combat occasional confusion over the nature of the event. “It’s still very focused on student work, but the new name takes away any ambiguity about what the purpose of the day is,” said Susan Mendoza, Director of the Office of Undergraduate Research and Scholarship.

What began as an event primarily composed of science and mathematics majors has grown to include student presentations representing majors from across the university. The GVSU community has truly embraced this annual event as a day in which to take pause and proudly celebrate the scholarly achievements of students from the past year. Student Scholars Day continues to grow, both in size and scope. The event continues to encompass interdisciplinary relationships among the presentations. Individually, the presentation is clear and focused. Taken as a whole, a larger, more inclusive picture of collaboration and learning emerges.

History of Undergraduate Research and Scholarship at GVSU

The pursuit of student research and scholarship at Grand Valley has deep roots in the history of the university. Original student research began in a number of the original Colleges at GVSU, namely Thomas Jefferson College, William James College, and the College of Arts and Science. This tradition continued through decades as the university grew.

Student Scholars Day (SSD) and Student Summer Scholars (S3), originally established in the Division of Math and Science, have served as the anchors for undergraduate research for over twenty years. These programs have served thousands of students by encouraging original research and scholarship.

SSD and S3 moved to the Brooks College of Interdisciplinary Studies and became part of the Office of Integrative Learning in 2006. During this time, both programs were expanded to support student research from all disciplines and majors.

In 2010, the Office of Undergraduate Research and Scholarship (OURS) was established as part of the Center for Scholarly and Creative Excellence. The mission and intent of the office is to establish comprehensive services and programs which support students in their pursuit of inquiry, creativity, scholarship, and research. In addition to Student Scholars Day, the programs of OURS include:

Scholar & Fellowship Programs

Alayont Undergraduate Research Fellowship in Mathematics
GVSU Library Scholars Summer Program
P. Douglas Kindschi Undergraduate Research Fellowship in the Sciences
REACH Scholars Program
Student Summer Scholars (S3) / Modified Student Summer Scholars (MS3)

Research Support & Recognition

Academic Conference Fund (ACF)
Academic and Professional Enrichment Fund (APEF)
Capacity-Building Grants for Faculty Mentors
OURS Project Supplies Grant
GVSU Undergraduate Research/Creative Scholar Transcript Designation
Undergraduate Research Assistants Program (URA)

Outreach Programs & Events

Goldwater Scholarship Program
OURS Ambassadors
Summer Research Orientation
Undergraduate Research Fair

SSD Speaker Series

April 6, 2023, 4:00 PM via ZOOM
Alumni Panel: Taking Your Research into the World

Join us as we talk with recent GVSU alumni about their experiences after undergrad. Learn from former students about how they utilize their undergraduate research experience in their current careers. This event will be a collaboration with Alumni Relations and will be presented via Zoom.

Moderator: Alex Priebe, Assistant Director, Digital Engagement and Communications for Alumni Relations

Panelists:

Hillery York
Hillery is the Senior Collections Manager for the Division of Work & Industry at the Smithsonian's National Museum of American History. Hillery obtained a BA in History from Grand Valley State University before receiving her MA in Museum Studies from The George Washington University's Museum Studies program. She is tasked with the care, collaborative research, and management of collections in the fields of work, history of technology, business, communications, food, energy, agriculture, numismatics, and visual cultures. The division cares for collections that originated in the 19th century and include the earliest known objects and images in the Smithsonian's holdings.

Jenna Hendershot, Ph.D.
Jenna is the Product Manager at Arbor Assays located in Ann Arbor, Michigan. Jenna is responsible for managing products throughout the product lifecycle – gathering and prioritizing product and customer requirements, defining the product vision, working closely with R&D, and marketing the final product to ensure revenue and customer satisfaction goals are met. Prior to joining Arbor Assays, Jenna was a Senior Scientist at Cayman Chemical and then Associate Director of R&D Proteomics at Progenity. She received her Ph.D. in Biochemistry from the University of Michigan, where she studied the biochemical and biophysical mechanisms by which DNA damage is detected and ultimately repaired. Jenna continues to serve on the American Society for Biochemistry and Molecular Biology (ASBMB) Membership Committee.

Kristin Carlesso
Kristin is a Research Attorney for the Michigan Court of Appeals. Carlesso obtained her BS in Criminal Justice from Grand Valley State University before receiving her JD from Western Michigan Cooley Law School. She thoroughly review appeals from various trial courts and then conducts research and drafts research reports and proposed opinions for the panel of judges to reference during case preparation.

SSD Speaker Series

April 11, 2023, 4:00 PM, Kirkhof Center, Allendale Campus
Native Truths: Recentering Who Tells the Story (SSD Keynote)

The SSD Keynote is a collaboration between the Field Museum and OURS. Moderated by Levi Rickert, Editor-in-chief of Native News Online, the keynote is a panel of Field researchers, scholars, and community members who will discuss the process the Field Museum took in creating the Native Voices exhibit as an example of decolonizing and the importance of storytelling. Panelists will discuss how researchers collaborated with Native and Indigenous communities and incorporated research and artifacts collected from a western and colonial methodology to reimagine the process of museum curation.

Moderator: Levi Rickert (Prairie Band Potawatomi Nation), Founder, publisher, and editor of Native News Online. Rickert won a 2021 National Native Media Award from the Native American Journalists Association for Best Column in the print/online category. He serves on the advisory board of the Multicultural Media Correspondents Association.

Panelists:

Alaka Wali, Curator emerita of North American Anthropology in the Science and Education Division of the Field Museum
She was the founding director of the Center for Cultural Understanding and Change from 1995- 2010. During that time, she pioneered the development of participatory social science research and community engagement processes based in museum science. She curates the North American collection, one of the Museum's largest regional anthropology holdings. Her research focuses on the relationship between art and the capacity for social resilience. She has authored several books and monographs and published over 50 articles on a wide range of topics, including museum practice, political ecology, and urban anthropology.

Karen Ann Hoffman, (Oneida Nation in WI), a Haudenosaunee raised beadwork artist whose work appears in the exhibition.

Dr. Eli Suzukovich III (Little Shell Band of Chippewa-Cree), Research scientist in the Negaunee Integrative Research Center at the Field Museum
Eli is an anthropologist with a focus on cultural resource management, ethnography, religion, oral history, and ethnobiology. Eli holds a PhD. in anthropology from the University of Montana-Missoula. Along with his work at the Field Museum, Eli is a professor in the Environmental Policy and Culture Program at Northwestern University.

Jason Wesaw (Potawatomi)
Multi-disciplinary artist, exhibiting works over the last 15 years in an array of media including ceramics, drawings, textiles, and traditional cultural pieces. His projects relate stories about the Potawatomi people's ancient and evolving connection to this Land. He balances being a maker with working in his Tribal community as a Peacemaker, helping to sustain cultural ceremonies and traditional knowledge across the Great Lakes. His work is in the permanent collections of the Eiteljorg Museum (IN), Grand Valley State University (MI), and the Field Museum (IL).

Exhibitions of Art (Apr 10 - 28)

The Visual and Media Arts Department presents student work displayed in the Calder Art Center from April 10 through 28, 2023, with an Artist Reception on Thursday, April 13 at 4:00 p.m.

Ceramics Students:

Spaces for Memories
Artist: Veronica Clapp
Mentor: Hoon Lee

Regression To The Mean
Artist: Mackenzie Kick
Mentor: Hoon Lee

Untitled
Artist: Sophia Nelson
Mentor: Hoon Lee

Untitled
Artist: Jacy Nichols
Mentor: Hoon Lee

Jewelry and Metalsmithing Students:

Self-Disintegration
Artist: Michael Bair
Mentor: Renee Zettle-Sterling

Second Home
Artist: Morgan Davis
Mentor: Renee Zettle-Sterling

Cast Bug
Artist: Rachael Denton
Mentor: Renee Zettle-Sterling

Bottle Brooches
Artist: Cassidy Grevemeyer
Mentor: Renee Zettle-Sterling

The Magician
Artist: Emilee Miller
Mentor: Renee Zettle-Sterling

Vessel
Artist: Anna Sordilla
Mentor: Renee Zettle-Sterling

Fairy Trinket box
Artist: Amelia VanWyck
Mentor: Renee Zettle-Sterling

Apartment and
Artist: Kaela Walters
Mentor: Renee Zettle-Sterling

Studio Art Students:

Untitled (Glass Boots)
Artist: Sam Arnone
Mentor: Paul Wittenbraker

Illuminating the Unsayable
Artist: Alexa Elkouri
Mentor: Paul Wittenbraker

6 Years Apart
Artist: Dustin Galarneau
Mentor: Paul Wittenbraker

(un)recognized
Artist: Janiah Mather
Mentor: Paul Wittenbraker

Sculpture Students:

Medieval/Fantasy Broach
Artist: Michael Bair
Mentor: Norwood Viviano

Artist: Katherine Brewer
Mentor: Norwood Viviano

Hand of Nature
Artist: Skyler Congemi
Mentor: Norwood Viviano

Artist: Eleanor Hopper
Mentor: Norwood Viviano

Fulfillment at its Finest
Artist: Christy Prater
Mentor: Norwood Viviano

Never enough
Artist: Elizabeth Robb
Mentor: Norwood Viviano

Artist: Ian Wallaker
Mentor: Norwood Viviano

Artist: Megan Wolan
Mentors: Norwood Viviano, Drew Pettinga

Illustration Students:

Gyrus Concept – Virrata
Artist: Aaron Kumpala
Mentor: Durwin Talon

Artist: Anneli Ryan
Mentor: Durwin Talon

An Uneasy Meeting
Artist: Briana Skerpen
Mentor: Durwin Talon

Printmaking Student:

The Flow of Things
Artist: Katherine Brewer
Mentor: Brett Colley

Visual Studies Students:

Someday You'll Be Gone
Artist: Caroline Bell
Mentor: Max Spitz

Coins
Artist: Isabella Good
Mentor: Max Spitz

Live Sessions & Extended Sessions, Abstracts & Schedule

Beginning at 9:00 AM (In-Person)

KIRKHOF CENTER 2263

Classics Capstone Research Projects I

Presenters: Melissa Bartlett, Hannah Foster, Kalli Reed-Saba, Elettra Rizzo

Mentor: Charles Ham

Amazons and the Acculturation of Athenian Girls (Melissa Bartlett)

In 5th century BCE Athens, women's roles were limited within society. They were expected to marry, bear children, and maintain the household. Yet, representations of the Amazon, who were a mythical inversion of the qualities that defined a "good" Athenian woman, enjoyed popularity in Greek literature and art. So much so that, young girls in Greece were given dolls in the form of Amazon warriors. While dolls can easily be dismissed as simply children's toys, they also play an important role in forming cultural expectations and norms in children. Therefore, I have studied ancient Amazon dolls as well as other exposures to the Amazon myth that Greek children may have had in order to explore the question of what role they may have played in the acculturation of Athenian girls. Research into the possible uses of the Amazon myth in acculturating children can help us to understand not only 5th century Athenian society, but also can perhaps shed light on the reception of Amazons by children today.

Giant Bones and Heroes' Weapons: Augustus' Attraction to the Wondrous and Monstrous (Hannah Foster)

I studied the interest that Augustus, the first Roman Emperor (31 BCE – 14 CE), had in collecting and exhibiting "wonders" or "biological curiosities." For example, Suetonius in his historical biography of Augustus tells us that Augustus displayed bones of "monsters" or "giants" and the "weapons of heroes" at his villa on the island of Capri (*Aug.* 72). In addition, Pliny the Elder mentions in his *Natural History* that Augustus displayed the bones of two "giants" in Sallust's Gardens in Rome (7.73-75). By looking at these accounts and others, I explore whether Augustus' interest in the "monstrous" is a part of the broader cultural discourse of the Augustan period. In particular, this research may serve to illuminate a connection between Augustus' "monstrous" interests and the antiquarian pursuits of Augustan culture, especially in literature.

Powerful Women? Medea, Dido, and the Question of Female Agency (Kalli Reed-Saba)

The Carthaginian queen Dido makes a relatively brief, but memorable, appearance in Virgil's *Aeneid*. While Virgil modeled Dido on a number of literary characters, I focus in this project on Medea in Euripides' tragedy *Medea* and Apollonius' *Argonautica* as models for Dido. Both Medea and Dido experience a similar narrative arc: they fall in love with male heroes, but their relationships end in tragedy. While it is common in ancient literary texts for gods to intervene in the lives of humans, it is not necessarily the case that humans are simply puppets of the gods. To what extent do Medea and Dido control their fate and to what extent are their actions constrained by divine and/or societal forces? Are Medea and Dido ancient examples of female empowerment? The question of women's agency and empowerment in the face of powerful external forces is still an urgent one today.

Extending Life in Ancient Greece: Myth and Science (Elettra Rizzo)

Not unlike today, the extension of life and the pursuit of immortality were common themes in ancient Greek cultural

discourse. These themes commonly appear in myths, such as those of Medea, Tithonus, and Sisyphus, but also in the writings of philosophers such as Plato and Aristotle. Aristotle, in particular, wrote several works bearing on these issues (*Youth and Old Age*, *Life and Death*, *Short and Long Lifespans*). By analyzing these sources, I explore the question of what ancient Greek attitudes were to the idea of prolonging one's life, and, additionally, of whether or not the beliefs on this topic presented by the mythological texts are different from the ones presented by the philosophical ones. Life extension and immortality are still widely discussed issues in modern medicine, and looking at these ancient texts might contribute to the ongoing debate of whether or not we should scientifically pursue these ideas, and how they might affect our society.

Beginning at 10:00 AM (In-Person)

KIRKHOF CENTER 2263

Grand Rapids Latinx History

Presenters: Nyala Ahmed, Aylinn Calderon, Frieda Campos, Andrew Ingber, Kristen Lach, Alexis Lilly,Hannah McBride, Jocelyn Medina, Maria Rueda-Rodriguez, Lillibeth Whelpley

Mentor: Nora Salas

Over its century-long history the Grand Rapids Latinx community has grown from just a few families to 16% of the city's population. This presentation shows how Mexican Americans, Mexican immigrants, Puerto Ricans, Cubans and other Latinx people navigated the social, cultural, and political realities of the city to make a new home in Michigan. We rely mostly on unpublished oral histories, local archives, and newspaper coverage to reconstruct this history as there are few published secondary sources. Our examination focuses on three community institutions prominent in the Grandville Avenue Neighborhood on the Southwest side of Grand Rapids. Between the 1950s and 1960s, St. Joseph the Worker Church shifted from serving a Dutch congregation to serving a predominantly Latino population, allowing immigrant families to feel a sense of belonging in their communities. Roberto Clemente Park, formerly Rumsey Park, has been significant to the Grand Rapids Latinx community, and a long-standing group of individuals used this space to make life possible for themselves in a place that had very little to offer them. Finally, the Latin American Council, formerly at 929 Grandville Avenue, was a grassroots community organization founded in the late 1970s where Latinx people celebrated their heritage in new ways.

Beginning at 10:00 AM (Virtual)

VIRTUAL VIRTUAL 004

Virtual Global Climate Change Symposium

Presenters: Leah Anderson, Kristin Davis, Jesse Goodyear, Kaytlin Poynter, Julia Shreve, Hannah Zylman

Mentor: Elena Lioubimtseva

(Leah Anderson, Kristin Davis)

"Climate Sisu" is the first documentary to address climate change and community resiliency in Michigan. Taking the audience on a journey from GVSU campus "Up North" in search of community knowledge about climate action, resilience, adaptation, and education, the documentary offers an urgent, yet optimistic call for climate action. It is a collection of powerful stories told by environmental activists, students, climate scientists, educators, farmers, winemakers, and urban planners, looking for climate change solutions in our state. "Sisu" is a concept known by many Michiganders, especially those who reside in the Upper Peninsula. It means "extrordinary determination,

courage, and resoluteness in the face of adversity". Our team felt a deep connection to this word as we traveled throughout our state. Not only did we see first hand the work of those who embody Sisu in the midst of climate change, but we also felt the hope that they were creating. Rather than inciting action through fear and "doom and gloom" messages, these educators, citizens, and climate activists reinforced how fun and rewarding doing their part in creating a resilient future can be.

(Jesse Goodyear)
Assessing the vulnerability of Australian infrastructure to climate change and reviewing the implications of infrastructure planning can be a complex and multifaceted research topic. Recently, Australia witnessed the worst bushfire crisis seen in a generation, the overall catalyst being wild weather swings. After these fires, the east coast region was hit by significant flooding (2021/2022), which turned much of the dry, arid, cracked land into new drainage zones: many residential areas within those zones' paths becoming severely flooded. Infrastructure becomes the last resort for many in finding safety during these periods. As an intensifying climate change exponentially increases, infrastructure planning has become a vital area of concern to protect as well as manage. This study identifies Australian infrastructure that is bearing the brunt of climate extremes and explores how the built environment can become more adaptable to this new era of climate change. When exploring the vulnerability of Australian infrastructure to climate change, data collection methods were crucial for the validity and accuracy of the report.

(Kaytlin Poynter, Hannah Zylman)
In recent years climate change has become one of the major topics in philanthropic agendas. Our study analyzes the role that private foundations play in equitable climate action and climate adaptation plans in the Upper Midwest (Michigan and Illinois). Our goal is to examine the best philanthropic practices and challenges for more equitable and inclusive approaches taking place in cities of different sizes supported through private funding [Kresge Foundation, Rockefeller Foundation, Bloomberg Foundation]. This study is based on the analysis of 5 case studies ranging from Traverse City, MI, Marquette City, MI, Grand Rapids, MI, Detroit MI, and Chicago, IL. Data collection and analysis include analyses of climate action and adaptation plans and related documents created by the cities, calls for grant proposals and reports published by the supporting private agencies, and interviews of professionals involved in the planning process. The strategies used in current climate change adaptation plans are examined with each city's motivators and goals in mind to determine what aspects can be implemented in a future climate change action and adaptation planning for cities in the United States.

(Julia Shreve)
The Great Barrier Reef, located off the coast of Australia, is one of the world's largest and most diverse coral reef systems. Climate change is having significant and profound impacts on the health and survival of the reef and its inhabitants. Rising sea temperatures and ocean acidification resulting from increased atmospheric carbon dioxide levels are causing coral bleaching and death. Ocean pollution is exacerbating the problem by introducing harmful chemicals and waste products into the water. Additionally, increasing frequency and intensity of extreme weather events, such as cyclones and storms, are further exacerbating the damage to the reef. These impacts have far-reaching consequences for the biodiversity of the reef and the livelihoods of the communities that depend on it. Therefore, it is crucial to reduce greenhouse gas emissions and implement effective adaptation measures to protect the Great Barrier Reef and other coral reefs from the devastating impacts of climate change.

Beginning at 12:00 PM (In-Person)

KIRKHOF CENTER 2263

Mathematics and Applications

Presenters: Nicolas Delibero, Robert Dolan, Amelia Goetzinger, Evan Henning, Alaina Hogan, Katherine Mast, Bradley Monarch, Marshall Nicholson, Duc Phan, Jacob Ritsema, Kadence Rosinski, Lisa Shen, Andrew Wilson, Isabella Zelenak

Mentors: Feryal Alayont, Lora Bailey, David Clark, Firas Hindeleh

12:00 – 12:20 On the Classification of seven-dimensional solvable Lie algebras with $A_{5,1}$ nilradical (Robert Dolan, Amelia Goetzinger, Evan Henning, Duc Phan)

In this talk we give an update on the classification problem of the seven-dimensional solvable Lie algebras. We highlight our contribution to the case where nilradical is isomorphic to $A_{5,1}$.

12:20 – 12:40 Minesweeper with Errors (Alaina Hogan, Kadence Rosinski, Lisa Shen, Izzy Zelenak, Andrew Wilson)

Minesweeper on paper is a game played on a 2D grid of cells, some of which are marked with numerical clues that range between 0 and 8. Each clue indicates the number of mines adjacent to its cell. The goal of the game is to identify which unmarked cells contain mines when given the number of mines in the grid. We study the introduction of errors into a game, where an error is changing the value of a clue by 1. We examine the number of possible solutions in an initial game with errors introduced.

12:40 – 1:00 Edge Cover Sequences (Evan Henning)

Graphs are mathematical models used to represent relationships between discrete objects, where the objects are represented by dots (vertices) and any two related objects are connected with a line (edge). An edge cover of a graph is a subset of edges such that each vertex is an endpoint of at least one edge in this subset. It is known that the number of edge covers of path and cycle graph families are the famous Fibonacci and Lucas numbers, providing us with a new combinatorial interpretation of these sequences. We will discuss new sequences and new combinatorial interpretations that resulted as the edge covers of other graph families, and discuss the various methods employed to investigate these sequences.

1:00 – 1:20 Minesweeper with Missing Clues (Marshall Nicholson, Katie Mast, Nicolas Delibero)

Minesweeper on paper is a puzzle that involves a 2-D grid of varying dimensions. The goal ofMinesweeper is to locate a given number of mines using numerical clues. These clues are inside the gridand indicate the number of mines in the eight adjacent squares. We study Minesweeper puzzles in whichspecific clues are missing. We examine when these puzzles are still solvable.

1:20 – 1:40 On the Classification of seven-dimensional solvable Lie algebras with $A_{5,2}$ nilradical (Robert Dolan)

In this talk, we give an update on the classification problem of the seven-dimensional solvable Liealgebras. We highlight our contribution to the case where nilradical is isomorphic to $A_{5,2}$.

1:40 – 2:00 Edge Covers of Graphs (Bradley Monarch, Jacob Ritsema)

Everything in our world is defined by relationships, whether they be between objects, concepts, or individuals. Thus, it is crucial that we have a tool to represent relationships in the world of mathematics.Graphs are mathematical models that, given discrete (separate) objects, are used to visualize relationships between those objects. We use dots (called vertices) to represent objects and lines joining those dots (edges) to represent the relationships

between them. In this talk, we will discuss our research pertaining to edge covers –the configurations by which every dot in a graph is connected by an edge to at least one other dot – including the various methods we employed to investigate this topic.

KIRKHOF CENTER 2270

Classics Capstone Research Projects II

Presenters: Hiro Briganti, Lynsey Masters, Lacey McGillicuddy, Miranda Schriedel
Mentor: Charles Ham

Hiro Briganti: Liveliness is Next to Godliness: Themes of Cheating Death and Time in Greek Mythology
Modern biomedicine is rife with realized and imagined methods of rejuvenation and longevity, but this is not a new ambition. The pursuit of youth or eternal life is a common motif in Greek myth, most often bestowed upon mortals by gods, and to varying effect. Non-deities who attempt or even achieve this power are meddlers; respected, feared, and sometimes punished. But could they have been onto something ahead of their time? When medical innovations such as organ transplants and blood transfusions were first introduced, its proponents were criticized as playing god. When figures in Greek myth attempt to extend life or youth, could the fear and otherness with which they're treated be becauset hey were also seen as testing these boundaries between mortals and the divine? Was this fear baseless, or should it be carefully inspected as we continue to better our understanding of life, longevity, and youth? Here, I analyze Greek myths, especially the myths surrounding the figure of Medea, in order to explore ancient Greek attitudes towards this "meddling".

Lynsey Masters: Imagining Amazons: How We Got From Hypsicratea to Wonder Woman
This project explored the reception of the ancient Greek myth of the Amazons in William Marston's early *Wonder Woman* comics. Amazon women in Greek literature and art were often depicted as beautiful and strong but needing to be conquered by male heroes. With the creation of *Wonder Woman* in 1941Marston, against the background of first wave feminism, claimed to offer a new kind of Amazon. By looking at Marston's reception of the ancient myth, this project explores whether Marston was effective in his attempt to reimagine the archetypal Amazon, or if he served to further perpetuate misogynistic themes. Contemporary popular culture is filled with reimaginings of ancient myth that make claims to empowering women, but this project demonstrates that there is value in subjecting those claims to critical examination, with the aim of illuminating how the Amazons can be used to change the narrative on strong female characters in the future.

Lacey McGillicuddy: Art Imitating Nature: Mathematical Structures Mirrored in Ancient Buildings and Art
In a famous example of art imitating nature, the mythical architect Daedalus was said to have created a perfect replica of a honeycomb using solid gold, which he gave as a gift to the temple of Aphrodite. The structure of honeycombs, an example of the *daedala tecta* or "skillfully worked buildings" of bees (Virg. G. 4.179), also served as a source of inspiration for some ancient scholars and architects. The Roman scholar Marcus Terentius Varro wrote the "Honeybee Conjecture" which created a theory on why the honeycomb shape was so significant mathematically. Along with the example of the honeycombs, I explore other cases of Greek and Roman artisans who based their art on forms found in nature. Also, I look into whether these structures were explored mathematically to see if the modern fascination with math in nature (such as the Fibonacci sequence seen in natural patterns) still existed back then.

Miranda Schriedel: Hippolytus the Amazon? A Study of Hippolytus' Amazonian Lineage
In this project, I studied the Greek mythological figure of Hippolytus, the son of the Athenian hero Theseus and

an Amazonian queen (either Antiope or Hippolyte, depending on the source material). Ancient texts rarely tell of an Amazon producing a son. When they do, the child is almost always insignificant or killed by the Amazons themselves, making the case of Hippolytus a rare one. Despite the apparent differences between the tales of the warrior women and Hippolytus, they both represent a rejection of the Greek institution of heterosexual marriage and are 'punished' for this rejection. In exploring texts like Euripides' *Hippolytus* and Seneca's *Phaedra*, among other ancient representations of Hippolytus' myth, I explore how Hippolytus' descent from an Amazonian mother has shaped his characterization and informed his myth.

Beginning at 2:00 PM (In-Person)

KIRKHOF CENTER 2263

Department of Psychology Oral Presentations and Award Ceremony

Presenters: Phuc Dang, Matthew Dickinson, Liam Hart, Jacob Maring, Emily Murray, Madison Wheeler
Mentors: Lawrence Burns, Robert Deaner, Mihaela Friedlmeier, Amanda Karsten, Benjamin Swets, Todd Williams, Michael Wolfe

Personal Values and Their Contribution to Financial and Subjective Well-Being (Phuc Dang)

Financial literacy is important to the success of emerging adults (Archuetal et al., 2011) and is predicted by attributes such as personal and family characteristics and values (Gudmonson & Danes, 2011). Values are emotionally charged beliefs that refer to goals and motivations (Schwartz, 2012). Some suggest their guiding influence extends to financial socialization and well-being. Literature on materialism and extrinsic motivations find these constructs being inversely related to well-being, warranting further exploration. College students from the US (N=374) and Romania (N=175) answered questionnaires on values, financial outcomes, and life satisfaction. Values were assessed using the Portrait Value Questionnaire (Schwartz et al., 2001). Materialism was captured by the Material Values Scale (Richins, 2004). Life satisfaction was measured utilizing the Satisfaction with Life Scale (Diener et al., 1985). Results revealed that Romanians scored higher on the values of security, universalism, self-direction, stimulation, hedonism, achievement, and power. For both samples, the most important values were benevolence, self-direction, and hedonism whereas the least important were tradition and power. This study highlights the importance of considering cultural and social influences when investigating the connection between values, aspirations, and well-being in emerging adults.

Unearthing the "Earworm": The Impact of Catchy Songs on Working Memory (Matthew Dickinson, Brenden Wardlaw, Destinee Partain & Ashton Cove)

Catchy songs impair our ability to perform on verbal working memory (WM) tasks. Evidence shows that verbal WM scores are lower both during the music, and afterward, when they remain playing in one's head as a so-called "earworm". Researchers have attributed these effects to the fact that music occupies verbal WM resources in the so-called "phonological loop". However, less is known about the potential effects of catchy music on other aspects of WM. We sought to replicate these findings and expand upon them by including a spatial WM task. Participants completed a verbally mediated WM task and a spatially mediated WM task in blocks of music and silence, where we expected that they would continue to hear songs as earworms. Preliminary results indicate that catchy songs affected verbal WM compared to silence, but did not similarly affect a measure of spatial WM. These results are consistent with the notion that the deleterious effects of catchy songs on WM are limited to verbally mediated tasks.

Research, Student Scholarship and Beyond: My Academic Journey (Liam Hart)
As a recent graduate with a bachelor's in psychology and applied statistics, Liam will provide an overview of his academic research and reflect on its value for graduate school applications. In his freshman year, Liam began research in an exercise science lab before declaring psychology as a major. In his senior year (2022), Liam was awarded the “Excellence in a Discipline” and the “Robert Hendersen Leadership” awards. Since then, he has engaged in two separate lines of research in social and cognitive psychology which have led to peer-reviewed publications and several manuscripts in progress. As an integral part of his academic journey, Liam will reflect on his participation in the Student Summer Scholars program and discuss the benefits of such programs offered by the Office of Undergraduate Research and Scholarship (OURS). Liam will discuss the importance of faculty mentorship and how active involvement in a research lab has helped prepare him for graduate school and a career in research.

Do Men and Women Differ in Their Approach to Seeking Status in Rock Climbing? (Jacob Maring)
It has been frequently hypothesized that men are more likely than women to directly compete for status, yet there have been few direct tests of this claim. To address this, we are studying rock climbing, a sport where individuals seek status in ways that range from subtle to conspicuous. Our study’s main prediction is that male climbers, relative to female climbers, will report more frequently engaging in climbing-related behaviors that display or show off one’s abilities or accomplishments; however, men are not predicted to report more frequently engaging other social behaviors. We will conduct pilot studies to identify behaviors that function, within the climbing community, to seek status, help others, or strengthen social relationships. In the main study, a large sample of climbers will report their frequency of engaging in the behaviors identified in the pilot studies. We will test for sex differences while controlling for climbing experience and demographic factors.

Effects of Remote Vignette-Based Training on Social Initiations of Young Adults with Autism (Emily Murray, Haillie McDonough & Leah Fetzer)
People with Level 1 autism have few work opportunities compared to neurotypical peers due to differences in soft skills. This study evaluates a training package for conversational initiations at work. Participants are young adults with autism who are at least 16 years old. Prior to the study, an employer survey was conducted to examine (a) the social validity of experimenters’ definition of appropriate conditions to initiate conversation and (b) whether vignettes were ecologically valid with respect to common conversational opportunities in the workplace. During Zoom-based training, participants with autism respond to written initiation scenarios based on three contextual decision-making factors (e.g., whether the individual was expecting to interact with them at that time). Additionally, investigators assess initiation decisions in simulated work scenarios before and after training.

The Narcissism/Vanity Distinction: Exploring Differences regarding Pride, Empathy, and Social Behaviors. (Madison Wheeler)
The purpose of this study was to answer whether narcissism and vanity could be distinguished as distinct personality constructs. It was hypothesized that based on traits of pride, empathy, and several social behavior variables narcissism and vanity could be differentiated. Correlation and regression analyses were conducted after participant survey data was collected. The results found that multidimensional vanity and narcissism traits reveal differences in their associations with pride, empathy, and social outcome variables of sensitivity to others, selflessness, and communal image management. When controlling for shared variance in the predictors the findings revealed independent associations with social outcomes and affirmed distinct relational patterns between narcissism and vanity with the criterion variables. Distinct relationship patterns between the types of narcissism and vanity are revealed and discussed. The differences in vanity and narcissism are thought-provoking as we seek to better understand intrapersonal motivations and feelings in which the predictors may differ fundamentally, and

how this may translate into variations in social behavior. This study calls for further research to continue evaluating vanity and its respective subtypes separately from narcissism to better understand these constructs within personality psychology.

Beginning at 5:00 PM (In-Person)

KIRKHOF CENTER 2263

IndieTrainer: Enabling Individuals with Cerebral Palsy to Receive Gamified Power Mobility Training in Their Own Manual Wheelchairs

Presenters: Kara Harrington, Jennifer Jenkinson, Brianna Kleikamp, Amanda Montgomery
Mentor: Lisa Kenyon

BACKGROUND: The IndieTrainer system, comprising both a mobility device and gamified training modules, was developed to aid powered wheelchair (PWC) skills acquisition in children with cerebral palsy (CP) or other similar condition. The aims of this small-scale study were to explore use of the IndieTrainer system to improve PWC skills in children who have CP and document parental/caregiver perceptions of, and satisfaction with, the IndieTrainer system. METHOD: This study was an open-label single-arm clinical trial involving a three-week PWC training intervention consisting of two 60-minute training sessions per week. A single session retention trial was held four weeks after the completion of the intervention period.Altogether, 25 child-parent/caregiver dyads will participate in the study. Each child participant will be 3 to 21 years of age and have a diagnosis of CP or other similar condition. The Assessment of Learning Powered mobility use will be the primary outcome measure. RESULTS: This session will report the outcomes attained by the first 11 child-parent dyads. CLINICAL IMPLICATIONS: The IndieTrainer system allows children to explore and use power mobility in their own manual wheelchair and was designed to meet the needs of power mobility learners across the continuum of learning.

Live In-Person Oral and/or Visual Presentation

Beginning at 9:00 AM

KIRKHOF CENTER 1104

Environmental Challenges of Mining Minerals for Solar Panels and Battery Energy Storage Systems

Presenter: Miranda Larva
Mentor: Griff Griffin

Reducing greenhouse gas emissions and meeting the Biden Administration's climate goal of reaching 100% carbon-free electricity by 2035 requires the deployment of renewable energy infrastructure and energy storage containers (i.e., batteries). Solar energy is growing across the United States and will be a major source of the nation's renewable energy portfolio. Rare minerals including arsenic, gallium, cobalt, and lithium are used for the manufacturing of solar panels and batteries used to store electricity. Monocrystalline silicon, polycrystalline silicon, cadmium telluride, and copper indium gallium selenide are the main types of solar panels made and sold. Lithium-ion based batteries are the most common utility-scale battery systems used for energy storage on the United States' electric grid. Mining alters the natural landscape of an area; some environmental impacts of mining include water pollution, habitat destruction, and the release of toxic tailings. I will take a comprehensive look at mining processes, and I will explore potential environmentally responsible mining practices.

KIRKHOF CENTER 1142

Presenters: Miranda Baker, Hailey Godbout, Hannah Scameheorn, Mya Van Nortwick
Mentor: Dawn De Vries

This presentation will discuss the benefits of animal-assisted therapy for children with cerebral palsy.

KIRKHOF CENTER 2201

From Passion to Action: A Multimodal Approach to Transgender Education in Undergraduate Nursing Curricula

Presenter: Rhian Williams
Mentor: Anna Hammersmith

Health disparities in America have been a focal topic for governmental agencies, universities, and researchers in recent years. Research indicates mental and physical health outcomes vary greatly by social determinants of health, including gender identity. While improvements have been made in some areas of social life, transgender people in America continue to experience discrimination in and out of the clinic.Transgender people in America experience high rates of suicide, social stigma and have specific health needs that must be addressed.

My project takes a multi-faceted approach that combines research and advocacy to address the transgender health knowledge gap in undergraduate nursing programs. While previous research in this field is often purely theoretical, I am making practical steps toward integration of education on social determinants of health and population health

in undergraduate nursing education. To accomplish this, my project incorporates five key elements: curriculum, faculty education, NCLEX questions, pre-nursing requirements, and additional recommendations. Each element contains both research and advocacy tasks that compile resources and make steps toward implementation of each element's desired outcome. This research establishes models that have been presented not only to faculty within my program, but also to those of other undergraduate nursing programs in Michigan.

KIRKHOF CENTER 2266

Accessibility to Language Immersion Programs and their Cognitive Benefits

Presenter: Lauren Gutierrez
Mentor: Mayra Fortes Gonzalez

Language immersion education programs, especially in Spanish, have become increasingly popular in the United States in recent decades. Nationwide, parents can choose to send their children to a traditional school, or to one that offers the added benefit of bilingual education. Language immersion programs provide multiple cognitive benefits, such as enhanced problem-solving, divergent thinking, pattern recognition, and brain disorder resistance. Due to benefits, the popularity of language immersion programs has grown; however, not every K-12 student can access them. Factors such as the socioeconomic status of the student and their family, the resources that their school or community can provide, and similar structural barriers to immersion opportunities for Latino/a/x students contribute to a lack of language immersion program accessibility and participation. My presentation will explore how these barriers can limit historically marginalized groups whose first language is not English. I will also demonstrate how a speech-language pathologist can aid in promoting bilingual education involvement, while emphasizing the cognitive benefits of language immersion programs. An increased awareness of the challenges that bilingual Latino/a/x youth face, as well as more support from educators and speech therapists, will extend the benefits from language immersion programs to all students.

KIRKHOF CENTER 2270

Geographic Information Systems as an Effective Grantmaking Tool

Presenter: Christina Vann
Mentor: Kin Ma

This exploratory study examines how Geographic Information Systems (GIS) and mapping can be used to improve grantmaking decisions. An ArcGIS Instant App is developed as a preliminary model for how to present geographic information to grantmakers. The literature review delves into technology acceptance research to lay the foundation for a discussion on the use of information technology (IT) in the nonprofit sector. Referring to the literature, it is determined that nonprofit organizations are not using technology to the fullest extent to achieve their social missions. The review then outlines a variety of prosocial outcomes of IT implementation including the development of critical spatial thinking, social capital, and increased community awareness. These prosocial outcomes suggest that nonprofits must work to advance their technological capacity. Experiential philanthropy is also discussed as a potential setting for IT training to be implemented. Finally, the research surrounding short, single-session training reveals positive learning outcomes indicating that short training may be a more affordable and accessible opportunity for nonprofits and philanthropic entities to engage in IT training and adoption. The mapping application created through ArcGIS is offered as a future tool to be utilized in short, informational tech training sessions for grantmakers.

Beginning at 9:30 AM

KIRKHOF CENTER 1104

The Economic, Social, and Ecological Effects of the Seasonal Hypoxia Dead Zone in the Gulfof Mexico

Presenter: Ashton Maurer-Wagner
Mentor: Griff Griffin

Many studies have examined the Gulf of Mexico hypoxia dead zone's negative economic, social, and ecological effects. This dead zone occurs on a seasonal rotation during the summer months. These effects range from a large loss of revenue for the United States economy to impacts on commercial and recreational fishing to the loss of ecological stability. The purpose of this study is to determine the costs associated with losing a fully functioning ecosystem located in the Gulf of Mexico due to the hypoxiadead zone. As the population of the United States continues to grow, the amount of pollutants that is generated continues to increase. The increase in the overall population also results in an increase in agricultural production and increased fertilizer use to sustain the population. As both of these factors continue to grow, so does the size of the hypoxia dead zone. A healthy ecosystem in the Gulf of Mexico provides essential benefits to the surrounding communities and the United States, including, but not limited to recreation, economic development, biological diversity, and ecosystem stability.

Beginning at 10:00 AM

KIRKHOF CENTER 1104

A Restoration Plan for the Bend Area Open Space Park in Jenison, Ottawa County, Michigan

Presenter: Nolan Weatherby
Mentor: Griff Griffin

Properties bought for city or county parks often have ecological problems left behind by the previous owners, creating disturbed sites that allow for invasive species to spread. Restoration and management of these sites is the best way to help these spaces become healthier. Using remote sensing data from Ottawa County and research into native plant species, a restoration plan was developed for a 421-acre park in Ottawa County, Michigan called the Bend Area. Previous gravel mining companies disturbed the site which allowed for the spread of plants such as non-native Phragmites, Autumn Olive, and Garlic Mustard. These invasive plants prevent growth of native wetland vegetation, which is beneficial for the threatened Blanchard’s Cricket Frog, a species found here that the county would like to protect. The proposed plan involves herbicide application of glyphosate near the main parking lot and along a stretch in the northeastern section within the first growing season once restoration starts. A prescribed burn will follow the next winter, and steps will be taken to monitor and manage the growth. Native wetland vegetation will be seeded and planted in the following years until they are established and invasives will still be monitored.

KIRKHOF CENTER 1142

Disordered Eating and the Arts

Presenters: Kenneth Chileshe, Emma Hahn, Catherine Lyman, Gabriella Monte, Brandy Peralta-Sosa
Mentor: Dawn De Vries

This presentation will explain the benefits of the therapeutic use of arts and other related arts therapies for those struggling with disordered eating. It will look into different aspects of the therapeutic use of the arts such as painting, writing, music, etc.

KIRKHOF CENTER 2266

One Way Repeated Measures ANOVA SASpy (Honors Senior Project)

Presenter: Alejandro Hoban
Mentor: Sango Otieno

I have been a statistical consultant at the SCC (Statistical Consulting Center) for the past three years, and we often see clients whose experiments involved multiple measurements on the same person under different conditions. I created this program to make our process more efficient for us at the center and for our clients. My program follows the book *Discovering Statistics Using SPSS: (And Sex and Drugs and Rock 'n' Roll)* (4th ed.), which contains an explanation of One Way Repeated Measures ANOVA and is very handy to us and our clients.

Beginning at 10:30 AM

KIRKHOF CENTER 1104

The Relationship Between Soil Factors and Plant Growth in Northern Alaska.

Presenter: Taylor Doorn
Mentors: Griff Griffin, Robert Hollister

This study examines the relationship between soils and the growth of graminoid plants occurring on the Arctic Coastal Plain. The study site was South of Atqasuk, Alaska. Measurements were made within a 1 km^2 grid established in the mid 1990's to monitor ecosystem change. The grid encompasses a wide array of community types that can be categorized as dry heath, wet meadow or moist acidic. Soil samples were taken from 126 plots to measure organic matter content and pH. Other soil abiotic data was recorded, including soil temperature, moisture, electrical conductivity, and thaw depth. Within each plot, the height of up to three individuals of every graminoid species were recorded each week from June to August of 2022. One-way Analysis of Variance was used to identify significant differences in soil factors between community types, while regression analyses were performed to find which soil factors showed the strongest association with plant growth. It is expected that pH, organic matter, and soil moisture had the strongest relationship with plant growth. Understanding the relationship between soils and plant growth may help explain different plant responses to climate warming observed across the landscape.

KIRKHOF CENTER 1142

Mind and Body Relationship: An Integrative Approach to Understanding the Effects of Recreational Therapy in Elementary Schools

Presenters: Aubrey Buckingham, Anna Raffaelli, Kailey Walter
Mentor: Dawn De Vries

This presentation will be about Recreational Therapy interventions based in elementary schools as a means to address behavioral and emotional impairments in children. It will cover activities that lead to mindfulness, coping skills, stress management, and reduced aggression. It will discuss how physical activity can lead to improved behavior and how recreational therapists can help address emotional and behavioral issues in elementary schools.

KIRKHOF CENTER 2201

Exploring Biodiversity and Biogeography of Microbial Mat Communities in Low-oxygen, High-sulfur Springs

Presenter: Davis Fray
Mentors: Bopaiah Biddanda, Dale Casamatta, Sarah Hamsher, Callahan McGovern

High-sulfur, low-oxygen environments formed by underwater sinkholes and springs create extreme habitats with unique microbial communities, living in thin layers known as microbial mats. To explore the diversity and better describe the taxonomic composition of these communities, mat samples, water parameters, and nutrients were collected from sites in Alpena and Monroe, Michigan and Palm Coast, Florida in the spring, summer, and fall. Cyanobacteria and diatoms, the dominant microbes in these mats, were cultured from mat subsamples to create a culture-based DNA reference library. Remaining mat samples were used for high-throughput sequencing using a multi-marker metabarcoding approach focused on exploring bacterial and diatom diversity. Preliminary data analyses revealed higher diversity in these mats than expected. Redundancy analysis was used to identify taxa associated with the conditions found at these sites. This study revealed distinct microbial mat communities in sites with similar groundwater conditions across a continental geographic range. Our results provide novel information on microbial mat communities in extreme environments and advance the field of microbial biogeography by providing insights into the distribution of cyanobacterial and diatom diversity.

KIRKHOF CENTER 2259

Religious Syncretism in Early Modern Latin America: Survival, Power, & Resistance

Presenter: Ian McGuckin
Mentor: Grace Coolidge

This paper explores the theory of religious syncretism and its application within early modern Latin America. It proposes a new model for understanding religious syncretism in order to eliminate the previous bias in the scholarship and misconceptions inherent in the term and seeks to discover why cultures chose specific religious elements over their counterparts in syncretic scenarios. Reviewing primary and secondary sources analyzing the religious characteristics and atmosphere of this period revealed that there was a pattern to syncretism and religious selection in Spanish Latin America. Europeans, Indigenous Peoples, and Africans in the New World selected religious elements based on three factors: survival, power, and resistance. This paper shows that religious elements in this region became“traits” which individuals employed to survive and prosper.

Beginning at 11:00 AM

KIRKHOF CENTER 1104

The Impact of Road Salts on Freshwater Systems and the Alternatives to Road Salt

Presenter: Hailee Lamorandier
Mentor: Griff Griffin

Sodium chloride-based road salt has been used as early as 1938 to de-ice the roads in the United States. De-icing is crucial for the safety of drivers, but can have negative impacts on the water quality of freshwater systems. While sodium chloride is a naturally occurring compound, rock salt being added to roads has increased sodium chloride numbers to harmful levels in wetlands and waterbodies. Alternatives to road salt are beet juice, sand, and salt brine (liquid salt). They all reduce the amount of sodium chloride entering bodies of water. Beet juice is broken down by microorganisms and can decrease oxygenin the water. Salt brine has the same negative effects as rock salt but adheres to the road more than typical solid crystals do. Sand does not melt ice chemically, but friction from the sand prevents buildup of ice on the road. However, sedimentation occurs and can cause the gills of fish to become clogged, smothering them. Each alternative to sodium chloride-based road salt can have negative effects on the surrounding ecosystem.

KIRKHOF CENTER 1142

Get Your Hike On

Presenters: Rosemarie Aquino, Aubrey Meindertsma, Jillian White, Emmerika Ziegler
Mentor: Dawn De Vries

This presentation will cover the benefits of outdoor adventure interventions, such as hiking and kayaking, for individuals with a traumatic brain injury.

KIRKHOF CENTER 2201

Michigan Tourism Trends

Presenters: Nathanale Cser, Logan MacGregor, Samuel Townshend
Mentors: Patty Janes, Sango Otieno

Convention and Visitor Bureaus from around Michigan sent surveys to their visitors in 2020 and 2021. We were tasked with the goal of analyzing a data set of over 15,000 observations to identify where certain (if any) demographics place their importance (e.g. Activities, Nightlife, Dining). Additionally, we rank destinations visited based on the performance ratings and assess using a significance test whether some subgroups have preffered destinations. Our ultimate goal is to appropriately market destinations to the demographics they best correlate with in an effort to prevent loss of tourism value. *This project is part ofthe STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting.*

KIRKHOF CENTER 2259

Organizational Research

Presenter: Malik Robinson
Mentor: Jamie Langlois

Organizations are at risk of creating a space between them and the people served. Almost half (forty-nine percent)

of all chief executives reported not having the right board members to establish trust with the communities they serve, and only a third of boards (thirty-two percent) prioritize knowledge of the community served (Wallestad, 2021). With this project, we will analyze the dynamics and culture of a nonprofit board and its navigation through leadership positions to be more inclusive. From research and analysis, I developed a case study investigating the dynamics and culture of a nonprofit board with leadership by interviewing the executive director and the board to analyze how the board functions with a rotating leadership position and how it impacts the culture and power dynamics of the board. The decisions made by the board impact the target population. Not being able to establish trust is significant evidence of a disconnect between the board as leading the organization and the people they are trying to serve. We encourage boards to look at the bigger picture by convincing nonprofit boards to focus on equity and inclusion within their organization and represent each voice within the board.

KIRKHOF CENTER 2270

Trauma-Informed Care Training for Officers

Presenter: Martina Anderson
Mentor: Jamie Langlois

Every day, police officers across the country serve and interact with individuals who have experienced one or more traumas, often during a traumatic event. Trauma exposure to individuals is recognized as a major public health priority with widespread consequences, including anger, depression, risky behaviors, substance use, and increased law enforcement involvement. With this project, I aim to provide Grand Rapids Police Department officers with training on trauma-informed care. From my research and analysis, I have provided training that requires officers to understand trauma and adverse childhood experiences, and apply trauma-informed principles to their work. Trauma-informed training better equips police officers to work with vulnerable populations. This project focuses on policing approaches. It is time to adequately train police with trauma-sensitive skills to improve interactions for the individuals they serve.

Beginning at 11:30 AM

KIRKHOF CENTER 1104

Potential Energy Provided from Solar Panels on the Rooftops of Grand Valley State University's Main Campus Buildings in Allendale, Michigan

Presenter: Hannah Schafer
Mentor: Griff Griffin

The purpose of this research is to find out how much of Grand Valley State University's power could be generated from solar panels on the rooftops of GVSU's campus buildings. Measurements of the area of rooftops on campus that would allow solar panels to be stationed on were taken from Google Maps. The amount of energy the solar panels could generate was calculated on a monthly basis in 2022 using the PVWatts Calculator. The energy the solar panels could generate was compared to the amount of energy that is needed to provide Grand Valley's campus with power in each month of 2022. Energy provided from these solar panels varies each month due to factors such climate, latitude, tilt, and orientation and angle of the solar panels. The average number of cloudy and sunny days in each month, as well as the orientation of the panels are factored into the solar calculator. The average amount of power the solar panels will provide Grand Valley's campus with will range from 15-25%

depending on each month in 2022.

KIRKHOF CENTER 1142
The Power of Play for Siblings
Presenters: Sydney Hain, Emma Sanderson, Sarah Smith
Mentor: Dawn De Vries

Siblings of pediatric cancer patients can experience a range of negative emotions from the moment their sibling is diagnosed, and throughout their course of treatment. Psychological symptoms such as increased anxiety, grief and decreased self-esteem can all be treated by recreational therapists through the use of play as an intervention. This study explores how therapeutic use of play can address the needs of these siblings, and what techniques and strategies lead to most effective outcomes.

Beginning at 12:00 PM

KIRKHOF CENTER 1142
The Use of Aquatic Therapy in the Reduction of Falls for Older Adults
Presenters: Madelynn Hickey, Chloe Sabo, Anna Schnyders
Mentor: Dawn De Vries

The purpose of this research is to determine if aquatic therapy has a positive effect on the daily lives of older adults. Aquatic therapy is an intervention used by Recreational Therapists to improve balance, functional skills, and overall quality of life in their patients. Our research seeks to address what benefits aquatic therapy has for older adults.

KIRKHOF CENTER 2266
Analysis of Clinical Efficacy: A Personality and Trauma Knowledge and Attitudes Review
Presenters: Ella Beringer, Cameron Lindsay
Mentor: Joshua Bishop

The following research investigates the relationship between personality and trauma knowledge and attitudes among Social Work students at a moderate-sized midwestern university in the United States. Previous literature has not investigated this connection but provided context for how personality interacts with general knowledge, coping skills, learning, and trauma. All of these depicted significant correlations between trauma knowledge or attitudes and the Big Five Personality traits: extraversion, agreeableness, openness or imagination/intellect, conscientiousness, and neuroticism (McCrae and Costa, 1987). For the current study, personality was operationalized with the Mini International Personality Item Pool (IPIP) Scale (Donnellan et al., 2006). Trauma knowledge and attitude were measured using the Knowledge, Attitudes, and Practice of Trauma-Informed Practice (King et al., 2019). JAMOVI was used to determine the Pearson Correlation Coefficient and descriptive statistics (JAMOVI, 2022). Doing this, the researchers found few low positive significant correlations between various personality traits and trauma knowledge and attitudes, specifically agreeableness and openness or imagination/intellect. Conscientiousness displayed a low negative significant correlation with trauma knowledge. *Keywords:* Personality, Trauma Knowledge,Trauma Attitudes, Social Work

Beginning at 12:30 PM

KIRKHOF CENTER 1142

Multidimensional Models of Personality: How Healthcare Providers can use Assessments to Provide Holistic Care in a Clinical Setting

Presenter: Krista Davis
Mentor: Dawn De Vries

In the last few decades there has been a paradigm shift in the way personality disorders are assessed and diagnosed. Classic categorical models for personality, 3 clusters organized by common behaviors, are being replaced in favor of multidimensional models that divide personality into various traits domains and and assess functionality within each domain. With the publication of the Alternate DSM-5 Model for Personality in 2013 and adoption of ICD-11 in 2022, multidimensional models are starting to see implementation in clinical settings across the world. Although the new models offer a more holistic description of personality and functionality, clinicians are still in the early stages of determining how these models can be used and expanded to populations beyond personality disorders. In my research I looked at how certain assessments based on multidimensional models were being used in clinical settings and discussed how this may be used by recreational therapists (also known as activity therapists in mental health settings).

KIRKHOF CENTER 2201

Markov Chains and Mixing Times

Presenter: Adam Korte
Mentor: Jiyeon Suh

In an ongoing study by McNair and Suh, we are presented with an irreducible, aperiodic Markov chain as a model for the evolution of an algal system. This Markov chain converges to its stationary distribution. We are interested in the rate of convergence and the time required for the chain to get close to the stationary distribution. This time to achieve some predetermined closeness to the stationary distribution is called mixing time. Deriving bounds for the mixing time of a reversible Markov chain is straightforward, thanks to the simplicity of the spectral decomposition of reversible chains. The Markov chain presented by McNair and Suh is non-reversible. This presentation will explore the challenges of finding bounds for the mixing time of a non-reversible Markov chain, and the role of the eigenvalues of a transition matrix on the bounds for its mixing time.

KIRKHOF CENTER 2266

Positive Assortative Mating of Grand Valley's Tree Swallows and Their Corresponding Reproductive Success

Presenters: Michael Clark, Brianna Desappio, Grace Heaton
Mentors: Michael Lombardo, Sango Otieno

Positive assortative mating occurs when mates assort themselves based on similar characteristics (e.g., males with long wings mate with females with long wings). Negative assortative mating occurs when mates assort themselves based on dissimilar characteristics (e.g. males with long wings mate with females with short wings). We analayze Tree Swallow data collected around Grand Valley to determine if there is evidence for positive assortative mating for several physical characteristics (e.g., mass, wing length, tail length) in Tree Swallows, and if positive assortative mating associated with measures of reproductive performance (e.g., timing of egg laying, the number of eggs laid,

the number of offspring that successfully leave the nest). *This project is part of the STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting.*

Beginning at 1:00 PM

KIRKHOF CENTER 1142

Spinal Cord Injuries and Aerobic Exercise

Presenters: Abby Haney, Grace Ottinger, Rachel Paulsen, Sandra Sanchez-Lagunas
Mentor: Dawn De Vries

Aerobic exercise holds many physical benefits and can produce positive effects in adults with spinal cord injuires.

KIRKHOF CENTER 2270

Damming, Deluge, Degradation and Displacement: The Relationship Between Hydroelectric Infrastructure and the Poor and Indigenous

Presenter: Coltrane Bodbyl-Mast
Mentor: Chad Lingwood

This presentation will focus on the relationship between hydroelectric infrastructure and impoverished and/or indigenous populations from several worldwide examples. The Klamath dams in the West Coast US, the Kinzua in the Allegheny region of Pennislyvania, dams on the Missouri, the Itaipu in Brazil, the Aswan in Egypt, and the Ilisu in Turkey will all be discussed; due to time constrants, the presentation may be limited to one or two of these regions. The main question of this project is the degree of intentionality in the respective states' actions against their indigenous/minority populations. Other questions ask how they (the states) interface with potiental confrontions, and how these dams are confronted by the non-Indigenous.

Beginning at 1:30 PM

KIRKHOF CENTER 2259

Profiles of Michigan State Park Campground Visitors based on 2019 and 2020 Surveys

Presenters: Malachi Daniels, Keagan Fisher, Chance Kramer, Jacob Pohl
Mentors: Patty Janes, Sango Otieno

The data were collected by an online survey sent out to all visitors of the campgrounds under Michigan's Department of Natural Resources. Data analysis to find factors that are conducive to positive experiences for campers is performed. The findings will assist the DNR in developing key factors that result in happy campers, for example, used to foster an environment more enticing to younger campers. This would help create a new generation of campers to enjoy everything the Michigan State Park system has to offer. *This project is part of the STA419 course designed to provide students with an opportunity to gain experience in statistical consulting.*

KIRKHOF CENTER 2270

Profiles of Michigan State Harbors/Marina Visitors based on 2020-2022 Surveys

Presenters: Talumba Chitaya, Emma Loveland, Alexis Studabaker
Mentors: Patty Janes, Sango Otieno

The data were collected by an online survey sent out to all visitors of the harbors/marinas under Michigan's Department of Natural Resources. In 2020, the survey was sent to 15,545 parties who registered, and 1,414 parties responded, while in 2021, the survey was sent to 23,919 people who made reservations and 2,275 responded, and in 2022, 1,656 responded from 22,511 that made reservations. Data analysis to find factors that are conducive to positive experiences for harbor/marina visitors is performed. The findings will assist the DNR in developing key factors that result in satisfied visitors, for example, used to foster an environment more enticing to younger boaters, helping create a new generation of boaters to enjoy everything the Michigan Harbor and Marina system has to offer. This project is part of the STA419 course designed to provide students with an opportunity to gain experiencein statistical consulting.

Beginning at 2:00 PM

KIRKHOF CENTER 1104

Factors that Contribute to Highly Impactful Nature Center Field Trip Experiences for K-6th graders

Presenter: Kalie Pathuis
Mentor: Griff Griffin

Nature centers are an invaluable community asset that have a unique function in serving as outdoor classrooms. They allow students to experience nature at a deeper level which can have lifelong benefits. The impact a nature center field trip can have on students compared to a traditional classroom setting has been studied using pre- and post-visit interviews, surveys, self-reported behavior, and comparative test scoring. School field trips have been linked to improved science literacy and attitudes toward biodiversity as well as physical and mental health benefits. Children who visit nature centers are more likely to demonstrate environmentally friendly actions in their home. Furthermore, students who view live animals at a nature center are more likely to correctly describe and identify those animals in the future.The focus of this paper is to explore the benefits of these unique field trip experiences and provide information for educators to use while designing nature-based educational programs that meet Michigan’s K-6 state standards.

KIRKHOF CENTER 2201

Profiling Michigan State Park Campground Visitors From a 2022 Survey

Presenters: Ian Curtis, Adam Korte, Ty Rau
Mentors: Patty Janes, Sango Otieno

This project involves data collected by the Michigan's Department of Natural Resources (DNR) in a 2022 online survey sent to overnight visitors at Michigan state parks and campgrounds. Exploratory and inferential data analysis, including various maps of camper origin and destination, are performed and created to profile parks by campers’ positive experiences. The trends discovered will help the Michigan DNR to identify why campers visit

parks, where they come from, and the activities they do there. This will lead to improving the environment of state parks to entice campers from all over the state, especially younger campers who are creating a new generation of camping trends. *This project is part of the STA419 course designed to provide students with an opportunity to gain experience in statistical consulting.*

KIRKHOF CENTER 2266

Impact of Hybrid Clinical Simulation Labs on the Student's Confidence Levels and Professional Competencies of Dysphagia

Presenters: Peter Frenette, Bradley Monarch, Aidan Pittenger
Mentors: Srihimaja Nandamudi, Sango Otieno

Dysphagia is a swallowing difficulty that occurs to any individual in the lifespan especially seen in older adults. Data from multiple labs designed to help graduate students develop and improve clinical competencies in dysphagia management at a Mid-West University in 2021 and 2022 were analyzed to determine whether the labs offer a positive impact on the student's understanding of dysphagia and professional competencies. Using Cronbach's Alpha, we assess if the questions on a scale from 1-5 can be collapsed into a single score for each subscale and thereafter investigate to see if on average the participants had more improvement within the year and if the magnitude of improvement differs between the two years. This project is part of the STA-419 course designed to provide students with anopportunity to gain experience in statistical consulting.

Beginning at 2:30 PM

KIRKHOF CENTER 1104

Predicted Effects of Climate Change on Endangered Felidae Species

Presenter: Kaley Filiccia
Mentor: Griff Griffin

Climate change has always influenced our planet. However, with climate change accelerating at unprecedented rates it is difficult for species to adapt quickly enough. Wildlife species can adapt, move, or go extinct. This research is looking at the modeled effects of climate change on the Snow Leopard, Siberian Tiger, Bengal Tiger, and Jaguar. Felidae species such as the Snow Leopard or the Siberian Tigerare vulnerable to climate change because of their habitats. Snow Leopards live in high-alpine areas above the treeline and Siberian Tigers live in mangroves susceptible to flooding. For Snow Leopards, their Himalayan habitat is at risk because the treeline is predicted to shift but refugia can be seen in China. The Bengal Tiger habitat is facing threats in Bangladesh due to flooding. The Siberian Tiger population will remain constant if habitat conditions stay the same but could go extinct under high climate scenarios.Compared to climate change Jaguars face issues primarily with poaching and deforestation. Regardless of what their largest threat is, large predators are vital to the Earth's ecosystems. They are part of a fully functioning healthy ecosystem.

KIRKHOF CENTER 2259

Overview of Camping in Michigan in 2021

Presenters: Julia Curtis, Brad Reame, Nolan Vander Wall
Mentors: Patty Janes, Sango Otieno

This project involves data collected by the Michigan Department of Natural Resources (DNR) via an online survey sent to overnight visitors at Michigan state parks and campgrounds in 2021. Data analysis identifies factors that are conducive to positive experiences for campers. The findings will assist the DNR in developing key experiential components that result in satisfied campers. Using variables such as age, region, income, and gender, we were able to paint a picture of camping experiences in Michigan's parks. This project is part of the STA419 course designed to provide students with an opportunity to gain experience in statistical consulting.

Beginning at 3:00 PM

KIRKHOF CENTER 1104

Camping Regulations at State Parks Across Different Regions of the United States

Presenter: Emily Ignasiak
Mentor: Griff Griffin

The purpose of this research is to determine how regulations while camping at state parks differ across five regions of the continental United States (West, Midwest, Southwest, Southeast, and Northeast). Within each of the five regions, one state was randomly selected using a random generator and from that three state parks from each state were also randomly selected. The chosen states were California, Minnesota, New Mexico, South Carolina, and Delaware. Variables I looked at when assessing campgrounds located in state parks included size of the park, months of operation, availability of first-come-first-serve sites, reservation times, pricing of campsites, fee of park entry, length of stay requirements, cancellation policies, offered hookups on sites (water, electricity, sewage), number of cars per site, and RV to tent to car sites ratios. My goal is to identify the similarities and differences in state park regulations between tfive regions and within each state themselves.

Beginning at 3:30 PM

KIRKHOF CENTER 1104

Comparing Nitrogen, Phosphorous, and E. coli levels in Michigan Surface Waters Between 1998-2018

Presenter: Elizabeth Hudson
Mentor: Griff Griffin

The purpose of this study was to compare E. coli levels to nitrogen and phosphorus in Michigan's surface waters. Escherichia coli is a bacteria found in human and animal waste. It is widely used as an indicator species in surface waters to signal the presence of other pollutants. The presence of elevated nitrogen and phosphorus in surface waters is a known cause of algal blooms which can lead to low dissolved oxygen levels and fish die offs. The primary source of E. coli in the State of Michigan is agriculture. I expected to find high levels of nitrogen and

phosphorus where E. coli also exceeded safe levels due to runoff, where both liquid manure and fertilizers are commonly used. To determine if these variables are linked, I compared land use with water quality measurements that were collected across the state over 20 years. The results suggested that in agricultural areas, there is a strong association between E. coli, nitrogen, and phosphorus. Furthermore, the levels have changed over the 20 years of the testing. These findings reinforce the importance of managing agricultural runoff for the health of Michigan's waters.

KIRKHOF CENTER 2201

Molecular Determination of Branch Angle in Native Tree Species

Presenter: Noah Holkeboer
Mentor: Margaret Dietrich

Tree branch architecture is responsible for a tree's ability to transport water and support its limbs; such architecture is determined by genetic and environmental factors. Branch angle is a key factor in branch strength, an important consideration for both ecological study and practical forestry and agricultural applications. Previously, I contributed to the development of a photo-based technique for quantifying branch architecture to use in models of hydraulic efficiency and structural support. Here, I pursued the coding sequences of two genes involved with regulating branch angle, so as to further understand why species branch differently. *TAC1* is a gene involved in the phototropic response that promotes wide branch angles, while the *LAZY1* gene is involved in the gravitropic response that promotes narrow branch angles. These genes have been studied in cultivated and ornamental trees, but not in native trees. We examined them in seven native species via reverse transcription PCR using degenerate primers and DNA sequencing. Differences between species within protein encoding sequences or expression could explain the difference in branching architecture as previously quantified with our non-destructive method. These sequences also open the door for future research and analysis on the architecture of native tree species.

KIRKHOF CENTER 2266

"The College Experience": An Expose of Challenges Faced by Indigenous University Students in Nicaragua

Presenter: Bradyn Mills
Mentor: Paul Lane

The "college experience" for Indigenous students in Nicaragua does not include highly-resourced orientation events, stacks of free pizza, or a bubble of well-funded social and academic opportunities. Rather, for these students, the "college experience" means one thing: sacrifice. The trip to university might include days of intensive travel by both water and land. To attend, students must assimilate to a language and majority culture which are not their own, learn to use technology that had not been available in their remote communities, and reallocate time that was previously spent helping their families survive. The presented research was compiled from a series of in-country qualitative interviews with students from the Miskito, Mestizo, and Mayangna groups in which participants shared their experiences of encountering their country's dominant culture and the challenges associated with it. Students were also asked to share their educational journey leading up to university, comparing their home communities to their time in higher education. These findings, while specific in context, raise important questions about cultural identity formation throughout K-12 education and how this influences the cross-cultural encounters at the university setting.

Beginning at 4:00 PM

KIRKHOF CENTER 1104

Dune Erosion, Coastline Erosion, and Vegetation Loss in the Nordhouse Dune Wilderness andLudington State Park (NRM Capstone Presentation)

Presenter: Zane Leslie
Mentor: Griff Griffin

The objective of this study is to quantify and analyze the changes in vegetation, dune systems, coastline movement, and water levels near Mason County, Michigan, over time. This research is focused on the impact of natural and human-induced processes on the coastal ecosystems of Ludington State Park and the adjacent Nordhouse Dunes Wilderness. Using data collected in ESRI's Wayback Imaging, Google Earth Pro, and Earth Explorer, then processed with ArcGIS Pro, the results show that the shoreline and dune areas have experienced significant erosion over the period of 1985-2022 due to more severe weather patterns and dramatic peaks in water levels, while hikers and beachgoers affected the dune vegetation. This study can inform management efforts in Ludington State Park and can help assist managers in understanding the current impact of hikers.

Beginning at 4:30 PM

KIRKHOF CENTER 2201

Let's get Back to Moving; Time to Rebuke the Sedentary Lifestyle that our Educational System is Reinforcing

Presenter: Jessie Webb
Mentor: John Kilbourne

In recent years, as many may have noticed, the emphasis placed on test scores is increasing at escalating rates, while the time dedicated to the physical movement in our schools is diminishing. This is problematic because daily physical movement is a necessity, and with such long school days oureducational system needs to place greater value on the incorporation of it. Every child, and every adult has a right to being given time specifically dedicated to physical movement. Every individual should be getting a minimum of 60 minutes a day. With that said, there is growing concern over the sedentary lifestyles in which many Americans are living. Unfortunately though, our educational system is reinforcing this concerning lifestyle. Sedentary lifestyles are really a death sentence, and so those in our educational systems need to evaluate and consider flipping the script in order to rewrite our stories. In this presentation I will detail the importance of including physical movement daily throughout all levels in K-12 by exemplifying how these changes improve an individual's mental health, ability to focus in the classroom, academic performance, and attitude towards school, as well as overall benefits for all students.

Find instructions on how to access Live Virtual and recorded presentations on our website.

Poster Presentations, Abstracts & Schedule

HENRY HALL ATRIUM 001

Investigating Best Practices for Engaging Chemistry Students in Online Learning

Participants attending 4:00 PM - 5:00 PM
Presenter: Megan Smith
Mentor: Jessica VandenPlas

This project investigated two online delivery methods to identify how to best support student learning. Students were grouped based on chemistry background and took part in one of two content lessons appropriate to their experience. These two content groups were then divided based on delivery method: asynchronous or synchronous. Participants completed a pre- and post-test around the lesson, with only content delivery method differing within groups; asynchronous students watched a video lecture, while synchronous students participated in a real-time lecture online. Both quantitative and qualitative data were collected. While student test scores improved pre-post, no statistical significance was seen in this pattern based on content delivery method. Qualitative data showed that students care more about teaching *style* rather than *modality*. This research suggests that instructors cannot be the same teacher they are in person as they are online, regardless of delivery method.

HENRY HALL ATRIUM 002

'Ruff Start': Animal-Assisted Therapy in Juvenile Corrections

Participants attending 11:00 AM - 12:00 PM
Presenter: Makenzie Griffin
Mentor: Dawn De Vries

This presentation will discuss animal-assisted therapy in juvenile corrections and the recidivism rates after introduction to programming.

HENRY HALL ATRIUM 003

Family Education and Autism Spectrum Disorder- How Recreational Therapy can be the Bridge

Participants attending 10:00 AM - 11:00 AM
Presenter: Kathryn Thornton
Mentor: Dawn De Vries

This presentation will discuss what family education is, the impact it has for families with children with Autism Spectrum Disorder (ASD), and the role Recreational Therapy plays in delivering this intervention.

HENRY HALL ATRIUM 004

Are We Done Yet?

Participants attending 10:00 AM - 11:00 AM
Presenter: Zoe DeHaan
Mentor: Dawn De Vries

Thus far, we have spent a quarter of our lives learning on a weekly basis. We start our lives by initiating brain

connections through our learning. Dementia is a series of weakened brain connections. By strengthening these connections, can dementia symptoms be lessened?

HENRY HALL ATRIUM 005

A Daily Dose of Iron

Participants attending 10:00 AM - 11:00 AM
Presenter: Emily Shaffer
Mentor: Dawn De Vries

This presentation will talk about the effects of therapeutic golf programs on the quality of life of stroke patients. It will look at the physical, psychological, and social health domains and how golf is beneficial for these individuals.

HENRY HALL ATRIUM 006

Family Education, Acquired Disabilities, and Recreational Therapy: The Triangle of Success

Participants attending 10:00 AM - 11:00 AM
Presenter: Madisyn Bunke
Mentor: Dawn De Vries

This presentation will break down the barriers that families face when their child acquires a physicaldis ability and how Recreational Therapy can provide direction and assistance. It will discuss ways parents can ensure they are receiving the proper education to adapt to their changing lifestyles.

HENRY HALL ATRIUM 007

"Teachers and Trauma Informed Care Education"

Participants attending 12:00 PM -1:00 PM
Presenter: Citlali Morales
Mentor: Jamie Langlois

In the United States, millions of youth migrants contribute to the culture of what is known as America. People who migrate to the United States suffer trauma due to the risks and dangers they've experienced in their country. Existing initiatives, such as UDHR, ensure the ability to provide equal opportunity in education. Research from the Sanctuary Institute establishes that teachers working with traumatized students require knowledge of trauma-informed care. The importance of being equipped with skills can enable the reconciliation of past traumas, the key that can help youth successfully resettle. This project,"Teachers and Trauma Informed Care Education," aims to provide training and resources on trauma to East Kentwood High School educators. The end goal is that, in the long run, all schools will accept and gain the support of the Sanctuary Institute and work towards becoming a Sanctuary agency.

HENRY HALL ATRIUM 008

Sphere of Influence: Batteries

Participants attending 2:00 PM - 3:00 PM
Presenter: Seth Lucas
Mentor: Ramya Swayamprakash

Batteries contain toxic chemicals including cadmium, lead, lithium, and more. When not properly recycled, these chemicals can leak out of the batteries and into Earth's soil and water. Cancer, kidney failure, brain damage, and countless others health risks are possible from over-exposure to these toxins.

Throughout all of grade school, I was never told about how batteries can negatively affect our environment. I threw away a large number of batteries over the years. I want recycling batteries to become a commonplace task that everyone learns to do as they grow up.

I use a controller that goes through an average of two batteries per week. My three roommates use the same controllers as well. Convincing them to recycle with me saves eight batteries per week which might not sound like much, but over time, it begins to add up. 416 batteries that could leak toxins are saved from going to the landfill after a year. Other options I explore include rechargeable batteries and advancements in electric car technology.

HENRY HALL ATRIUM 009

Is Body Modification Related to Deliberate Self-Harm? A Meta-Analytic Review

Participants attending 12:00 PM - 1:00 PM
Presenter: MJ Hosep
Mentor: Naomi Aldrich

After 40 years of clinical evaluation, the magnitude of individuals' engagement in deliberate and intentional self-injury (e.g., cutting, burning) with the absence of suicidal intent (Nonsuicidal Self-Injury; NSSI), was recognized as "a condition for further study" rather than a symptom associated with a diagnosis (DSM–5; 2013). Although prevalence rates are highly variable between studies, investigations of NSSI within clinical (~40%) and non-clinical (18%) populations suggest that intentionally damaging one's own flesh— without trying to end one's life— is a worldwide mental health concern for today's youth (Zetterqvist et al., 2020). Although some individuals may engage in body modification behaviors (e.g.,tattooing, body piercing) as an outlet for self-injurious tendencies, the DSM-5 excludes certain socially sanctioned behaviors from the diagnostic criteria. Within the last decade, research concerning NSSI and body modification has increased. Thus, the current investigation seeks to bring together this literature through meta-analysis. Findings from this study may call into question the exclusion of some behaviors from the DSM-5's NSSI criteria, potentially increasing awareness of different forms of self-harm.

HENRY HALL ATRIUM 010

Committing to Reducing Macroplastic Pollution in the Great Lakes

Participants attending 9:00 AM - 10:00 AM
Presenter: Noah Gerhard
Mentor: Ramya Swayamprakash

This research project explores the importance of environmental sustainability within the Great Lakes area and why keeping them free of plastic pollution is vital. Specifically, macroplastic pollution, such as water bottles and bags,

in the Great Lakes is a critical area of my concern. Wildlife can confuse this type of plastic for food, resulting in them not getting proper nutrition. The Great Lakes are essential because over 40 million people rely on them for a stable, clean water supply. They are home to a very biodiverse ecosystem that impacts all surrounding populations. Reduced biodiversity in the Great Lakes can have a cascading negative effect on local communities. The outline of my plan of action to lessen this pollution involves advocating for more robust policies and regulations with local and national representatives. It is critical to highlight local organizations' and communities' roles in promoting sustainability. This also includes getting involved in local beach clean-up efforts to mitigate the number of macro-plastics on our shoreline. The Great Lakes feed off into the Atlantic ocean; we must maintain their health to ensure an environmentally sustainable future.

HENRY HALL ATRIUM 011

Effects of Postpartum Depression on a Child's Emotional and Cognitive Development: A Systematic Review

Participants attending 9:00 AM - 10:00 AM
Presenters: Tessa Baker, Emma Ann Miller
Mentor: Chad Sutliffe

Purpose: The purpose of this poster was to identify the impact of postpartum depression (PPD) on the emotional and cognitive development of a child. **Objective:** Examine the effects of PPD on a child's emotional and cognitive development. **Background:** After birth, mothers can experience PPD. PPD is defined as "a depression commencing within six weeks of delivery and involves symptoms such as depressed mood, lack of interest in surroundings, lack of energy, insomnia, and low self-esteem" (Holm Larsen et al., 2019, p. 2). **Methodology:** An Interprofessional team of students sought to answer the question of the impact of PPD on a child's emotional and cognitive development. The team consisted of four undergraduate Allied Health Science professionals. Literature was reviewed for the effects of PPD on emotional competence, cognitive capabilities, and childhood development. **Conclusion:** PPD has a negative affect on children's development, specifically the emotional and cognitive aspects. Without interference, PPD can significantly alter the life of a child. A feasible way to help combat PPD is through early education of PPD symptoms, in addition to identifying those who are at risk.

HENRY HALL ATRIUM 012

Comparing Pubic Arch Width and Gut Volume

Participants attending 11:00 AM - 12:00 PM
Presenter: Emma Long
Mentor: Natalie Laudicina

The pubic arch is an anterior structure at the bottom of the pelvis formed by the articulation of the hip bones. A wider pubic angle is linked to increased pelvic girdle pain. My research measures the pubic arch and how this angle may change in relation to increased mass (gut volume). 3D scans of 100 individuals (50 male, 50 female) were measured using Cloud Compare software. Each pubic arch was measured at three locations: superior, middle, and inferior widths. These measurements were then compared to each individual's gut volume. Comparisons will be analyzed through linear regression of logarithmic data to compare gut volume and the pubic arch at the three measured widths. Sex differences will also be analyzed in these pelves, allowing for further comparison of gut volume with pubic arch angle. This research is important because pelvic girdle pain has been previously linked to increased pubic arch width. Testing the relationship between gut volume and the pubic arch angle can offer information about the risk of pelvic girdle pain based on gut volume.

HENRY HALL ATRIUM 013

Aging Effects on Articular Cartilage at the Knee Joint

Participants attending 3:00 PM - 4:00 PM
Presenter: Mckenna King
Mentor: Natalie Laudicina

This research examines the aging effects at the knee joint. In particular, the space between the femoral and tibial condyles will be measured as a proxy for articular cartilage. CT scans of 80 individuals in four different age categories: young (20-30 years), adult (31-50 years), older adult (51-70 years), and elderly (71+ years) will be measured using CloudCompare 3D imaging software. Each age group will have 10 females and 10 males to examine if there are sex differences at the knee joint. We hypothesize that as an individual ages, the articular cartilage will deteriorate between the femur and tibia. The knee joint is essential for everyday activities (e.g., walking) but as we age, the forces put upon this joint can degrade the articular cartilage, causing pain and arthritis. However, there has been a lack of research in sex-specific changes in how the articular cartilage degrades over time. I am interested in contributing to rectifying this gap by studying not only cartilage degradation, but how it varies as we age and between the sexes.

HENRY HALL ATRIUM 014

Power of Communcation

Participants attending 3:00 PM - 4:00 PM
Presenter: Allison McGinnis
Mentor: Ramya Swayamprakash

Almost everything that I am voting for is counteracted by a large group of people with opposite beliefs, thus resulting in conversations that oppress one another's ideas and beliefs. A large piece that is missing to fix issues in the world involving environmental sustainability is the ability to have open conversations with one another and learning how to be comfortable in uncomfortable situations. At the end of the day I want to know that I am secure in what exactly I am voting for. This is not able to happen unless the public is able to bring in the concept of questioning authority to our lives. Actions that I am voting for are actions that I believe authorities are going to put into place. When these promises are not made it disadvantages certain communities that are depending on these actions. Communicating to one another and challenging the ideas and beliefs of ones around us brings new perspectives that may be needed to be looked at for certain issues, and we are able to bring people together and see any inequalities that may be happening around us that we turn a blind eye too.

HENRY HALL ATRIUM 015

Pain Management in Neonates and Newborns: Circumcision

Participants attending 11:00 AM - 12:00 PM
Presenter: Mikaela Crute
Mentor: Elizabeth Davis

Pain in neonates is widely misunderstood and believed to be near non-existent. However, research evidence demonstrate neonates do perceive pain similarly to adults, yet evidence indicates nearly half of painful procedures performed on neonates were completed without any analgesia or pain management. Standard of health of care protocols and procedures are essential to providing safe, quality care. This scholarly project provides a review of the literature and policies and their alignment to recommended standard of care practice related to neonatal

management. Focused on neonatal pain management during circumcision, variations were noted in both pharmacologic and non-pharmacologic analgesics used during circumcision. As a result, this project notes a lack of standardization in care for this vulnerable population.

HENRY HALL ATRIUM 016

Instagram Influencers: Self-esteem, Well-being and Women's Sexualization

Participants attending 10:00 AM - 11:00 AM
Presenter: Stephanie Warren
Mentor: Julia Mason

Self-esteem and sexualization are two categories highly relevant to the Instagram user experience. Research has previously examined how the social media app affects its average users, but the difference between an Instagram influencer's experience and an average user's experience has not yet been explored. This study focuses on this difference as well as exploring how Instagram impacts an individual's self esteem and well-being and how the sexualization of women may alter a user's content. Instagram influencers and average users will complete surveys regarding self-esteem levels and Instagram use, which will then be compared to their Instagram profiles to gain a better understanding of the impact the social media platform has on its users. The goal of this study is to acquire further knowledge about Instagram's impacts on women.

HENRY HALL ATRIUM 017

Lake Michigan and our Environmental Influence

Participants attending 9:00 AM - 10:00 AM
Presenter: Nicole D'Arienzo
Mentor: Ramya Swayamprakash

Lake Michigan is a one-of-a-kind ecosystem. During the winter the lake is partially frozen. In the summertime surrounding ecosystems enjoy the Mediterranean-blue lake with the bright sun. I want the ecosystem to thrive without the distraction of pollutants. For the next few weeks, I am going to conduct research that focuses on the percentage of the trash in the ecosystem that is recyclable. I will also use the trash that I picked up as a part of an art project I will create in hope to be featured in the GVSU *Fishladder*, a student-run publisher. To connect with Grand Valley, I will post QR codes around campus linked to a survey. Students and faculty will be asked to answer questions relating to their opinions about recycling and their recycling practices. This data will show how much our university community advocates for recycling and taking care of our environment. Through my research project and recycling advocacy, I hope to help Lake Michigan reach a goal of optimum environmental health.

HENRY HALL ATRIUM 018

NRP-cDcD: Outpacing Ethical Considerations

Participants attending 9:00 AM - 10:00 AM
Presenter: Jonathan McCabe
Mentor: Jeffrey Byrnes

There are two current methods that patients can be considered dead for organ procurement in the United States, donation following brain death and donation following circulatory death. However, with advancements in technology, lines are becoming blurred between when death is occurring and when organ procurement can begin. Normothermic regional perfusion (NRP) is a method used to increase the number of organs and the quality of them

in the donor pool but is in the process of being implemented without proper ethical considerations being taken into account. Although the efforts to increase the donor pool come from a place of great need, interventions, such as the ligation of vessels, cause ethical problems. Here, we will explore the literature surrounding NRP-cDcD and its implications in the real world.

HENRY HALL ATRIUM 019

Case Study of a Previously Healthy Patient After Acute Onset Seizure Resulting from Intracranial Hemorrhage Originating From Dural Arteriovenous Malformation Rupture: An Overview and Evaluation of Presentation and Recovery

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Connor Veen
Mentor: John Capodilupo

The aim of this research project is to examine the initial presentation, rupture, subsequent hemorrhagic stroke/ seizure, and complete recovery from a previously undiagnosed right temporal dural arteriovenous malformation (dAVM) in a previously healthy patient.

HENRY HALL ATRIUM 020

Mutational Analysis of Aminoglycoside Nucleotidylyltransferase-6 (ANT-6Ia) from *Bacillus subtilis*

Participants attending 2:00 PM - 3:00 PM
Presenter: Sofia Mansoor
Mentor: Brian Smith

Antibiotics known as aminoglycosides function by binding to the bacterial ribosome and inhibiting the essential process of protein synthesis. However, the efficacy of these drugs has been severely reduced due the rise of multidrug-resistant bacteria, a globally recognized problem. One mode of resistance is caused by bacterial enzymes that chemically modify aminoglycosides. The modified form of the antibiotic is unable to bind to the ribosome thus conferring resistance to these drugs. The modification enzyme, aminoglycoside nucleotidylyltransferase-6Ia (ANT-6Ia) functions by adding an adenylylate (AMP) from ATP to position 6 on the aminoglycoside streptomycin. Although the structure of the apo enzyme has been determined, many details concerning the mechanism of ANT-6Ia are unknown. Using amino acid sequence alignments of other related ANT enzymes and the ANT-6Ia structure as guide, several amino acid residues were selected for mutational analysis. MIC analysis demonstrated that many of the mutant strains exhibited growth defects in the presence of streptomycin compared to wild-type, suggesting that these residues are important for ANT-6Ia activity. Furthermore, kinetic characterization of variants S89A and Y113A suggests that S89 functions primarily in streptomycin binding whereas Y113 likely serves a general role in stabilizing the structure of the active site.

HENRY HALL ATRIUM 021

Serotonin and Its Effects on the Chronic Stress Response in Crayfish Following Nonylphenol Exposure

Participants attending 12:00 PM - 1:00 PM
Presenters: Nina Alpers, Madelyn Maurer, Tara Olen
Mentor: Daniel Bergman

Crayfish are a well-studied neurophysiological model and consequently are used to examine the mechanistic causes of neurophysiological stress. One potential stressor for aquatic species is nonylphenol, a hydrophobic chemical widely used in agricultural products and detergents that can pollute rivers, streams, and lakes. Nonylphenol is a known endocrine disruptor and can lead to physiological and behavioral impairments in crayfish. Long-term non-lethal exposure to nonylphenol likely induces chronicanxiety-like stress in crayfish. Stress is analyzed by observing behaviors like avoidance and shelter occupancy, and by measuring crayfish hyperglycemic hormone levels in the hemolymph. Previous research demonstrates that serotonin can modulate aggression and anxiety-like stress in crayfish. We, therefore, administered serotonin agonist and antagonist treatments to influence chronic stress levels of crayfish exposed to nonylphenol, with the intent to modulate their stress levels.

HENRY HALL ATRIUM 022

Popliteal Artery Responses from Pedaling Interruptions During One Hour of Seated Video Games

Participants attending 9:00 AM - 10:00 AM
Presenters: Garrett Falk, Madalyn Hickey, Gabriele Peters
Mentor: Nicholas Lerma

In the United States people played video games for an average of 7.5 hours per week, with competitive players accumulating up to 8 hours per day. Most time spent gaming is in a sedentary behavior which is linked to decreased musculoskeletal, endothelial, and cardiovascular health. Flow mediated dilation (FMD) is an objective measurement of cardiovascular health. The purpose of this study is to analyze the effect of sedentary behavior on endothelial response within the lower limbs through the use of FMD. Methods: College aged participants (age 20.7 ± 1.6 years) were recruited to participate in this randomized crossover study. Participants performed 60 minutes of seated first-person shooter video games on two separate visits with one visit interrupted with two 3-minute seated pedaling bouts. Before and after each gaming session the participant underwent a flow-mediated dilation (FMD) protocol on the lower leg. Vascular imaging of the popliteal artery was captured using a linear array ultrasound transducer. Arterial diameter (cm) and flow (cm3) were measured in MatLab and repeated measures ANOVA will be performed to determine differences by time and group. Results: Data collection and preliminary analysis are currently underway.

HENRY HALL ATRIUM 023

Measuring Microbialite Contributions to Lake Bottom Sedimentation in Fish Lake, Michigan, with Stable Isotopes

Participants attending 12:00 PM - 1:00 PM
Presenter: Adam Greve
Mentor: Ian Winkelstern

Unique microbialites (microorganism-made carbonate mounds) are found throughout shallow waters in Fish Lake,

Michigan. Their abundance indicates interactions between the local microbial ecosystem and water chemistry. Here we investigate the relationship between lake sedimentation and the activity of microbialites using a ~0.4 m core. We used sedimentological analysis of core material, XRD, and stable isotope analysis. XRD data from the core sample and microbialites collected from Fish Lake suggest that the relative composition of these two materials are identical. Both microbialites and core material are~100% calcite, suggesting a common origin. Core δ18O is largely constant, ranging from -8.76 to -9.24‰ VPDB. Bivalves collected from Fish Lake also overlap with this range, suggesting that the temperature at which all carbonate material is produced in the lake is broadly consistent. Core δ13C ranged from -6.0 to -4.9 ‰, while microbialite δ13C ranged from -4.8 to -3.0 ‰. This spread of δ13C values suggests that the majority of lake bottom sediments have been contributed by microbialites, but also that a significant contribution comes from other sources within the lake. These results will aid our understanding of how abundant microbialites can affect sedimentation and water quality in a small inland lake.

HENRY HALL ATRIUM 024

Equity in the Classroom for Individuals with Disabilities at Grand Valley State University

Participants attending 9:00 AM - 10:00 AM, 3:00 PM - 4:00 PM
Presenter: Abagail Boyd
Mentor: Beth Macauley

This project identifies areas of equity and inequity for students with disabilities at Grand Valley State University (GVSU) pertaining to their ability to complete their degrees. GVSU has a history of being at the forefront of accommodations with their creation of the LINKS program for students with Autism Spectrum Disorder and their policies on assistance in the classroom. However, it is not known whether these accommodations offer students with disabilities an equitable opportunity for academic success. To obtain this information, a survey on equitable treatment including access to classrooms, helpfulness of accommodations, the flexibility of faculty, and use of Blackboard was sent anonymously to a random sample of GVSU students, targeting those who have registered with Disability Support Resources. Results were compared across all students with disabilities as well as within individual disabilities in each area of interest. Data revealed that a majority of DSR registered students are content with the level of educational equity that they receive at GVSU. However, DSR satisfaction tended to be significantly lower, especially for questions related to achieving more group-related, interactive goals. Based on the results, recommendations were proposed for DSR to increase the accessibility of their services, as well as encourage self-advocacy skills.

HENRY HALL ATRIUM 026

Raspberry Pi Based Computing Prototypes: Design, Implementation and Performance Analysis

Participants attending 4:00 PM - 5:00 PM
Presenter: Marissa Gonzales
Mentor: Beth Macauley

Nowadays, in Internet of Things (IoT) applications, IoT devices generate and gather data. These data can be handled in different ways. They can be processed by IoT devices directly, by the Cloud, or by the edge servers. In recent years, Raspberry Pi has been developed as a small IoT device for many applications. In this paper, we design and implement various computing models, e.g., Cloud Computing, Edge Computing, and computing on IoT devices, using Raspberry Pis as prototypes. We deploy multiple applications, run hands-on experiments, and analyze the results accordingly. We also compare the performances of these different computing paradigms, and

take advantage of the parallel processing capability of Raspberry Pi devices to demonstrate the effectiveness of improving the prototype performance.

HENRY HALL ATRIUM 027

Small Solutions for Big Data: Compressed Sparse Fiber (CSF) Matrix Compression

Participants attending 3:00 PM - 4:00 PM
Presenters: Skyler Ruiter, Seth Wolfgang
Mentor: Zachary DeBruine

Large amounts of data take time and money to store, process, and compress. As data grows exponentially, we need better, cheaper tools to store and process it. The Compressed Sparse Fiber (CSF) format is a way to take advantage of naturally redundant data and store it in a usable way. CSF works very well with redundant data, so much so that preliminary testing shows that we can beat common alternative formats in memory footprint by up to 50%. Our implementation of CSF has variable compression levels that give the user options to lower this footprint even further at a small performance cost. Through our benchmarking we will collect data on the performance and data usage of our CSF format versus other popular, open-source alternatives, such as Compressed Sparse Column. CSF offers a novel solution to storing large amounts of data at little performance cost allowing otherwise bottlenecked systems to solve problems with large amounts of data.

HENRY HALL ATRIUM 028

Social Justice Begins With Me! Gender Equity

Participants attending 10:00 AM - 11:00 AM
Presenters: Jennifer Brugger, D'Angelo Starks
Mentors: Jamie Langlois, Paola Leon

Scholars such as Rudine Sims Bishop have reported the importance of literature as windows that lead the reader into the outside world, sliding-glass doors that open new worlds for readers, and mirrors in which readers see themselves reflected. In regard to gender equity, it is important for children to see themselves and the positive gender messages reflected in the books they read, specifically positive female and LGBTQ+ messages. Our short-term goal of Social Justice Begins With Me! Gender Equity is to participate with Grand Valley State University School of Social Work and Grand Rapids Public Library to review ten children's books and choose five books that address Gender Equity for ages 4-5 and 6-8. We will also review two youth books and choose one book that addresses Gender Equity for ages 9-11. The long-term goal is for the Grand Rapids Public Library to use the chosen books in their Fall 2023 children's bookclubs, accompanied by handouts we provide, to continue the conversation and answer children's questions about gender equity at home. This library program will support families in family conversations that may be uncomfortable for them to have with their children regarding gender equity.

HENRY HALL ATRIUM 029

Social Justice Begin With Me Book Club: Immigration

Participants attending 4:00 PM - 5:00 PM
Presenters: Terra Owsley, Haley Page
Mentors: Jamie Langlois, Paola Leon

In Michigan, one in ten children come from immigrant families. There are about 33 students per classroom in

the state, meaning that there are on average three immigrant children in each Michigan classroom. Classroom discussions of social justice topics such as immigration are important because these topics affect children's daily lives. This project, in partnership with the Grand Rapids Public Library, aims to bring awareness of social justice topics to children and families within the community. We are collecting books that support the exploration of social justice topics that may then be used for the Social Justice Begins with Me book club in the fall. By helping to make these books available, we are encouraging children and their families to explore these topics together and increase public awareness about the diverse populations within our society. Our project aims to encourage inclusiveness in our local community of Grand Rapids. It's time we come together as a community to learn about and embrace our differences.

HENRY HALL ATRIUM 030

In the Care of Others: Alzheimer's and Dementia Education

Participants attending 3:00 PM - 4:00 PM
Presenter: Michaela Owen
Mentor: Jamie Langlois

48% percent of nursing home residents and 42% of assisted living residents are living with Alzheimer's Disease or another form of dementia. Only 23 states require dementia training for staff in nursing homes specifically, excluding any requirements for all other forms of assisted living for the geriatric population. With my project, In the Care of Others: Alzheimer's and Dementia Education, I will gather vital information surrounding Alzheimer's Disease and dementia from both previous training methods and new research that is critical for caregiving staff to know. From the research and collaboration, I will design an educational tool to utilize for training purposes at my current employment, Yorkshire & Stonebridge Manors, an assisted living facility. With the overwhelming staffing crisis in most geriatric facilities, caregivers and other staff are not receiving proper and essential training for Alzheimer's and other forms of dementia as seen in the residents that they care for. Through the creation of this educational tool, I will have the opportunity to educate and inform staff about caregiving for those with Alzheimer's or another form of dementia. It is time to provide this vulnerable population with the educated and purposeful care they need and deserve.

HENRY HALL ATRIUM 031

Social and Emotional Learning for Cognitively Impaired Youth

Participants attending 3:00 PM - 4:00 PM
Presenter: Katelyn Fauska
Mentor: Jamie Langlois

Cognitively impaired students often have problems making connections with peers, which leads to increased feelings of loneliness and emotional distress. The barriers that are present for these students when it comes to making peer connections are directly correlated to their current social and emotional skills. With my project, "Social and Emotional Learning for Cognitively Impaired Youth," I will be working to conduct research and needs assessments to help find a social and emotional curriculum that will better serve cognitively impaired students and help them grow in this knowledge. From the research and collaboration, I will find a curriculum that is a better fit and help find the funds to provide these resources for my school. Cognitivitely impaired students often go unnoticed because of their lack of voice for themselves and their apparent struggles with their disabilities. The hope of this project is to give these individuals a voice and help them to receive the same care and education that their peers receive. It is time for the needs of these students to be heard and respected.

HENRY HALL ATRIUM 032

The Stability and Physical Properties of Compartment Models Through Liquid-Liquid Phase Separation

Participants attending 2:00 PM - 3:00 PM
Presenter: Julia Malysh
Mentor: Fatma Pir Cakmak

Diverse biological processes require a spatial organization to sustain processes necessary for life.[1] The modern cell itself includes other compartments such as organelles with functions ranging from sequestering biomolecules to spatiotemporal reaction control. Compartmentalization is one of the fundamental properties for creating protocell and synthetic cell models. Creating compartment models could help generate microreactors to synthesize and deliver drugs, mimic intracellular signaling cascades, and exhibit collective behaviors. Mimicking one of the cell's fundamental properties using compartments provides a bottom-up approach to model cells and study diverse functions.[2] Taking advantage of self-assembly of biopolymers through liquid-liquid phase separation (LLPS), functions of compartments, and regulation of various types of biological tasks that could be mimicked in vitro cell models. Coacervation can be achieved by using oppositely charged molecules and/or by a change in the solvation of a biopolymer. One or more macromolecules form a dense organic-rich phase with a macromolecule depleted supernatant phase in associative phase separation or coacervation. The macromolecule-rich coacervate phase is dispersed as droplets in the continuous dilute phase.[3,4] We are examining physical properties using fluorescently biomolecules studying diffusion rates and exploring the physical conditions including salt concentrations (Hoffmeister series anions), these compartments could stay stable.

HENRY HALL ATRIUM 033

Coping Skills for Youth at Risk

Participants attending 10:00 AM - 11:00 AM
Presenter: Emma Peake
Mentor: Dawn De Vries

This is a research based presentation that seeks to explore how coping skills education in schools can improve the mental health of at-risk students. This presentation details coping techniques that have proven to be effective in reducing mental health related issues in school-age youth who are experiencing poverty, isolation, family issues, trauma, and other life events related to living in an at-risk area.

HENRY HALL ATRIUM 034

Microwave Assisted Installment of Bis-acetal Protecting Groups onto Diols

Participants attending 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM
Presenter: Deacon Darling
Mentor: Matthew Hart

Bis-acetal compounds can be created with diols, and act as a protecting group. This protecting group installment allows the diol to undergo further reactions in a more selective manner. However, the traditional process of installing these protecting groups is energy-intensive and time-consuming. Therefore, there is a need for a more efficient synthesis method for the installment of bis-acetal protecting groups. One common method used to reduce reaction time in synthesis is microwave assistance. In this method, a microwave is used to increase the energy efficiency of reactions. Herein we report a method utlizing microwave assistance. Using this method, we can attach a protecting

group (2,3- tetra-methoxy butane) to a diol (1,2 cyclohexane diol). This greatly reduced both the energy and time required for this process compared to the traditional reaction, making the reaction less energy intensive and more practical for laboratory use.

HENRY HALL ATRIUM 035

Assessing the Aggregation Rate and Types of Aggregates Formed by the Functional Amyloid Kassinin

Participants attending 11:00 AM - 12:00 PM
Presenter: Lillie Waldron
Mentor: Laura Hawk

Protein aggregation, or the clumping together of proteins, to form amyloids is implicated in several diseases such as Alzheimer's Disease and Parkinson's Disease. This aggregation has several stages, progressing from isolated protein molecules (monomers) to small aggregates (oligomers), which are toxic to cells, and finally to large, string-like mature aggregates. Despite this association with disease, functional amyloids, which have normal biological functions, also result from protein aggregation. Kassinin, an amphibian peptide involved in nerve signal transmission, is a model system for functional amyloid study. To compare the aggregation of functional and disease-causing amyloids, we monitored the aggregation process of fluorine-labeled kassinin. We synthesized the fluorine-labeled kassinin through solid-phase peptide synthesis and purified the peptide by high performance liquid chromatography (HPLC). The aggregation was monitored by ^{19}F-NMR under various conditions including changes to temperature, pH, and additives. Examining the aggregation process of functional amyloids and contrasting with disease-associated amyloids will contribute to a clearer understanding of the disease process of protein aggregation-associated diseases.

HENRY HALL ATRIUM 036

Computational Insight into Cyclopropanation Catalyzed by Bis-Alkoxide Fe Carbene Complexes: Novel Carbene Coordination with Methyl Ester Substituents

Participants attending 2:00 PM - 3:00 PM
Presenter: Edison Browne
Mentor: Richard Lord

Organometallic catalysis with first row metals is a contemporary research topic due to those metals' high abundance and low toxicity. Recent experimental work in the Groysman group at Wayne State University showed that iron bis-alkoxide complexes serve as catalysts for cyclopropanation. Using DFT calculations, this work investigates the electronic and geometric structures, and associated energies, of one of those iron bis-alkoxide systems reacting with a hypervalent iodine ylide to form an iron carbene that reacts with styrene to give a tri-substituted cyclopropane product. Surprisingly, the calculations suggest that the carbene substituents (R = CO2Me) coordinate to the iron center instead of the carbene carbon, allowing radical character in the high-spin Fe(iii) / carbene radical anion species to be centralized on the metallacycle backbone. Work to date on this mechanism will be presented.

HENRY HALL ATRIUM 037

Synthesis of Novel Antibiotics to Treat Tuberculosis

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenter: Jonathan Bajko
Mentor: Matthew Hart

Tuberculosis (TB) is the second leading cause of death from infectious diseases worldwide. The WHO estimates that 10.6 million people fell ill with TB in 2021, 1.6 million of whom died. From 2020 to 2021, it is estimated that the worldwide number of cases has increased by 4.5 percent. The WHO's recommended current course of treatment requires four different drugs and takes 6 to 12 months to complete. Unfortunately, improper treatment of TB has led to drug-resistant forms of TB. This has increased the need for new novel treatments for TB. Previously, our group developed several novel Diphenyl Ureas (DPU) that were active against TB. This project is focused on synthesizing new DPU variations to test their effectiveness in treating TB infections. We are working to determine how changing the structure of our lead DPU may affect its biological impact on TB. The current targets include varying diamine chain links and the addition of fluorine. Herein, we report the synthesis of many of these novel DPUs.

HENRY HALL ATRIUM 038

Exploring Cross-class Inhibition of Key Antibiotic Resistance Targets in the Multidrug Resistant Pathogen *Acinetobacter baumannii*

Participants attending 12:00 PM - 1:00 PM
Presenter: Mary Fergus
Mentor: Rachel Powers

Multidrug-resistant *Acinetobacter baumannii* is an urgent threat level pathogen with resistance to β-lactam antibiotics, the most clinically relevant and effective treatment for bacterial infections. β-lactamases are the most widespread resistance mechanism to β-lactams, and *A. baumannii* possess all four classes of these enzymes (A-D). Designing a single molecule to inhibit multiple β-lactamase classes would be advantageous for treating this pathogen. Currently, there are no known cross-class inhibitors of class C and D β-lactamases. A novel series of boronic acid transition state inhibitors (BATSIs) were tested against the class C β-lactamase ADC-33 and the class D β-lactamase OXA-24/40 through competition kinetic assays. Of the compounds tested, all inhibited ADC-33, with K_i values between 0.35-2.44 μM, but none showed inhibition of OXA-24/40. The BATSIs were also tested against OXA-146, another class D β-lactamase that contains an alanine insertion near the active site which is similar to ADC-33. Overall, the BATSIs inhibited OXA-146 with higher affinity than OXA-24/40, suggesting that the alanine insertion in the class D enzymes impacts inhibitor binding. X-ray crystal structures may help elucidate the structural basis for inhibition and will provide insight into differences between class C and D β-lactamases that can inform optimization efforts for improved binding affinity.

HENRY HALL ATRIUM 039

Addiction Support

Participants attending 11:00 AM - 12:00 PM
Presenter: Allison Salas
Mentor: Jamie Langlois

"Individuals with a substance use disorder, the clinical diagnosis for an addiction, sometimes feel shame or internalize the disease as a moral failing due to a long-standing stigma associated with the disease of addiction"

(Buffo, 2023). What some may not know is that addiction is treatable. With the negative stigma around addiction, it leads to many people with an addiction that is not being treated. Individuals may feel this shame and moral failing which leads them to be scared to receive treatment or even talk about it. The goal of this project is to educate and talk about what addiction is, reduce the stigma, the myths vs. facts, local resources, and how one may help an individual who struggles with an addiction.

Buffo, J. (2023, January 25). *Addiction stigma*. DrugAbuse.com. from: https://drugabuse.com/addiction/stigma/

HENRY HALL ATRIUM 040

Multi-GPU Accelerated Nonnegative Matrix Factorization

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM
Presenter: Marc Tunnell
Mentors: Nathan Bowman, Erin Carrier, Zachary DeBruine

Non-Negative Matrix Factorization (NNMF) is a numerical method for the factorization of a fully positive matrix A into fully positive components W, D, and H. This type of factorization is used as a method of dimensionality reduction similar to that of principal component analysis; however, the components are easily interpretable. Current NNMF techniques are limited by the computational time to perform the factorization, an issue that is becoming increasingly exacerbated as the size of modern datasets continues to grow. To solve this issue, we have developed a CUDA implementation of NNMF with similar convergence properties to the current state-of-the-art implementation. To accomplish this, we have developed an efficient mathematical formulation of the problem that is highly conducive to GPU acceleration. For the optimization stage, we implement a GPU-accelerated Non-negative Least Squares approach. Benchmarking is ongoing and we expect this new implementation to be considerably faster than the current state-of-the-art for problems of large size.

HENRY HALL ATRIUM 041

Analyzing the Effects of Myocardial Infarction through Spatially-Resolved Single Cell Transcriptomics using Machine Learning Methods

Participants attending 12:00 PM - 1:00 PM
Presenter: Olivia Brumar
Mentor: Zachary DeBruine

Myocardial infarction is caused by one or more areas of the heart being deprived of oxygen when blood flow through the heart is blocked. This can cause permanent damage to the muscle tissue such as cardiac cell death, impaired signaling and the remodeling/rearrangement of remaining cardiomyocytes/myoblasts. By using Graph Convolutional Non-negative Matrix Factorization (GCNMF), this study compares spatially relevant cell type patterns to explore rearrangement caused by myocardial infarction. The NMF model is visualized using standard methodologies to gain qualitative insights into cell type ratios. Finally, a Gene Set Enrichment Analysis (GSEA) is used to break down the NMF factors by the genes that play the highest roles in factors of interest to analyze what biological processes may play a role in the rearrangement of the cells after a myocardial infarction. GCNMF, along with GSEA will reveal spatially relevant cell type patterns and rearrangements caused by myocardial infarction, and identify marker genes that play a role in the pathology of the disease.

HENRY HALL ATRIUM 042

Affective Lability Among College Students

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Erin Mangan
Mentor: Lawrence Burns

Previous research has sought to understand the occurrence of intense and fluctuating emotions, as well as the ability to manage these emotions and affective states. Respectively, these phenomena have been labeled as affective lability and emotion regulation and have often been studied among individuals diagnosed with BPD, ADHD, BD, and PTSD. We will expand upon the foregoing empirical research to explore the general tendency of affective lability and the capacity one has to self-regulate emotions among college students. In the present study, participants have completed three questionnaires that measure their level of affective instability, capacity to manage fluctuating affective states, and overall psychological well-being.

HENRY HALL ATRIUM 043

CAR T-cell Therapy Advances in Acute Lymphoblastic Leukemia

Participants attending 10:00 AM - 11:00 AM
Presenter: Ava Miller
Mentor: John Capodilupo

Chimeric antigen receptor (CAR) T-cell therapy is a type of immunotherapy that has been experimented with as a treatment for relapsed acute lymphoblastic leukemia (ALL). ALL is the malignant transformation and accumulation of lymphoblasts in the bone marrow and blood. Although chemotherapy has been a reliable treatment against ALL for many years, some patients still do not go into remission, or they relapse. In CAR T-cell therapy, T-cells are extracted from patients and genetically modified in a lab so that the CAR will be expressed. These new CAR T-cell receptors can recognize and bind to specific proteins on cancer cells, causing the destruction of the cancer cells. CAR T-cell therapy has shown promising results in providing a more effective treatment for patients who have relapsed ALL.

HENRY HALL ATRIUM 044

Infant Primate Cranial Measurements

articipants attending 3:00 PM - 4:00 PM
Presenter: Rylei Helder
Mentor: Natalie Laudicina

Primate births are rarely witnessed in the wild. This is due to the fact that primates typically give birth alone, at night, and up in trees. Therefore, little is known about how primates give birth. However, in captive specimens, medical interventions have been necessary, as fetal primates get stuck in the birth canal. For this study, we are taking cranial measurements of infant and fetal primates to compile one of the first databases which can then inform how crania are getting stuck in the birth canal. CT images of 45 infant primate crania from the Kyoto Digital Museum of Morphology were converted to 3D surface scans and measured. Each cranium's width, facial height, skull height, and skull length were measured with CloudCompare 3D imaging software. This research is important because as our closest relatives, the primate birth mechanism should be evaluated and compared to provide a better understanding of the human birth process, in particular, where the cranium is exceeding dimensions of the birth canal and how this causes longer and more painful labor.

HENRY HALL ATRIUM 045

The Relationship Between Pubic Symphysis Width and Parity

Participants attending 12:00 PM - 1:00 PM
Presenter: Emma Piasecki
Mentor: Natalie Laudicina

The pubic symphysis forms the anterior connection between the two hip bones and contributes to the mechanical integrity of the pelvis. Pubic symphysis dysfunction, a suite of painful symptoms, during pregnancy is common due to widening of the joint. Dysfunction usually goes away after delivery, but for some individuals symptoms persist due to the relaxation of the joint, causing pelvic instability and mobility issues. In some cases, when the pubic symphysis widens too much, patients can experience diastasis or rupturing of the joint. This project examines the relationship between pubic symphysis width and the number of births a woman has had (parity). Pubic symphysis widths (PSW) were measured at three locations on ~80 de-identified CT scans on CloudCompare, a 3D processing software. The measured PSW were then compared to the number of births. The aim of this project is to have a greater understanding of pain related to the widening of the pubic symphysis in order to help providers better treat individuals who experience symptoms related to the joint.

HENRY HALL ATRIUM 046

Visualizing Progress Toward Course Objectives

Participants attending 12:00 PM - 1:00 PM
Presenter: Anna Carvalho
Mentor: Zachary Kurmas

This project demonstrates a new tool to help students track their progress in various areas of their individual courses. By using progress bars, students can easily see where they're doing well and where they might need to improve. Professors can customize the tool to fit their specific needs, and students can use it to monitor their progress toward their desired grade. This tool has the potential to increase student engagement and motivation by making learning more transparent and actionable.

HENRY HALL ATRIUM 047

Perception of Student Debt Crisis in the United States

Participants attending 3:00 PM - 4:00 PM
Presenter: Piper Johnson
Mentor: Julia Mason

The student debt crisis in the United States has resulted from tuition increases outpacing incomes, causing unsustainable borrowing levels to pay for college. Within this crisis, it is essential to analyze the relationship between various identities and how individuals discuss the impact of student debt. This study uses a feminist theoretical framework that investigates how individuals of multiple genders, races, and sexualities reflect upon student debt in a structural system with particular power dynamics. Understanding how individuals discuss their lived experiences will unveil and build awareness of diverse positions. These conversations will also give insight into social systems, their impact, and strategies for change. The data within this study is presented from contextual analysis derived from the social media platform TikTok. This research is vital in understanding perceptions of how the student debt crisis is impacting the lives of individuals from various identities. With this data, strategies for change can be identified to help advance racial, gender, sexuality, and socioeconomic equality and alleviate

financial burdens.

HENRY HALL ATRIUM 048

Structural Analysis of Class D β-lactamases and the Inhibitory Effects of Novel Boronic Acids

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM
Presenter: Leah Pierce
Mentor: Rachel Powers

Carbapenem-resistant *Acinetobacter baumannii* is a multidrug resistant pathogen that is of particular concern due to its resistance to β-lactams, the most commonly prescribed class of antibiotics. However, a large part of β-lactam resistance is due to the expression of β-lactamase enzymes. β-lactamases hydrolyze the amide bond within the defining β-lactam ring of the antibiotic, rendering the molecule ineffective against its original transpeptidase target. *A. baumannii* contains all four classes of β-lactamases, with the most concerning being the carbapenem-hydrolyzing class D β-lactamases (CHDLs or OXAs). One way to overcome resistance due to β-lactamases is through the use of inhibitors that block the enzyme's activity. Currently, there are few effective inhibitors against the class D enzymes. A series of novel boronic acids was tested against the CHDL OXA-24/40, and none showed detectable inhibition at 100 μM. For comparison, a variant of the related CHDL OXA-23, OXA-146, was tested against the series and showed improvements in inhibition, with the highest affinity compound exhibiting a *K*i of 4.57 μM for OXA-146. To elucidate the role of the Ala insertion present in the β5-β6 loop of OXA-146, its parent enzyme OXA-23 will be tested against the boronic acids.

HENRY HALL ATRIUM 049

Non-Traditional Interventions for Perinatal Mood and Anxiety Disorders: A Program Evaluation

Participants attending 9:00 AM - 10:00 AM
Presenter: Emily Bemben
Mentor: Kelli Damstra

Perinatal mood and anxiety disorders (PMADs), typically defined as occurring during pregnancy or the first year postpartum, can have lasting negative impacts on maternal and child health. Overcoming barriers to treatment and choosing effective, individualized modalities for parents is key. Research highlights several insights and promising non-traditional treatments for PMADs. Informal psychosocial support is an effective intervention for many mothers, and several nonprofessional community- and home-based interventions show positive results. Unstructured, non-directive social support can be an essential component of care aimed at reducing PMADs.

There is a need for measuring the impact of interventions that can reach more parents via these nontraditional intervention modalities. A local nonprofit offers an approach that may help alleviate PMADs symptoms and reduce their prevalence, but the program's outcomes have not been formally studied. The Doctor of Nursing Project will help determine if home-based psychosocial interventions for PMADs utilizing volunteers impact patient outcomes and expand evidence-based treatment options. The program evaluation will entail a systematic assessment of the program outcomes to make judgments regarding the program's impacts on PMADs, improve its effectiveness, and guide development. The project assesses trends in PMADs symptoms, self-reported support, and stress levels before and after parents complete the program.

HENRY HALL ATRIUM 050

Role Of Health Policy in Achieving *Healthy People 2030* Health Care Access & Quality Objectives

Participants attending 1:00 PM - 2:00 PM
Presenter: Sheila Mwanda
Mentor: Chad Sutliffe

Each decade, *Healthy People* creates a list of health-related objectives that will contribute to improving health outcomes in the United States. While it is vital to set objectives to create a healthier and more equitable society, each one must be met with specific, measurable, achievable, realistic, and time-bound goals for the targets to be met in the desired timeframe. The goal of this project is to analyze the role that family income and health insurance type play in three specific healthcare access and quality goals and to create evidence-based policy recommendations to meet the goals of each target by 2030.

HENRY HALL ATRIUM 051

Conspiratorial Mindsets

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenters: Emily Hill, Joshua Kopich, Diana Longstreet, Nicholas Reddy
Mentors: Brian Bowdle, Mario Fific

Previous research has failed to support the relationship between personality and conspiracy tendencies, suggesting that personality does not significantly influence the adoption of conspiracy mindsets. Conspiracy beliefs were found to be distributed among groups of individuals representing each of the Big Five personality dimensions. The present study aims to expand on existing research by examining how decisiveness correlates with the need for closure and cognition, and how this mediates the impact of personality measures on an individual's propensity to form conspiratorial beliefs. Data were collected from a sample of 206 undergraduate students at Grand Valley State University. The study measured conspiracy propensity using several scales, including the Generic Conspiracist Beliefs (GCB) scale, Causality Scale, Need for Closure Scale (NCS), Need for Cognition Scale (NFCS), Conspiracy Mentality Questionnaire (CMQ), and Personality/Decisiveness Scale. The results of the study challenged the current understanding of how conspiracy beliefs are formed and can help researchers to learn more about the underlying mechanisms behind conspiratorial thinking.

HENRY HALL ATRIUM 052

FNMR on Antibiotic Resistant Protein OXA-066 with Fluorinated Protein Residues

Participants attending 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM
Presenter: Oliver Reyes
Mentors: Laura Hawk, David Leonard

OXA-66 is a class D β-lactamase capable of hydrolyzing carbapenems such as doripenem, meropenem, and imipenem. This enzyme renders β-lactam antibiotics useless by utilizing a catalytic serine to hydrolyze the β-lactam ring. These β-lactam medications account for about 65% of all antibiotics currently being used for treatment. OXA-66 was grown in defined media to produce a 7-fluoro indole tryptophan variant in order to obtain a label with 19F-NMR for each tryptophan residue present within the protein. Fluorine's bioorthogonal properties allow for the tags to not drastically affect the function and shape of the protein, while still giving very easy-to-see measurements

and readings. This is done because these tryptophan residues are in very important places, one being very close to the catalytic serine. The role of the tryptophans was explored by watching the changes in the 19F-NMR spectrum before and after inhibitor treatment. This research will help advance the knowledge on how to combat resistance to antibiotics.

HENRY HALL ATRIUM 053

Crockery Creek Speaks

Participants attending 1:00 PM - 2:00 PM
Presenter: Alexis Phillips
Mentor: Amanda Buday

This study explores environmental or manmade barriers that influence how people with mobility disabilities access water at parks located in the Crockery Creek watershed. With the help of the Ottawa Conservation District, a survey was mailed to Crockery Creek watershed residents. The study evaluates survey responses regarding the accessibility of six parks within the watershed. Access to parks is important because of the mental and physical health benefits provided by outdoor recreation. It is important to make sure that people with mobility disabilities can travel to parks without much hassle and have equitable access to outdoor activities. We learned that people in the Crockery Creek watershed thought that Grose Park and Musketawa Trail were most accessible. To describe these parks, people used the terms “paved, trail, access.”

HENRY HALL ATRIUM 054

The Impact of Mechanical Injury and Nociception on the Foraging Behavior of Crayfish

Participants attending 9:00 AM - 10:00 AM, 12:00 PM - 1:00 PM, 3:00 PM - 4:00 PM
Presenters: Patrick Baumann, Colin Carter, Lauren DeHerder, Madelyn Maurer, Jonathan McCabe, Naiya Summerville
Mentor: Daniel Bergman

The capacity to encode noxious stimulus, nociception, has long been thought to be absent or greatly reduced in invertebrates. However, more recent studies have begun to argue against this paradigm due to behavioral observations. Studies in *Procambarus clarkii* have shown nociception to high heat, resulting in escape behavior such as tail flipping away from the stimulus (Puri, 2014). Studies in crabs, such as *Cancer pagurus*, have shown that competitive behavior in males is significantly decreased when appendages were torn off and actions like rubbing the wound markedly increased (McCambridge, 2016). Our study utilizes similar mechanical injuries to crayfish and observes changes in their ability to find food. Crayfish will either experience no injury, injury to the carapace, injury to one uropod, or injury to one cheliped (i.e., claw). We hypothesize that crayfish with more significant injury/pain will reduce their exploration for food.

HENRY HALL ATRIUM 055

Understanding the Foundations of Nanocharacterization Tools Using Simulation-Based App

Participants attending 4:00 PM - 5:00 PM
Presenter: Ian Lilly
Mentor: Atilla Cakmak

Nanocharacterization tools are heavily used in both industry and academia in order to elucidate different properties

of the materials or research products. One of the leading branch of nanocharacterization procedures involve optical inspection in the broadest sense. X-ray, infrared and ultraviolet together with visible parts of the specrum are utilized. Specifically, these methods are called X-ray Photoelectron Spectroscopy (XPS), X-ray Diffraction Spectroscopy (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and Ultraviolet-Visible Spectrophotometer (UV-Vis). Each of the spectroscopy methods have highly advanced dedicated tools, which might make them quite hard to obtain outside of a classical research environment. Hence, the underlying working mechanisms of the tools might become out of reach for the students. Consequently, the present submission adapts a simulation-based approach to bring all of these nanocharacterization methods within the reach of the interested students. A variety of simulation tools offered by NIST, myscope, nanohub.org, PhET and MATLAB are functionalized to individually study the fundamentals of the individual methods. A total of 11 simulation tools are discussed in the submission. Simulation results have been collected and are found to form reinforcing links with both freshman and sophomore STEM courses.

HENRY HALL ATRIUM 056

Gorillas' Gestural Communication

Participants attending 4:00 PM - 5:00 PM
Presenter: Abigail De Meo
Mentor: Michael Wroblewski

Gorillas, one of humanity's cousins though not as close to us evolutionarily as the Chimpanzees and Bonobos, still share behavioral, physical characteristics and DNA relations with us. By examining Gorillas we gain insight to understand our human behavior. Observing behavior between two troops will yield significant insight to understanding what is considered innate species-specific behavior and what is learned behavior within a troop. The 25 hours of data collected from both troops will open the possibility of understanding both primate and human behavior due to environmental conditions and what is defined as an innate species specific/general behavior and what can be determined to be learned behavior not exhibited by another troop.

Keywords: Gestural Communication, Nonhuman Primates, Innate Species-Specific Behavior, Learned Behavior/ General Behavior, Homo sapiens

HENRY HALL ATRIUM 057

Numerical Analysis of the Ising Model Using Monte Carlo Techniques

Participants attending 12:00 PM - 1:00 PM
Presenter: Shane Armstrong
Mentor: Benjamin Holder

Monte Carlo techniques are used in statistical mechanics to generate simulations of statistical mechanical systems and obtain numerical results, according to the probability of such results occurring in nature. Monte Carlo techniques can simulate systems which are based on the most studied model in statistical mechanics: the Ising model. The Ising model is a mathematical model of ferromagnetism that entails a graphical representation of an ensemble of entities—postulated to be microscopic in reality--that determine the state of the system based on their individual magnetic moments, and such moments and system could also be influenced by an external magnetic field, or other optional phenomena. I will develop a computer code in the Python language to reproduce known results of the Ising model where the entities are arranged into a square lattice. The program will generate equilibrium states at a chosen temperature, and I will identify the phase transition as I change the temperature

setting between simulations. I will also work with different types of lattice shapes for the model and look into the usefulness and significance of these differences.

HENRY HALL ATRIUM 058

Crop Diversity Loss

Participants attending 10:00 AM - 11:00 AM
Presenter: Hayden Welindt
Mentor: Ramya Swayamprakash

Crop diversity loss is a submerged issue within climate change that is often misunderstood and not well covered by mainstream media. I will present on the outcome of conversations with farmers from my hometown about crop diversity. I have anticipated pushback but have responded with information about the beneficial factors of crop diversity for not only the crops, but also for the farmers, including the potential economic benefit. Coming from a small town reliant on a farming economy, I am aware that we are at the mercy of disease and pests. These factors are becoming ever more intense with climate change. I have found that crop diversity provides small communities with food security and allows farmers to have a more stable form of income, as they do not have to rely on one type of crop and government subsidies. As a nation, we are dependent on 30 crop species to provide 90% of our daily nutrients. This is a problem that can be solved with crop diversity.

HENRY HALL ATRIUM 059

Regeneration of Neurons in Human Brain Tissue: A Revolutionary Concept with Therapeutic Potential

Participants attending 10:00 AM - 11:00 AM
Presenter: Mackenzie Dunn
Mentor: John Capodilupo

There are current clinical trials to suggest that endogenous neuronal regeneration, exogenous neuronal stem cell implantation and glial cell reprogramming could be prospective therapeutic treatments for neurodegeneration and traumatic injury. Given inhibitory factors in the environment and limited natural regeneration capacity, there was previously little hope for mammalian central nervous system (CNS) regeneration (Mahar, M). However, it has been discovered that the brain does possess neuronal stem cells (NSCs) present in the hippocampal dentate gyrus (DG) that may serve in the promotion of regeneration in two distinct ways (Vasic, V). Firstly, NSCs may serve as an endogenous regenerative reservoir that can be extrinsically stimulated using a complex cocktail of chemicals such as erythropoietin, brain-derived neurotrophic factor (BDNF) and vascular endothelial growth factor (VEGF), and also intrinsically stimulated by having patients engage in regular physical activity and an enriched environment (Vasic, V). These stem cells can also support externally engrafted NSC implantation to various sites in the brain. The genetic mapping and reprogramming of glial cells into neurons is also an exciting development to potentially replace lost or damaged existing neurons. This review will examine the current research, methodology, and future outlook of these three therapies for neurological regenerative medicine.

HENRY HALL ATRIUM 060

Mental Health of University Nursing Students: A Literature Review

Participants attending 3:00 PM - 4:00 PM
Presenter: Makenzie Carpenter
Mentor: Briana Hutchinson

This project explores the ongoing issue of mental health, specifically in nursing students. In addition to maintaining good academic status through exams, assignments, and papers, nursing students must also endure the stressful environment of a clinical setting. Through summarizing research and drawing overall conclusions, this paper examines the contributing and alleviating factors to poor mental health in this population. Data were obtained from studies published from 2017 to 2023 in the CINAHL database, and 11 studies were retrieved from a data collection process to be included in this review. Multiple studies show a low deviation in mental health levels, healthy behaviors, and resilience levels when examining nursing student populations. Topics such as resilience, mindfulness, yoga, and university courses and assignments demonstrated changes in levels of anxiety, depression, and stress in nursing students. Further exploration of ways to improve mental health in nursing students is necessary to ensure the future nursing workforce can take care of themselves and provide excellent care in their future careers.

HENRY HALL ATRIUM 061

The Effect of Alpha-synuclein-related MicroRNA Mimics on Alpha-synuclein and Tyrosine Hydroxylase Protein Expression in Parkinson-like Neuronal Cells.

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenters: Alona Chekalina, Dahlya Kamarudin
Mentor: Sok Kean Khoo

Parkinson's disease (PD) is the second most common neurodegenerative disorder with no cure. The pathological hallmark of PD is the presence of Lewy bodies consisting primarily of alpha-synuclein (a-syn) protein aggregates. Thus, a-syn is an attractive drug target to potentially stop or slow PD progression. MicroRNAs (miRNAs) are short nucleotides that regulate gene and protein expression in important biological processes. Here, we will use PD-like neuronal cells to evaluate the effects of miRNA miR-34b and miR-34c mimics that can bind to a-syn mRNA. We hypothesize that these mimics will lower α-syn protein expression, while increase the expression of tyrosine hydroxylase (TH), a dopamine synthesis enzyme. To test our hypothesis, SH-SY5Y cells originated from neuroblastoma will be differentiated and induced to exhibit early PD phenotypes before being transfected with miRNA mimics or negative control. Western blot and immunofluorescent analysis will be performed to evaluate a-syn and TH protein expression. This is a proof-of concept study to use miRNA mimics as an intervention to treat PD.

HENRY HALL ATRIUM 062

The Lumbosacral Angle: Comparison of Two Software Programs

Participants attending 11:00 AM - 12:00 PM
Presenter: Carly Stoops
Mentor: Natalie Laudicina

The human lower back is curved to support bipedal gait. The degree of spine curvature can be influenced by many factors (pregnancy, gut volume) and can result in pain or impaired mobility. However, past research does not

describe exact measuring criteria. This leads to inconsistent methodologies and results. This project investigates the difference in spinal angle measurements taken with two different software programs. The goals of this study are to 1. determine the best spinal angle measurement and 2. determine how variable the same measurements are across different software programs. Two spinal angle measurements from 30 CT scans will be recorded, including the lumbosacral disc angle and the central lumbar angle. Two freely available and commonly utilized software programs, Image J and Cloud Compare, will be used to compare any differences. This research will provide insight into how this lower angle is better measured and which software is more useful for measurements of these specific angles.

HENRY HALL ATRIUM 063

Mechanosensing and Anesthesia of Single Internodal Cells of Chara

Participants attending 10:00 AM - 11:00 AM
Presenter: Manya Rodgers
Mentor: Mark Staves

The giant (2-3 cm long) internodal cells of the aquatic plant, Chara, exhibit a rapid cyclic protoplasmic streaming which stops in response to mechanical stimuli. Since the streaming is easily visible with a stereomicroscope, these single cells are ideal tools to investigate mechanosensing in plant cells, as well as the potential for these cells to be anesthetized. We found that dropping a 6mm magnetic ball through a 4.6 cm tube (delivering 4 x 10-4J) reliably induced mechanically-stimulated excitation-cessation coupling, EC-coupling (i.e., the mechanical stimulation caused an excitation which resulted in the cessation of protoplasmic streaming). We found that the mechanically induced E-C coupling is dependent on external calcium. Using calcium buffers, we found that in a pCa 5 buffer (containing 10-5 M free Ca2+) 100% of cells exhibited mechanically-induced E-C coupling, whereas, at pCa 7, E-C coupling was completely inhibited. To determine whether E-C coupling in Chara was subject to anesthesia, we treated Chara internodal cells in pCa 5 to volatilized chloroform in a 9.8 L vacuum chamber. We find that 1ml of chloroform completely, and reversibly, induced anesthesia in these cells. To our knowledge, this is the first report of anesthesia in single plant cells.

HENRY HALL ATRIUM 064

Using an In-situ Sand Filter and a Schmutzdecke to Remove Coliforms from Ground Water

Participants attending 3:00 PM - 4:00 PM
Presenter: Isabelle Hammond
Mentor: Rod Morgan

Currently, millions of people around the world drink water contaminated with E. coli and other fecal pathogens. One household treatment method is the use of bio-sand filters (BSF) and schmutzdecke, which function primarily to remove pathogens from small amounts of water for daily consumption. In contrast to BSFs, large in-ground in-situ sand filters (ISF) have the potential to overcome the challenges of BSFs while increasing access to potable water. In the summer of 2020 we successfully installed an (ISF) ground water well near the Grand River in Allendale, MI. The ISF well has successfully reduced E. coli and other fecal coliform levels for the past two years. We have found the ISF well keeps fecal coliforms levels low regardless of rainfall, river levels, or microbial contamination levels of the surrounding ground water. Our work will help us better understand how ISF wells can be adapted to different environments throughout the world to provide potable water for residents.

HENRY HALL ATRIUM 065

Limnological Assessment of Lake 16, Allegan, MI

Participants attending 3:00 PM - 4:00 PM
Presenter: Isabelle Hammond
Mentor: Mark Luttenton

Limnological assessments of inland lakes are integral to natural resource management practices, however, implementing management practices on lakes without assessments is not practical. One such lake, Lake 16 in Allegan, MI, is roughly 56 acres in size and has limited development. During October 2022, I developed a bathymetric map in ArcGIS Pro to create visual models of the lake bottom. The average depth of the lake is approximately 40 feet with a maximum depth of nearly 80 feet. Physical data indicated that temperature and dissolved oxygen were uniform from the surface to a depth of 50 feet. Secchi disc depth averaged 11 feet, and pH was circumneutral at 8.1. Total phosphorus (TP) in surface samples was >0.007 mg/L. The plankton community had generally low diversity and only 2 aquatic plant species were observed, the native Whitestem Pondweed (*P. praelongus*) and the invasive Eurasian Watermilfoil (*M. spicatum*). These findings suggest that during autumn, Lake 16 temperatures are approximately uniform from surface to 50 ft, TP is lower than expected, secchi disc depths are good, and plankton diversity is comparatively low, indicating that the lake is relatively healthy with fairly good water quality. However, additional sampling is recommended.

HENRY HALL ATRIUM 066

Food Insecurity and BMI Impact on US and African Children: A Literature Comparison

Participants attending 10:00 AM - 11:00 AM
Presenters: Dayna Borregard, Josef Kleitch
Mentor: Susan Strouse

The purpose of this project is to investigate the impact that food insecurity has on the BMI of children in the United States and Africa. By utilizing the PRISMA diagram, the research has been narrowed down to the most relevant sources. With these sources, there will be summary and synthesis of the selected literature. With the information that has been gathered by Josef and myself, we will be able to combine both of our literature reviews into a poster project that evaluates the issue of food insecurity and its impact on BMI in the United States and Africa. We hope that this project brings attention to the importance of health of developing children in both developed and developing nations. This is a very prevalent topic to discuss, since it is important to be familiar with the effect of food insecurity and to understand how it is associated with modifiable and preventable social and health factors.

HENRY HALL ATRIUM 067

Can Increasing the Density of External Media Mimic Microgravity?

Participants attending 11:00 AM - 12:00 PM
Presenter: Grace Miller
Mentor: Mark Staves

There are two leading models of plant gravity sensing: the statolith model, where statoliths sediment and sense gravity, and the gravitational pressure model, where the protoplast acts as the gravisensor. The statolith model is widely accepted, but plants without statoliths and plants with statoliths removed retain their ability to sense gravity. Thus, we tested between these models using *Oryza sativa* (rice) as it contains statoliths and grows well in liquid media. We grew the plants with the roots exposed to unilateral light in artificial pond water (APW) and OptiPrep

solutions. The APW experiments gave a baseline for how roots respond to the light conditions. OptiPrep increased the density of the media and the root curvature increased, suggesting the gravity response was reduced. These results are consistent with the gravitational pressure model and inconsistent with the statolith model. We compared sections of rice roots to check statolith distribution, which was not affected by our experiments. These results lead us to conclude increasing the density of external media can mimic microgravity in plants. We are now testing this hypothesis by comparing the response of *Arabidopsis* to light and gravity stimulation in Optiprep solutions with their reported responses in microgravity on the International Space Station.

HENRY HALL ATRIUM 068

Determining the Optimal Method of Inhibiting ERK1/2 Enzymatic Activity in Mice

Participants attending 9:00 AM - 10:00 AM
Presenters: Caroline De Roo, Erin McLean
Mentor: Ruijie Liu

Without proper treatment, type 2 diabetic patients suffer damage to many organs such as nerves in the limbs, the heart, kidneys, and eyes. Indeed, about 19~26% of diabetic patients develop cardiac dysfunction characterized by heart enlargement, myocardial stiffness, and altered intracellular signaling proteins. Based on the benefits of inhibition of ERK1 and ERK2 proteins in other animal disease models, we hypothesize that reduction of ERK1/2 enzymatic activity alleviates diabetes-induced heart disease in mice. In this study, we tested the optimal method of ERK1/2 inhibition by U0126 in mice. U0126 was delivered into mice by either intraperitoneal injection or formulized chow containing U0126. We analyzed ERK1/2 phosphorylation by Western blot. In summary, our preliminary study provides a solid foundation for studying the U0126 inhibition of ERK1/2 phosphorylation in a larger cohort of mice.

HENRY HALL ATRIUM 069

Intercellular Communication via Gap Junctions Influences Cell Survival During Hypoxia

Participants attending 9:00 AM - 10:00 AM
Presenter: Lauren Harmon
Mentor: David Geenen

Stem cell therapy can be beneficial following myocardial infarction. However, when murine bone marrowderived mesenchymal stem cells (mBM-MSCs) are injected into the ischemic area, a large percentage of these cells undergo apoptosis resulting in decreased therapeutic benefits. We hypothesize that the loss of these mBM-MSCs is regulated by intercellular channels or gap junctions (GJs) that provide apoptotic signals passed between ischemic cardiomyocytes and mBM-MSCs. Our research aims to attenuate these GJs by suppressing Connexin-43 (Cx43) expression, the predominant channel-forming protein. We will accomplish this by transiently transfecting a Cx43 siRNA into mBM-MSCs. Our data demonstrate that intracellular fluorescent dyes and FACS analysis can quantify cell-cell coupling between mBM-MSCs in coculture. Disrupting Cx43 expression will identify a potential therapeutic target for increasing the retention of mBM-MSCs following myocardial infarction.

HENRY HALL ATRIUM 070

Tracking Traffickers: Investigating the Relationship Between Human Trafficking and Ports of Entry

Participants attending 11:00 AM - 12:00 PM
Presenter: Connor Wardrop
Mentor: Courtney Topic

Human trafficking is defined as obtaining a person and subjecting them to some sort of servitude against their will. The purpose of this study is to determine if reports of human trafficking occur at higher rates in areas with International Ports of Entry, such as international airports, border control points, or ports for boats. In order to do this, the study utilizes data from the Uniform Crime Reporting (UCR) program, run by the Federal Bureau of Investigation (FBI), collected from 2013-2020. These data were then added to a program named Business Analyst 2019, a type of Geographic Information System (GIS) designed to analyze trade and develop maps to show data, developed by Esri, the leading supplier of GIS Software, and analyzed at the county level. Using maps to show the illicit trade of human trafficking allows for a better visualization of where hotspots are throughout the US. Additionally, the software provides us the ability to show trends over time, which could inform law enforcement response at the local, state, and federal levels.

HENRY HALL ATRIUM 071

Characterizing DUSP6, DUSP8, and ERK1/2 Expression Levels in Diabetic Mouse Hearts

Participants attending 12:00 PM - 1:00 PM
Presenter: Joshua Kurlinski
Mentor: Ruijie Liu

Cardiovascular disease is the #1 cause of death in the world today. In 2020, 697,000 people died in the United States due to heart disease, which is 1 in every 5 people. People with diabetes are twice as likely to develop heart disease than those without diabetes. However, the molecular mechanism underlying the diabetic heart disease is incompletely understood. Dual-specificity protein phosphatases (DUSPs) are a group of protein phosphatases able to dephosphorylate tyrosine, serine, and threonine residues within target proteins. The focus of this study is to determine whether the expression of DUSP6, DUSP8, and ERK1/2 phosphorylation are altered in diabetic mouse hearts. Both real-time PCR and Western blot were utilized to determine the expression or phosphorylation level of these proteins. We found out that ERK1/2 phosphorylation was increased in both type I and type II diabetic mouse hearts. However, the expression level of DUSP6/8, the two phosphatases regulating ERK1/2 phosphorylation, was not altered. Together, these data suggest that DUSP6/8 may not play a role in the development of diabetic cardiomyopathy.

HENRY HALL ATRIUM 072

Testing the Expression of β2-adrenergic Receptor DNA in HEK293 Cells

Participants attending 1:00 PM - 2:00 PM
Presenter: Joshua Kurlinski
Mentor: Ruijie Liu

β(beta) adrenergic receptors mediate the sympathetic flight and flight responses. In human heart, β 1 - and β 2 -adrenergic receptors are expressed at a ratio of about 70:30, and activation of both receptors increase the heart rate and contractility. In this study, we sought to purify β 2 -adrenergic receptor(β 2 AR) plasmid DNA from

host bacteria DH5α and determine its protein expression by transfection into human embryonic kidney 293 cells (HEK293). A small amount of Flag-β 2 AR plasmid DNA was transformed into DH5α, and positive colonies were selected by 50 μg/ml of ampicillin in the LB agar plates. Plasmid DNA was purified by Promega mini-DNA preparation kit and quantified by nano-drop. To test its expression, 5 μg of DNA was transfected into HEK293 using lipofectamine 2000 reagent. After 48 hours expression, protein samples from HEK293 were analyzed by Western blot using anti-Flag antibody. In summary, our study successfully purified large quantity of receptor DNA and verified its expression in mammalian cells.

HENRY HALL ATRIUM 073

Sphere of Influence: PFAS

Participants attending 11:00 AM - 12:00 PM
Presenter: Mitchell Fedewa
Mentor: Ramya Swayamprakash

Per- and Polyfluorinated Substances, often referred to as PFAS, are a group of synthetic chemical compounds that contain multiple Fluorine substituents on an alkyl chain. Coined “forever chemicals,” these compounds are extremely strong and are very difficult to break down on a molecular level. This robustness causes a wide range of issues to individual biological organisms and our natural world as a whole. First discovered in the 1930’s, and first widely produced in the 1950’s, the threat these substances posed was widely unknown for decades. Even after their danger was realized the public remains generally ignorant about the specifics of what makes PFAS contamination so threatening to humans as a species and to our environment. This project explores the solutions proposed to solve various PFAS issues and identifies which have the most merit moving into the future. It will also identify methods of improvement achievable on an individual scale that can reduce the harmful impact of these chemicals while exploring methods of keeping the general public informed and productive.

HENRY HALL ATRIUM 074

Alignment of DNP Degree Competencies with Employer Perspectives: The Value of Academic-Practice Partnerships

Participants attending 9:00 AM - 10:00 AM
Presenter: Madison Niederer
Mentor: Katherine Moran

Doctor of Nursing Practice (DNP)-prepared nurses are equipped to evaluate and translate quality metrics, improve health care outcomes, and lead the nursing profession. The perspective of employers of DNPprepared nurses is less clear but needed to inform educators as to how the DNP-prepared nurse’s skills and competencies are aligned and operationalized in organizations. The purpose of this study was to examine employers’ perspectives of DNP nurse competencies and reasons to hire a DNP-prepared nurse. Employers of DNP-prepared nurses were recruited from organizations of nurse leaders in the United States for a quantitative, cross-sectional survey design (N = 87). Respondents were nurse leaders/administrators 41.3% (n = 36), advanced practice nurses 25.2% (n = 22), and nurse educators 20.7% (n = 18). Implementing evidence-based projects, synthesizing literature, translating evidence, collaboration and communication were the highest perceived competencies held by DNP-prepared nurses. Of those that reported participating in hiring DNP-prepared nurses, the most important reported reasons for hiring included engagement in process improvement projects, working at a systems level, and leadership experience. Innovative academic-practice partnerships with shared perspectives of employers and educators are needed to optimize the preparation and impact of DNP-prepared nurses on health care outcomes.

HENRY HALL ATRIUM 075

Modeling Spring Systems on Spherical Geometries

Participants attending 11:00 AM - 12:00 PM
Presenter: Robert Dolan
Mentor: Benjamin Holder

Vibrational modes of crystals are determined by bond strength and lattice configuration, which is mathematically linked to the symmetries of the system. However conventional crystals only exist in Euclidean space which carries translational symmetries. In other topologies, we expect different symmetries will lead to novel vibrational behaviors. We aim to construct analytical models for the vibrations of non-euclidean crystals in spherical geometries.

HENRY HALL ATRIUM 076

The Effects of ß(beta)-estradiol on Crayfish Behavior and Gonadal Structure

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenters: Alyson Furstenau, Megan Gasparaitis, Kayla Shields, Hannah Shull, Lily Weber-Bailey, Lauren Wilmore
Mentor: Daniel Bergman

An essential aspect of crayfish survival is the ability to find a mate and reproduce. If these abilities are negatively impacted, then a decrease in crayfish populations is likely to occur. Although estrogen is found in both male and female crayfish, an increased concentration has the potential to feminize the male sex organs and lead to reduced fertility. ß(beta)-estradiol, an estrogen steroid hormone found in most birth control medications, has entered many of our local bodies of water via sewage effluent. In this experiment, we expose male and female crayfish to acute and chronic levels of ß(beta)-estradiol, and then observed whether they can distinguish male and female odors, as well as the attractiveness of each. Gonads from chronically exposed crayfish will be analyzed to detect alterations in structure and size. We hypothesize that increased exposure to ß(beta)-estradiol will negatively impact crayfish when attempting to find a mate and potentially change their reproductive organs.

HENRY HALL ATRIUM 077

Determining the Optimal Method of Inhibiting ERK1/2 Enzymatic Activity in Mice

Participants attending 9:00 AM - 10:00 AM
Presenters: Caroline De Roo, Erin McLean
Mentor: Ruijie Liu

Without proper treatment, type 1 diabetic patients suffer damage to many organs such as nerves in the limbs, the heart, kidneys, and eyes. Indeed, about 19~26% of diabetic patients develop cardiac dysfunction characterized by heart enlargement, myocardial stiffness, and altered intracellular signaling proteins. Based on the benefits of inhibition of ERK1 and ERK2 proteins in other animal disease models, we hypothesize that reduction of ERK1/2 enzymatic activity alleviates diabetes-induced heart disease in mice. In this study, we tested the optimal method of ERK1/2 inhibition by U0126 in mice. U0126 was delivered into mice by either intraperitoneal injection or formulized chow containing U0126. We analyzed ERK1/2 phosphorylation by Western blot. In summary, our preliminary study provides a solid foundation for studying the U0126 inhibition of ERK1/2 phosphorylation in a larger cohort of mice.

HENRY HALL ATRIUM 078

The Effects of Hormonal Contraceptives on Child-Bearing-Age Women

Participants attending 1:00 PM - 2:00 PM
Presenter: Ruby Brown
Mentor: Kelli Damstra

Hormonal contraceptives are a prominent part of life for adult and adolescent women, with over 100 million women using birth control worldwide (Pletzer & Kerschbaum, 2014). It is also estimated that 88 percent of all fertile-age women have used synthetic hormones at some point in their lives (Bronnick et al., 2020). When appropriately used, hormonal birth control can be a great way to prevent unwanted pregnancies and allow women to make decisions for their bodies; however, some drawbacks must be equally considered when deciding to use hormonal birth control. These drawbacks include unwanted side effects such as weight gain, acne, blood clots, headaches, and decreased libido. Furthermore, synthetic hormones can bring about more severe issues, including brain structure alterations, increased stress response, and cancer, and even affect how women choose their partners. These behavioral and mental changes within the female body could lead to a tremendous shift in societal dynamics. This paper aims to analyze artificial contraceptives' physical, cognitive, and behavioral effects to educate women about the unintended impacts that extend far beyond women's bodies.

HENRY HALL ATRIUM 079

Michigan's K-12 Sex Ed Curriculum; How Government Policies Effect Reproductive Health

Participants attending 1:00 PM - 2:00 PM
Presenter: Abigail Hasse
Mentor: Julia Mason

The lack of standardized, regulated, comprehensive sex education in public K-12 schools leads to sexual health issues. Using feminist content analysis, this research will focus on analyzing reproductive health textbooks to show the connection between public sexual health phenomena and reproductive health curriculums. Reproductive health courses have been used to attack public sexual health issues in the past, yet have not been adapted to fit current issues. This research is designed to call attention to both that gap and the need for current, comprehensive, regulated curriculums.

HENRY HALL ATRIUM 080

Temporal Effects of Preservation on the Shape and Size of Yellow Perch

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenters: Tyler Hoyt, Jacob Yingling
Mentor: Carl Ruetz

Preservation of fish often involves fixation in formalin followed by preservation in ethanol. This preservation technique can alter the size and shape of specimens, although the effects are often species specific. We evaluated the temporal effects of preservation on the body size and shape of adult Yellow Perch (Perca flavescens). To collect specimens, we sampled 42 Yellow Perch from three drowned river mouth lakes (White Lake, Lake Macatawa, and Arcadia Lake). Upon capture, fish were transported to the laboratory, fixed in formalin, and then preserved in ethanol. Measurements (length, mass, and photograph to analyze shape) were made on fresh fish (i.e., prior to preservation) and 3 and 6 weeks after being preserved. Shape was analyzed using geometric morphometrics.

Preliminary results suggested the effects of preservation on the shape and size were complex, although we found evidence that shape changed with preservation. Thus, we recommend the conservative approach of only comparing shape among Yellow Perch that have been preserved, at least initially, for the same amount of time.

HENRY HALL ATRIUM 081

Ranking Variable Importance in the Holistic Admissions Process among Nursing Applicants to a Bachelor of Science in Nursing Program

Participants attending 9:00 AM - 10:00 AM
Presenter: David Mosack
Mentor: Katherine Moran

In 2018, the Kirkoff College of Nursing (KCON) expanded upon its pre-licensure admissions process to include a holistic strategy that evaluated and gave balanced consideration to student applicants' unique experiences and attributes, in addition to their demonstrated academic achievement. Under the new process, applicants to KCON's Traditional and Accelerated Second Degree Bachelor of Science in Nursing (BSN) programs were holistically evaluated on a personal statement, a profile, an interview, and their GPA. The purpose of this quality improvement study titled, "Advancing Diversity in Nursing with Holistic Admissions" as conducted by Dr. Barbara Hooper, Dr. Genevieve Elrod, and Dr. Janet Winter, was two-fold: to explore the effect of the holistic admissions process in improving student success and increasing diversity of the student population, and to examine the various elements of the holistic admissions application to determine their impact on the equity of the process, with a focus on sustainability.

Analysis methodology involved using data aggregated from admission records and Banner This poster focused on objective two. After building a classification tree in SAS with proc HPSPLIT, we found that interview score was the most important determinant of applicant acceptance, followed in descending order by GPA, profile score, and personal statement score.

HENRY HALL ATRIUM 082

The Effects of Phonetics Training on the Production and Perception of Rhotic Vowels in American English

Participants attending 9:00 AM - 10:00 AM
Presenter: Megan Andrzejewski
Mentor: Wil Rankinen

This talk examines how the American "r" phoneme affects the production and perception of American English front vowels in pre-rhotic positions. Rhotic vowels challenge listeners in accurately identifying the phonetic quality of vowels due to r-coloring effecting formants (Chung et. al 2021; MacAllister et. al, 2017). For example, a word like "beer" is commonly perceived as a [i] by listeners yet can be produced as either the tense or lax high front vowel. This challenge is particularly concerning to aspiring clinicians learning phonetic transcription. This study seeks to investigate speakers' acoustic identity of the prerhotic high and mid front vowels and listeners' ability to accurately perceive these pre-rhotic vowel identities.

This study examines a 50-speaker sample of college-age participants separated into two groups (with and without phonetics training). All participants read a 100-word wordlist and completed a 200-word four-alternative forced-choice identification (AFCI) task. Furthermore, the AFCI task presents each word twice by either a male or a female

voice. Listeners select from four options (“BEAT”, “BIT”, “BATE”, “BET”) and rate their confidence level for each choice. Preliminary findings indicate the mapping between production and perception to be strongest for those with previous phonetic training.

HENRY HALL ATRIUM 083

Examining the Localization and Function of a *Candida*-specific Protein

Participants attending 3:00 PM - 4:00 PM
Presenter: Lane Everett
Mentor: Ian Cleary

The gene *orf19.2302* is upregulated during filamentous growth in the fungus *Candida albicans*. This gene encodes a protein that is predicted to contain several transmembrane domains. Based on sequence similarities to proteins in different fungi, it is predicted to function as a permease and could be a transporter of cations between the ER and the cytoplasm. To further explore the function of this gene, we constructed a strain expressing an mCherry-tagged version of the protein. The localization of the protein was compared in different hyphae-inducing media and at different time points. Additionally, growth of deletion and over-expression strains in different metal ions was examined.

HENRY HALL ATRIUM 084

Emotional Support Animals at College

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Rachel Pease
Mentor: Julia VanderMolen

Background/Purpose: Emotional support animals (ESAs) are similar yet distinct from service animals as they are not specifically trained for certain disabilities but still provide support for individuals with psychiatric disabilities. A policy review was conducted to survey existing policies on college campuses that address the accommodations available for individuals with emotional support animals (ESAs).

Methods: A policy review was conducted using The Center for Disease Control and Prevention’s Policy

Analysis: Key Questions Table and the Policy Analysis Table. Policies from 87 colleges and universities in Michigan were compiled from the Carnegie Classification of Institutions of Higher Education. Institutions compiled were placed into four categories based on the information that colleges and universities provided on ESAs and SAs.

Results: No Policy or Infomation Addressing of SAs or ESAs (n = 31)

Policy or Information Addressing Either SAs and ESAs (n = 44)

Policy or Information Addressing ESAs (n = 6)

Conclusion: Colleges and universities have limited information and accommodations available for individuals with ESAs despite being locations where they are increasingly needed. Further research and advocacy is needed to help promote the benefits and use of ESAs on college campuses and improve mental health.

HENRY HALL ATRIUM 085

Exploring Altered Gene Expression of *Candida albicans* During Spaceflight using QPCR, Immunoprecipitation, and Western Blots

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Evan Sidebotham
Mentors: Ian Cleary, Derek Thomas

The fungus *Candida albicans* is one of the most common nosocomial infections in the US, and biofilms play a large role in the microbe's ability to cause disease. Spaceflight alters gene expression in the opportunistic pathogen *C. albicans* in ways that may enhance biofilm formation and thus increase its pathogenicity. Based on a published transcriptional analysis from space flight, we constructed overexpression strains for genes that have this altered expression in an attempt to learn more about their role in biofilm formation. We conducted real-time PCR on these strains to quantify the expression of known adhesins compared to a wild-type strain to explore what was causing biofilm enhancement. We also isolated the proteins produced by these genes through immunoprecipitation and used western blotting to detect if these proteins were ubiquitinated or interacting with other proteins.

HENRY HALL ATRIUM 086

Are Social Work Students Prepared to Practice with Traumatized Individuals, Groups, and Communities?

Participants attending 3:00 PM - 4:00 PM
Presenter: Kelsey Klimkewicz
Mentor: Joshua Bishop

This study explored whether personal and educational variables predict preparedness for Trauma-Informed Practice (TIP) among Social Work Students. MSW students, those who have taken a trauma class, and those with personal experience of trauma have higher Self-Rated Competency for TIP. The study explores a quantitative, cross-sectional study using a convenience sample (n=154) of Social Work students from a Midwestern public university. The study examined whether personal and educational variables predict preparedness for Trauma-Informed Practice (TIP). The sample was BSW (49%) and MSW students (50%), had an average age of 26.5 years (range=18-55), and identified as primarily female (85.5%) and White (82%). This study focuses on Life Events Checklist (LEC-5) to measure adversity and trauma exposure. The study aims to find a correlation between LEC-5 and TIP, LEC-5 and Trauma-Informed Knowledge, LEC-5 and Trauma-Informed Attitudes, and Self-Related Competency (SRC) for trauma-related practice and LEC-5. SW students reported lifetime trauma exposure (M=13.5 out of a possible 68; LEC-5). Findings suggest personal experience with trauma predicts TIP and trauma-focused coursework is an effective competence-building experience and should be included in SW education. This study also highlights the need for TIP measurement tools for SW practice.

HENRY HALL ATRIUM 087

The Effects of Carbonate on *C. albicans* Biofilm Formation, Filamentation, and Antifungal Resistance

Participants attending 9:00 AM - 10:00 AM
Presenter: Trenton Miedema
Mentor: Ian Cleary

Candida albicans, a member of the normal microbial population of healthy humans, is an opportunistic pathogen

that can cause serious disease in immunocompromised patients. An important virulence trait of *C. albicans* is the formation of biofilms. These organized communities of cells are efficient at attachment to host cells and implanted medical devices. Carbonate has been studied as an agricultural antifungal agent and we are examining whether carbonate can affect biofilm formation, filamentation, and antifungal drug resistance.

HENRY HALL ATRIUM 088

Potential Charges of the Atoms in Li_2CO_3

Participants attending 12:00 PM - 1:00 PM
Presenter: Edward Fowler
Mentor: Christopher Lawrence

The combustion of coal and the incineration of municipal waste generate acidic oxide SO_2 and protic acid HCl. They can be removed by wet scrubbing with calcium carbonate or calcium hydroxide. The molten alkali carbonate Li_2CO_3, works as a liquid state alternative. Previous research has shown that Li_2CO_3 can remove these gases while rarely interacting with any water present. The goal is to perform quantum calculations to determine the potential charges of each atom in molten Li_2CO_3. The charges help us to build a better model and from this we can better understand how Li_2CO_3 interacts with other molecules.

HENRY HALL ATRIUM 089

Confirmation of the Hammet Postulate: The Effect of Substituents and Predictability of 1H, 13C, and 31P NMR Sshifts

Participants attending 2:00 PM - 3:00 PM
Presenters: Georgia Sands, Katherine Wyniemko
Mentor: John Bender

The Hammet Postulate is a method that allows for the prediction of chemical structure and function properties. Although the Hammet Postulate has no basis in thermodynamics, it has had great success in describing correlations between substituents. Sigma values are used to quantify the Hammet Postulate, and originate from pKa changes that substituents induce on benzoic acid. In this study, we explored and analyzed the effect of various electron withdrawing and donating substituents bound to an aniline in accordance with the Hammet Postulate. We furthered our study with experimental procedures to compare the effect of the various substituents when reacted with phosphorous containing compounds. We have found that the Hammet Postulate sigma values accurately predict the trend on 1H, 13C, and 31P NMR shifts.

HENRY HALL ATRIUM 090

Do Different Types of Social Exclusion Elicit Different Behavioral Reactions?

Participants attending 10:00 AM - 11:00 AM
Presenter: Alyssa Flowers
Mentor: Kristy Dean

How do people react after experiencing social exclusion? Richman and Leary (2009) argue that behavioral reactions after exclusion depend on various circumstances (e.g., fairness) or the type of relationship one has with their excluder. Williams (2007) argues that behavioral reactions depend on the degree of threat to four fundamental needs. The current study draws from these theories to better understand the conditions under which people engage in social withdrawal or prosocial or antisocial responses after a social exclusion experience. We predict that social

withdrawal behaviors will occur after chronic exclusion. Prosocial behavior is expected to occur when people are excluded by a high value relationship partner, or when they have opportunities to connect with other people. Antisocial responses are expected when social exclusion is unexpected or unjust. We also plan to examine whether certain personality attributes like rejection sensitivity, introversion versus extroversion, and attachment style impact these possible relationships between exclusionary events and their behavioral reactions.

HENRY HALL ATRIUM 091
Stability of Microdroplet Compartments from Complex Coacervation
Participants attending 1:00 PM - 2:00 PM
Presenter: Brett Vincent
Mentor: Fatma Pir Cakmak

A variety of biological functions depend on spatial arrangement to support the essential processes of life.[1] Within cells there are compartments, organelles that serve functions such as sequestering biomolecules and spatiotemporal reaction control. Compartmentalization is one of the critical characteristics for modeling synthetic and protocells. Modelling compartmentalization could help create sites of drug synthesis and delivery, mimic intracellular processes, and more. Mimicking a fundamental property of cells through compartmentalization provides a bottom-up approach to study cell functions.[2] Through the use of liquid-liquid phase separation (LLPS) to assemble biopolymers, biological task regulation and functions of compartments could be mimicked in *in vitro* cell models. We are going to focus on LLPS through complex coacervation.[1] Coacervation can be accomplished by utilizing molecules with opposite charges or through altering the solvation of a biopolymer. These macromolecules form a dense organic-rich phase with a macromolecule depleted supernatant phase in associative phase separation. The coacervate phase is scattered throughout the continuous dilute phase in the form of microdroplets.[3,4] Our investigation involves analyzing the physical characteristics of biomolecules through fluorescence, investigating the rates of diffusion, and exploring physical factors such as salt concentrations (Hoffmeister series anions) to determine under what conditions these compartments can remain stable.

HENRY HALL ATRIUM 092
The Pharmacokinetic Properties of 5 Sulfonamide Antibiotics in the Greater Wax Moth, *Galleria mellonella*
Participants attending 12:00 PM - 1:00 PM
Presenters: Kendahl Overbeck, Marcel Wiggins
Mentor: Babasola Fateye

In vivo models are essential for testing the effectiveness of new drugs. Less-sentiment invertebrates are a cheaper alternative to rodents for drug screenings. If changes in drug levels can be measured efficiently over time in invertebrate tissues (pharmacokinetics), such studies in invertebrates can be used to predict dosing in humans. This study used larvae of *Galleria mellonella* (Greater Wax Moth) to assess the (i) toxicity of 5 sulfonamide antibiotics, (ii) the *in vivo* effectiveness of these antibiotics in treating E. coli infections G. melonella, and (iii) the pharmacolinetic properties of the sulfonamides. Preliminary results show that low doses of the drug Sulfamethoxazole (SMX) alone is nontoxic, but demonstrated dosedependent antibacterial effectiveness against E. coli *in vivo*. LCMS method development for SMX is ongoing.

HENRY HALL ATRIUM 093

Characterizing Arbuscular Mychorrizal Associations in Managed Oak Savanna Ecosystems

Participants attending 9:00 AM - 10:00 AM
Presenter: Jake Stuck
Mentor: Jennifer Winther

There are many plants that benefit from forming associations with arbuscular mycorrhizal fungi (AMF). These associations are critical in enhancing the plant's resource absorption, abiotic stress tolerance, and resistance to pathogens and herbivores. There is a growing body of literature focused on understanding the impact AMF has on native plants and in particular on the success of restoration efforts with native plants. We continue to conduct a long-term study in partnership with the Land Conservancy that examines various aspects of restoration efforts in the historically mixed oak savannas with sections of open oak-hickory forest ecosystems at the B.D. White and Brower Lake Nature Preserves. This study characterized the AMF association with roots of native perennial and annual plants in the ground layer, as well as the impact of this association on the soil environment. This study focused on determining if AMF colonization differs between treated (fire and girdling) and untreated sites, if AMF richness and diversity differ between sites, and if soil Glomalin concentrations differ between sites. This study is the first of many to understand the role of fungi in the long-term restoration goals of these sites.

HENRY HALL ATRIUM 094

In Vivo Effectiveness of Linalool in Pseudomonas Aeruginosa Infection in Galleria Melonella

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM
Presenters: Micaela Manschula, Marcel Wiggins
Mentor: Babasola Fateye

Antibiotic resistance is becoming more common. Resistance in the highly virulent, facultative anaerobe Pseudomonas aeruginosa is a challenge for healthcare. There is a need to develop and assess new antibacterial treatments for this and other medically important infections. Linalool oil has natural antibacterial properties and part of this testing is to see if there is any therapeutic benefit that can help treat antibiotic resistant bacteria infections.

Drug effectiveness studies are usually done in rodents, which are expensive. This experiment was designed to (i) determine lethal doses of pseudomonas bacteria in Galleria Mellonella in vivo (ii) to assess the effectiveness of Linalool oil in treating Galleria infected with pseudomonas.

Preliminary data so far has shown higher lethality of Pseudomonas on day 2 after infection. Pseudomonas was more virulent than E.Coli was (LD75 at 2 x10^5 vs < 2 x 10^4 colony forming units, respectively). Experiments are ongoing to assess the acute toxicity of linalool and its effectiveness in P aeruginosa

HENRY HALL ATRIUM 095

Communicating Science Through Visuals

Participants attending 9:00 AM - 10:00 AM
Presenter: Kassandra Baker
Mentor: Chris Reed

Medical illustration integrates art and biomedical science. Anatomical illustration is important for medical education and communicating scientific ideas about the human body. This project is a compilation of anatomical drawings and graphics of organ systems, organs, and tissues using both traditional drawing methods and digital media. This portfolio displays the skills I will be using as a future medical illustrator.

HENRY HALL ATRIUM 096

The Effects of Misogynistic Views of Women in Social Media and the Impact Negative Views Have on the Developing Adolescent Brain

Participants attending 9:00 AM - 10:00 AM
Presenter: Samantha Slanger
Mentor: Julia Mason

I will explore the prevalence of negative opinions of women in social media as well as the connection between these negative views and the developing adolescent brain, which can lead to a cycle of misogyny and reinforced patriarchal ideas. This study will bring awareness to the harmful stereotypes and ideas that are being spread to young impressionable minds and showcase the detrimental effects. I will pull examples from a podcast titled “Fresh and Fit” where misogynist comments are commonly made and spread throughout social media. I will then compare that information with the science behind socialmedia use and the brain to explore the detrimental effects inegative views can have on mental health and overall cognitive function. I will showcase and analyze data on cognitive function and the different areas that are affected by overuse of social media. This topic is relevant to society today in the wake of the overturning of Roe v. Wade, heightened polarization, and the use of social media to spread ideas to anyone and everyone. I'm hoping this information will cause people to background-check information they find on social media and use social media in a smarter, more beneficial way than before.

HENRY HALL ATRIUM 097

Preventing Agricultural Runoff and What that Means for Large Farms

Participants attending 9:00 AM - 10:00 AM
Presenter: Laura Colley
Mentor: Ramya Swayamprakash

Agriculture and food industries contributed $1.264 trillion to the U.S gross domestic product in 2021; to meet the need for food in the United States the agriculture and food industries seek quicker means of production and prevention of crop loss on an ever-larger scale. Before the 1950's many crops were grown on small family farms with little to no chemicals used. Around 1982, as more land was devoted to farm use and the demand for grain and other common crops increased, so did the need for fertilizers. Since 1960, nitrogen had the steepest increase in use. By 2015 nitrogen accounted for more than 20 percent of the total fertilizer usage. Nitrogen is primarily found in organic forms but can also occur as nitrate, which is very mobile and often causes algal blooms and can contaminate the water. I wanted to investigate local farms regarding their approach to fertilizing their crops and how they prevent runoff, along with general questions about their current farming practices. I wanted to find where new

approaches to going fertilizer-free were occuring (creating biodiversity, buffer strips, biofertilizers, etc.).

KIRKHOF CENTER GRR 001

Study of miR-7 and miR-153 Mimics in Parkinson-like Neuronal Cells

Participants attending 12:00 PM - 1:00 PM
Presenter: Zane Walters
Mentor: Sok Kean Khoo

Parkinson's disease (PD) is a neurodegenerative disorder affecting over 10 million people worldwide. It is characterized by the death of dopaminergic neurons and the abnormal buildup of alpha-synuclein protein in the midbrain. MicroRNAs (miRNAs) are short RNAs that can bind to specific messenger RNAs (mRNAs) to regulate gene expression or protein translation. Here, we studied the effects of miR-7 and miR-153 mimics on alpha-synuclein gene expression in PD-like neuronal cells. We hypothesized that miR-7 and miR-153 mimics would reduce alpha-synuclein gene expression in those cells. We treated the SH-SY5Y cell line originated from neuroblastoma with retinoic acid, brain-derived neurotropic factor, and rotenone to function as a PD-like cell model. Cells were then transformed with miR-7 or miR-153 mimics and their concentrations of alpha-synuclein RNA were analyzed by quantitative real-time PCR. Both miRNAs induced up-regulation, instead of down-regulation, of alpha-synuclein gene expression, probably due to an unknown negative feedback loop triggered by initial gene down-regulation.

KIRKHOF CENTER GRR 002

Muscle Oxygenation Responses of Lower Leg from Pedaling Interruptions During One Hour of Seated Video Games

Participants attending 9:00 AM - 10:00 AM
Presenters: Garrett Falk, Madalyn Hickey, Gabriele Peters
Mentor: Nicholas Lerma

Purpose/Intro: In the United States, people played video games for an average of 7.5 hours per week with competitive players accumulating up to 8 hours per day. Most time spent gaming is in a sedentary behavior which is linked to decreased musculoskeletal, endothelial, and cardiovascular health. The purpose of this study is to analyze the effect of sedentary behavior on muscle oxygenation within the lower limbs. Methods: College aged participants (age 20.7 ± 1.6 years) were recruited to participate in this randomized crossover study. Participants performed 60 minutes of seated first-person shooter video games on two separate visits with one visit interrupted with two 3-minute seated pedaling bouts. Before and after each gaming session the participant underwent a flow-mediated dilation (FMD) protocol on the lower leg. Throughout the entire laboratory session the participant wore a near-infrared spectrometry device (MOXY) on the tibialis anterior and soleus muscle to measure local muscle oxygen saturation and total hemoglobin. Repeated measures ANOVA was performed to determine differences by time and group. Results: Data collection is currently underway.

KIRKHOF CENTER GRR 003

The Fashion Crisis: Conquering Unsustainable Trends One Thread at a Time

Participants attending 1:00 PM - 2:00 PM
Presenter: Hailey Bos
Mentor: Ramya Swayamprakash

The fashion industry accounts for 10% of our global carbon dioxide emissions, produces a fifth of the 300 million tons of plastic waste on a global scale annually, and consumes 93 billion metric tons of clean water each year. But beyond those staggering numbers, producing textiles on a mass scale for so many years has had a devastating effect on our planet Earth–and much of it is beyond our repair. I am striving to heighten awareness of the unsustainable methods the fashion business has been utilizing for decades through social media, marketing, and campaigns. I also hope to develop more sustainable methods for buying, wearing, and recycling clothing on an individual level. Demonstrating sustainable practices for everyday consumers will benefit the local community and eventually branch out to a global scale (as long as we all transform our unsustainable practices into sustainable ones). For the health of our planet, people need to be aware of humanity's negative impacts with something as simple as clothing choices; we also need to make big changes within the fashion industry as a whole.

KIRKHOF CENTER GRR 004

5 Factors To Develop Academic Self-Concept and Self-Efficacy In College Students

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Cabdulcasiis Ciise
Mentor: Jamie Owen-DeSchryver

There are several factors that are known to positively impact college students' academic performance. Among these factors, positive academic self-concept and self efficacy stand out as significant. In fact, after conducting a review of the research literature on the subject, I have identified five factors that are strongly correlated with college academic success. In this presentation, I will be describing these five factors and how they can help college students achieve success. Additionally, I will also be sharing my own experiences as a student who struggled with performing well in school but was able to use the strategies from this review to improve and achieve academic success.

KIRKHOF CENTER GRR 005

Marginalized in Academia: A Guide to Disability Studies

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Noelle Charbonneau
Mentor: Leigh Rupinski

Although many academic institutions in recent years have begun researching disability outside of a clinical context, few have dedicated programs of study or resources available to scholars. Considering this gap and the University Libraries' commitment to inclusion and diversity, I set out to create a library resource guide to introduce GVSU students to disability studies research. In doing so, I discovered several challenges that could hinder students' research, including limited resource availability and antiquated search terms. After identifying these issues, I sought to expand the guide's purpose to also include research tips and explanations about gaps in resources to help students who get stuck while researching. Through this project, I was able to reflect on my abilities as a researcher to address an underrepresented subject in our University Libraries catalog.

KIRKHOF CENTER GRR 006

The Effect of Beet Extract on the Vascular Reactivity of Renal Arteries

Participants attending 3:00 PM - 4:00 PM
Presenters: Kyle Fish, Madeline Johnson
Mentor: Francis Sylvester

The primary purpose of this study was to determine the effect of red beetroot (*Beta vulgaris rubra*) on the vascular reactivity of renal arteries. Initially, 1 gram of beet powder was diluted in 10 mL of Krebs-Henseleit solution. Porcine renal arteries were dissected, cut into 5 mm rings, and then mounted in isolated organ baths coupled to force transducers. Some of the renal arteries were denuded prior to mounting in the organ baths; this was done to determine the potential role of the endothelium in mediating the observed vascular responses. Following a 1-hour equilibration period, the arterial rings were treated with increasing concentrations of potassium chloride (15-60 mM KCl), a potent vasoconstrictor, followed by increasing concentrations of acetylcholine ($1x10^{-8}$-$1x10^{-4}$ M ACh), an endothelium-dependent vasodilator, and sodium nitroprusside ($1x10^{-8}$-$1x10^{-4}$ M SNP), an endothelium-independent vasodilator. Renal arteries were then treated with increasing concentrations of phenylephrine ($1x10^{-8}$-$1x10^{-6}$ M Phe), a receptor-mediated vasoconstrictor. After preconstricting with phenylephrine, the arterial rings were treated with increasing concentrations of beet powder solution ($1x10^{-7}$-$1x10^{-2}$ g/mL).

KIRKHOF CENTER GRR 007

Biomechanics Of a Fall from Height

Participants attending 11:00 AM - 12:00 PM
Presenter: Madeline Becker
Mentor: Richard Vallery

Falls from a height involving fatality or serious injury will be examined. The examination of the body and the final landing position are often the only concrete evidence when investigating a fall, making both a crucial part of the analysis. Based on the final landing position, trajectory can be calculated and tested to determine under what conditions the fall occurred. Varying initial conditions, such as launch angle and initial velocity, can help investigators determine whether the fall is consistent with a slip, push, or jump. In addition to the final position, what happens to the body at impact is also crucial information necessary for the investigation. Injuries inconsistent with those a fall could cause, based on the impact force or contact with other objects, may indicate whether injuries are a direct result of the fall, or occurred prior to or post fall. Our study emphasizes the impact force, examining the peak force and how it is distributed throughout the body for various fall positions. Force probes are used on simplified human body models to measure the impact force.

KIRKHOF CENTER GRR 008

The Switch to Sustainable Laundry Detergent

Participants attending 1:00 PM - 2:00 PM
Presenter: Brianna Bumgardner
Mentor: Ramya Swayamprakash

Laundry does not have to be *both* a laboriously mundane task and atrociously negligent to the environment. Most people don't like to do their laundry because it takes hours, can be a hassle, and is a tedious task. However, most people don't know the lasting, negative, impact to the environment that the prosaic task of doing laundry can inflict. Most detergents come in large, plastic containers or jugs that are more than likely thrown away when the detergent

is consumed. These canisters end up in landfills all over the world. The laundry detergent containers in landfills sit for as long as 1,000 years before they are finally broken down by the conditions and end up as microplastics in the environment. There is now a solution to this problem that does not involve bulky plastics at all and is completely carbon neutral and biodegradable. Biodegradable laundry detergent is a completely sustainable alternative to the traditional laundry detergents such as “Tide” and “Gain.” The easy and simple switch to sustainable forms of laundry detergent such as laundry sheets can have a lasting impact on the world and the environment as a whole.

KIRKHOF CENTER GRR 009

Utilizing Pro-Inflammatory Cytokine from T Cells to Understand Hygiene Hypothesis

Participants attending 2:00 PM - 3:00 PM
Presenter: Elizabeth Borton
Mentor: Kristin Renkema

Hygienic practices are a hallmark of the United States, but scientists have begun questioning whether a high degree of cleanliness is suitable long term. Our lab’s research broadly investigates the Hygiene Hypothesis, which hypothesizes increasingly sterile and antimicrobial practices, especially with younger children, is now impacting immune responses. More specifically, we looked at the connection of hygiene and combating cancer using the B16 melanoma model in specific pathogen free C57Bl/6 mice (SPF) and C57Bl/6 mice cohoused with pet store mice (CoH). We observed that CoH mice have reduced tumor sizes when compared to SPF mice. We used an ELISA kit to detect IFN-g, a pro-inflammatory cytokine that is produced by T cells, in spleen and tumor samples stimulated with anti-CD3 and anti-CD28. We found that splenic T cells from CoH mice more rapidly produced IFN-g when compared to SPF mice. Increased sample size is required to determine whether differences in IFN-g production exist in tumor samples. Overall, our data suggests that tumors from CoH mice have increased IFN-g, and therefore perhaps have more efficient anti-tumoral immune responses.

KIRKHOF CENTER GRR 010

3D Scanning and Mapping Heritage

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenters: Zoya Deen, John O'Dell, Michelle Oberlin
Mentors: Steven Dorland, Wesley Jackson

3D scanning technology is a helpful tool used by archaeologists in museums and organizations to assist in cultural heritage preservation and community engagement with materials. This project involves ceramic artifacts from prehistoric and historic sites that are currently housed in the GVSU Anthropology Department collection. Artifacts were scanned with the RevoPoint Mini Scanner and the POP 2 High-Precision 3D Scanner, then processed in RevoStudio and MeshLab, resulting in high quality 3D models. We review the experience of using 3D scanning technology and mesh processing software and highlight the benefits to heritage conservation, including using this technology to make cultural materials more accessible to Tribal Nations. Through this project, we aim to highlight the great potential of 3D scanning technology in archaeology and cultural heritage preservation.

KIRKHOF CENTER GRR 012

Searching for Continuous Gravitational Waves from Neutron Stars

Participants attending 10:00 AM - 11:00 AM
Presenter: Keegan Hawkins
Mentor: Dirk Pandel

Gravitational waves have become recently popular in the astrophysics community since the first detection from the LIGO facility. Gravitational wave detectors have so far observed over 90 events of merging black holes or neutron stars. These merger events result in a short burst of gravitational waves. Other than in a merger, neutron stars are also expected to generate gravitational waves due to their rotation both when isolated and in a binary. While these gravitational waves are continuous, they are much weaker and harder to detect. These isolated neutron stars emit gravitational radiation due to asymmetries in the distribution of the mass of the star. The asymmetric deformations can, for example, be caused by strong magnetic fields in the core of the neutron stars. In this project, I will investigate methods for detecting continuous gravitational waves and apply them to LIGO data to search for signals from an isolated neutron star.

KIRKHOF CENTER GRR 013

Encourage Use of Reusable Shopping Bags

Participants attending 11:00 AM - 12:00 PM
Presenter: Rebecca Terryberry
Mentor: Ramya Swayamprakash

For my project I wanted to reduce the use of single use plastic shopping bags and get people and communities to use/normalize reusable shopping bags. Many states across the U.S. have already banned the use of single use plastic shopping bags and Michigan should join them. According to the U.S. International Trade Commission, the 100 billion plastic shopping bags in use each year in the U.S. are made from the estimated equivalent of 439 million gallons of oil, and cost retailers an estimated $4 billion. On top of major pollution from plastic bags, they use large amounts of oil to be produced. The harm that these single use bags bring to the environment can be avoided easily if people took action. With my project, I plan on reaching out to people to push the usage of reusable bags instead of plastic ones. Stores have started selling them for ten cents but there is no push to use them. People don't want to put in effort to use reusable bags but I want to change their way of thinking. I hope that this project will help many communities realize the harm of plastic shopping bags and start using reusable shopping bags.

KIRKHOF CENTER GRR 014

Environmental Studies and Sustainability

Participants attending 12:00 PM - 1:00 PM
Presenter: Samantha Brandon
Mentor: Ramya Swayamprakash

The issue I would like to tackle is food waste. Grand Valley State University has a composting system in the dining places on campus, but in the dorms there’s sometimes not even recycling areas open for use. As a result, a ton of recyclable materials and food waste gets thrown out in the dumpster. Food waste is relevant to me because I don’t always use all of the food I buy. There’s no place to deposit food scraps in the dorms, however, so all of my food scraps go in the trash. This is extremely wasteful, and like myself, there’s little chance that anyone else in the dorms is going to be making a significant effort to curb their food waste and where it ends up without a solution

being easy and accessible. Reducing the amount of food scraps that end up in landfills slows the rate they fill up at. It also allows food waste to be reused as compost, which can make gardening easier and more accessible. This decreases the need for commercially grown food, however slightly, and therefore also helps reduce the environmental impact that commercial farming has.

KIRKHOF CENTER GRR 015

Sphere of Influence/Ecobricks

Participants attending 3:00 PM - 4:00 PM
Presenter: Amani Jones
Mentor: Ramya Swayamprakash

For my sphere of influence project, I am focusing on eco-bricks, an easy way to recycle and reuse plastic with the overall intent to reduce the amount of plastic found in landfills and to ensure that plastic is being recycled. Eco-bricks are any type of plastic bottle, packed with washed and dried pieces of soft plastic. Once the bottle reaches the weight requirement, the bricks can be donated to build small houses and schools, or they can be kept for personal use (for things like gardens or art projects). While eco-bricking is not an all-encompassing solution to pollution, it helps keep plastic out of landfills for as long as possible by giving it a second chance to be useful. With a weight requirement of about half a pound, one brick could take a few months to be finished correctly, but eco-bricking is also not an excuse to go out and purposely buy single-use plastics to complete a brick. Because it is challenging to avoid plastic entirely, I wanted to provide a easy, temporary solution for reducing, reusing, and recycling single use, soft plastics.

KIRKHOF CENTER GRR 016

Farm Animal Assisted Therapy

Participants attending 10:00 AM - 11:00 AM
Presenter: Gina Hess
Mentor: Dawn De Vries

This presentation will be about how farm animal assisted therapy can reduce depression, anxiety, and improve social skills in persons with psychiatric disorders. Farm animal assisted therapy includes a variety of farm animals and interventions to help individuals of all ages improve their mental health.

KIRKHOF CENTER GRR 017

Seeing Me for Me

Participants attending 9:00 AM - 10:00 AM
Presenter: Naomi Baker
Mentor: Dawn De Vries

This presentation is about whether or not inclusion-education is eductionally beneficial for classmates of peers with various disabilities . I focus on inclusion-education at the elementary-school level.

KIRKHOF CENTER GRR 018

Benefits of Including Siblings of Children with Disabilities in Adaptive Sports Programs

Participants attending 10:00 AM - 11:00 AM
Presenter: Heather Bowns
Mentor: Dawn De Vries

This presentation will discuss how recreational therapists can include siblings to children with disabilities into adaptive sports programs. The research will dive into how inclusive sports can benefit the sibling by working to address their emotions and coping skills related to their sibling with a disability.

KIRKHOF CENTER GRR 019

Dialectical Behavior Therapy for Major Depressive Disorders

Participants attending 9:00 AM - 10:00 AM
Presenter: Michelle Newton
Mentor: Dawn De Vries

This presentation will discuss the benefits of Dialectical Behavior Therapy for people with depression.

KIRKHOF CENTER GRR 020

Psychedlics in Mental Health

Participants attending 10:00 AM - 11:00 AM
Presenter: Jade Squires
Mentor: Dawn De Vries

This presentation will be about the benefits of psychedelics in mental health disorders.

KIRKHOF CENTER GRR 021

Understanding the Relationship Between Age, Self-compassion, and Job Satisfaction

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenter: Carly Andrus
Mentor: Benjamin Walsh

Self-compassion (SC) refers to how we treat ourselves in instances of perceived failure, inadequacy, or personal suffering. Previous literature suggests that as we age, the wisdom that comes from maturity and experience allows for a kinder and more balanced stance toward oneself that recognizes the shared nature of human suffering. Additionally, SC enhances one's motivation and well-being, supporting highperformance standards and personal initiative, which suggests that workers who are more selfcompassionate will have more positive attitudes about their job, including job satisfaction (JS). We hypothesize that as we increase in age, we become more self-compassionate (H1), and higher levels of SC are positively associated with JS (H2). Our hypotheses were tested using survey data from 971 participants, that measured their perceived levels of self-compassion and job satisfaction with validated measures. Ordinary least squares regression analysis was used to test hypotheses with these data. Results supported both hypotheses: age is positively associated with higher levels of SC, and higher levels of SC are associated with higher JS. Our results replicate prior research concerning the link between age and self-compassion and help clarify inconsistent findings in the literature regarding the relationship between self-compassion and job satisfaction.

KIRKHOF CENTER GRR 022

Effects of Remote Vignette-Based Training on Social Initiations of Young Adults with Autism

Participants attending 1:00 PM - 2:00 PM
Presenter: Emily Murray
Mentor: Amanda Karsten

People with Level 1 autism have few work opportunities compared to neurotypical peers due to differences in soft skills. This study evaluates a training package for conversational initiations at work. Participants are young adults with autism who have interest in new jobs or internships. Prior to the study, an employer survey was conducted to examine (a) the social validity of experimenters' definition of appropriate conditions to initiate conversation and (b) whether vignettes were ecologically valid with respect to common conversational opportunities in the workplace. Participants with autism will receive vignette-based training via videoconference on when to initiate conversation, based on three contextual decision-making factors (e.g., whether the individual was expecting to interact with them at that time). Additionally, investigators will assess initiation decisions in simulated work scenarios before and after training.

KIRKHOF CENTER GRR 023

Vietnamese and English Interpretation of Expressions Throughout Generations.

Participants attending 11:00 AM - 12:00 PM
Presenter: Ammy Huynh
Mentor: Josita Maouene-Cavin

There is a lack of data on developmental bilingual English and Vietnamese speakers. We specifically wondered how expressions from different generations were interpreted. In particular, when the expression is uncommon to a generation do they revert back to a literal (concrete) meaning rather than treating it as a figurative (abstract) meaning? We asked 19 participants ranging from ages 18 to 65 years old and older to participate in an association task. Participants were given 15 expressions, 10 in English and 5 in Vietnamese, and prompted to type the first word or phrase that came to their mind; this was repeated 3 times. The interrater reliability showed an agreement of 93% and a Kappa of .84. The overall results indicate that the participants whose dominant language is English reverted significantly less to a literal interpretation of the expressions than the participants whose dominant language was Vietnamese, respectively 35.09% to 24.25%. When comparing 5 random expressions in English to 5 Vietnamese expressions, the Vietnamese dominant increased their figurative comprehension by 12.73%.

KIRKHOF CENTER GRR 024

How to Elicit Associations About People in Younger Children: A Comparative Study with Judgements

Participants attending 2:00 PM - 3:00 PM
Presenters: Bekah Cole, Ramnit Saini
Mentor: Josita Maouene-Cavin

The objective of this study was to find a method to elicit associations pertaining to people and objects from young children (3.5-6 years old) since the original pilot study had been unsuccessful. The new method consisted of asking the younger children to close their eyes and tell us what they saw in their minds when they heard the word “babysitter” or “clown”, for example. We were successful at enticing the children to provide associates

such as “baby” and “grandma and grandpa” with “babysitter,” and “red nose”, “colorful hair”, and “colorful shoes” with “clown”. Then we created networks of these words and their associates and compared their results with the associates in older children (7-10 years old) along with the networks for judgements on the same terms collected from a former study for both age groups. The comparison allowed us to determine what core keywords overlap across development.

KIRKHOF CENTER GRR 025

The Observed Similarities Between Blocking Events in Speech and Music.

Participants attending 12:00 PM - 1:00 PM
Presenter: Elizabeth Aprahamian
Mentor: Beth Macauley

For a professional musician, the ability to play fluently is vital to finding work and maintaining a good reputation. Unfortunately, brass musicians may experience blocking while playing their instrument. Blocking is a disfluency where muscles tense and the person is unable to perform the movement. For example, as a trumpet player prepares to play the first note, they bring the trumpet to their lips and inhale in preparation for their signal to start but are not able to blow out. The trumpet player’s muscles are “stuck" and no air is pushed into their instrument as they attempt to play. After a moment of uncomfortable struggle, the first note is finally released. From the perspective of speech-language pathology, the characteristics of blocking while playing a brass instrument appear to be similar to the characteristics of blocking while speaking in people who stutter. The purpose of this study was to compare the characteristics of blocking in brass musicians to the characteristics of blocking during speech by integrating the results of two different surveys of brass musicians. Many similarities between the blocking behaviors in speech and music were found through qualitative analyses of responses to short answer survey questions from 356 brass musicians.

KIRKHOF CENTER GRR 026

Empowering Youth Through Employment

Participants attending 11:00 AM - 12:00 PM
Presenter: Faith Williamson
Mentor: Jamie Langlois

According to the Social Science Research Counsel 12.6% of America’s youth are disconnected, meaning they are individuals who are not in school nor working (SSRC). Disconnected youth are two times more likely than their counterparts to live in poverty. Through the project Empowering Youth Through Employment, I aim to support The Other Way Ministries (TOW) with their summer youth employment program through protocol creation and connecting with existing programs. From the research and collaboration with The Other Way Ministries, I will assist to implement an intentional structure for how the program is/will be run, take part in the preparational steps for this upcoming summer, and work to create a connection between TOW and Grow1000. Without access to resources such as youth employment services, youth who currently live in poverty are likely to remain in this reality. By supporting The Other Way’s youth employment program, Grand Rapids' South West side youth will have easier access to and benefit greater from this program. Opportunities, resources, and connections are too often a privilege. It is time that all individuals in America are given a better fighting chance to achieve financial stability.

KIRKHOF CENTER GRR 027

Middle Eocene Vertebrate Microfossil Screen Washing Investigation

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenters: Stephanie Brzeczek, Jeffrey Catron, Meryl Luoma-Mannisto, Ella Puffer, Dylan Ruiter
Mentor: Laura Stroik

Vertebrate microfossils reveal critical information about the ecology of the past, serving as faunal indicators of climatic fluctuations. The middle Eocene (ca.43.8-42.5 Ma) site of the Uinta Basin, located in northern Utah, not only preserves an extensive vertebrate fauna but is also coincident with the Middle Eocene Climatic Optimum. The goal of this project is to increase the sample size of vertebrate microfossils from this site by using multiple screen-washing techniques. Samples of matrix collected from fossiliferous localities (N=13) within the Uinta Basin underwent a combination of dry sieving, wet sieving, and/or a chemical wash, based on each sample's composition to break down the sediment. The concentrate of each sample was then examined under a microscope to find vertebrate microfossils. Results of a case study on WU-117 indicate that screen-washing is effective: wet sieving removed ~60% and the chemical wash removed ~5% of the total mass. After picking through all localities, 19 fossils were discovered and 6 were identifiable. Our investigation will aid in furthering our understanding of how vertebrate species and their communities responded to changing environmental conditions, which can be applied to modern vertebrates and today's changing global climate.

KIRKHOF CENTER GRR 028

Leisure Education for Parents of Children with Disabilities

Participants attending 10:00 AM - 11:00 AM
Presenter: Calysta Bailey
Mentor: Dawn De Vries

This presentation will be about leisure education interventions for parents of children with disabilities. The research dives into the parental journey of parents of children with disabilities and how the health field, specifically therapeutic recreation, can aid them with their experiences.

KIRKHOF CENTER GRR 029

Tiny Homes in a Big World

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Mason Burkeen, Alyssa Westerink
Mentor: Amanda Buday

In this presentation, Mason Burkeen and I researched tiny homes and their implementation into today's society and housing markets. Mason has experience in construction and has built two tiny homes, both of which are included in our presentation. I focused my research on the application of green development and sustainable building within tiny home construction and livability, while also looking into the potential for tiny homes as housing for marginalized populations in areas of poverty, environmental injustice, and other discriminatory situations. We constructed a website containing our research as well as videos of Mason throughout the construction process for his second tiny house. We plan to publish our website while also giving a presentation on our project and what we have accomplished.

KIRKHOF CENTER GRR 030

New Biomarkers for Mild Traumatic Brain Injuries

Participants attending 10:00 AM - 11:00 AM
Presenter: Maya Varela
Mentor: John Capodilupo

Concussion, also known as mild traumatic brain injury (mTBI) is defined as having a mild blow to the head or violent shaking of the head and body. The diagnosis for a concussion is not evident when doing a physical exam. Computed tomographic scans and magnetic resonance imaging are tests that can be done that do not provide enough evidence to diagnose a concussion. There is now research that supports about eleven new biomarkers to detect a concussion. The S100B protein has been studied the most for detection of a concussion as its function is to be a neurobiochemical marker for traumatic brain injury. Concussions can happen anywhere, but more commonly can occur in a sports game at any age. The new biomarkers could help distinguish the severity of each concussion and better evaluate the recovery time of the athlete.

KIRKHOF CENTER GRR 031

Interprofessional Education: Who is Learning from Whom?

Participants attending 9:00 AM - 10:00 AM
Presenter: Abby Dunster
Mentor: Beth Macauley

In today's world of specialized care, improving outcomes for patients and students requires collaboration. Students and professionals in one profession must work together with professionals in other disciplines—as well as families and caregivers. Interprofessional practice (IPP) is a framework that makes this collaboration more successful in the industry, and interprofessional education (IPE) helps students develop the skills needed to work on these interprofessional teams. The National Academies of Practice is the only interprofessional group of healthcare practitioners and scholars in the United States dedicated to supporting affordable, accessible, coordinated quality healthcare for all and advocating for increased IPE in health care undergraduate and graduate programs. The purpose of this study was to analyze results from an interactive IPE poster presented at the NAP Conference in 2022. Attendees of the conference, leaders of IPE/IPP in their fields, were asked to draw lines on the poster between their profession and all other professions in which they practice IPE. This poster will discuss the analyses of which professions tend to conduct IPE which each others and which do not.

KIRKHOF CENTER GRR 032

The Effect of Instructor Feedback on Student Motivation in Undergraduate Chemistry

Participants attending 1:00 PM - 2:00 PM
Presenter: Lindsey Schmidt
Mentor: Brittland DeKorver

According to social constructivism and the self-determinism theory, knowledge is constructed via social interaction and social factors have the ability to undermine and facilitate intrinsic motivation. Though current research indicates that student motivation tends to decrease upon receiving disrespectful or vague feedback from instructors, there is little of this type of research done on undergraduate chemistry students. This project aimed to further investigate the relationship between instructor feedback and student motivation in chemistry courses by interviewing students currently enrolled in undergraduate chemistry classes. During each interview, an undergraduate student participant

was provided with various assessment feedback samples. Feedback differed across specificity and respectfulness: specific vs. vague and respectful vs. disrespectful, for a total of four feedback groups. Participants described their impressions of each type of feedback and the instructor providing feedback, and how receiving such feedback would impact their engagement in the course. Analysis of participant reactions was carried out via inductive coding. Results underscoring the impact of the relationship between the student and the professor on student learning will be presented on this poster.

KIRKHOF CENTER GRR 033

Testing the Feasibility of Heat Shock Protein Detection in Mammalian Feces

Participants attending 3:00 PM - 4:00 PM
Presenter: Sawyer Barton
Mentor: Cynthia Thompson

As climate change causes temperatures to rise, animals inhabiting stressful thermal environments will have less effective physiological responses to heat, putting species at greater risk of harmful heat stress. Heat shock proteins (HSPs) maintain protein stability and improve an organism's tolerance to heat. Current HSP sampling methods for free-ranging animals are often invasive, which has limited our ability to conduct longitudinal studies. To provide an alternative technique, we tested fecal matter from N=12 mammalian species spanning N=8 taxonomic orders for the presence of HSPs. Samples were lyophilized, and proteins were extracted and analyzed with enzyme-linked immunosorbent assays (ELISA). These results will determine the feasibility of a non-invasive method to measure HSP levels, leading to a greater understanding of HSPs in mammalian excretions, and facilitating a broad array of research questions.

KIRKHOF CENTER GRR 034

Prevalence of Axillary Arches on Cadavers at GVSU

Participants attending 11:00 AM - 12:00 PM
Presenter: Shane Byrne
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Laura Stroik

The axillary arch (AA), also known as Langer's muscle, is a small, irregular, vestigial muscle originating from the anterior portion of the latissimus dorsi to the pectoralis major. It runs superficial to the axillary artery, axillary vein, and nerves branching from the brachial plexus. The axillary arch can vary in length from 7 to 10 cm and 5 to 15 mm in width. It has no known function, and has become vestigial in humans. Information on its prevalence is inconsistent, with sampled individuals having an axillary arch ranging between 5% and 27%. In addition, the presence of this muscle on each side of the body is variable: the axillary arch can be either bilateral (38%) or unilateral (62%). The objective of this study is to increase the number of sampled individuals in order to refine current estimates of axillary arch prevalence. Twenty cadavers from Western Michigan (currently being housed at GVSU) were surveyed for the presence of an axillary arch. Both axillary regions on each cadaver were examined. The prevalence of the axillary arch is important for clinical situations, because the presence of an axillary arch can complicate surgeries in the axillary region.

KIRKHOF CENTER GRR 035

Psych Friends Peer-to-Peer Mentorship: Enhancing the Student Experience

Participants attending 3:00 PM - 4:00 PM
Presenters: Sydney Spotts, Marjorie Stowe
Mentor: Tessa Jordan

Peer Mentoring involves a relationship between two individuals who share similar experiences in which one has the capability of providing knowledge, skills, expertise, and support to the other (Verlinden). Peer mentoring offers benefits to both the mentor and mentee involved. Mentors gain the ability to enhance their own learning, practice self-reflection, fulfill their social needs, and learn the value of networking (Booth et. al., 2016). Moreover, mentees reap similar benefits as well as an increased sense of belonging, improved retention, and higher-grade point averages (Hall et al., 2020).

To enhance the student experience and increase student success, GV's psychology department developed a peer-to-peer mentoring program, Psych Friends. Between the years of 2021-2023 there have been a total of 22 mentors and 198 mentees served. The goal of this study is to assess the success of Psych Friends Peer-to-Peer Mentoring program by examining survey data collected from both mentors and mentees since the launch of the program in fall 2021. Results indicate Psych Friends has been successful in providing a positive experience for both mentors and mentees.

KIRKHOF CENTER GRR 036

Generative Art via Grammatical Evolution

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Abigail Diller
Mentors: Erik Fredericks, Jared Moore

Generative art produces artistic output via algorithmic design. Common examples include flow fields, particle motion, and mathematical formula visualization. Typically an art piece is generated with the artist/programmer acting as a domain expert to create the final output. A large amount of effort is often spent manipulating and/or refining parameters or algorithms and observing the resulting changes in produced images. Small changes to parameters of the various techniques can substantially alter the final product. We present GenerativeGI, a proof of concept evolutionary framework for creating generative art based on an input suite of artistic techniques and desired aesthetic preferences for outputs. GenerativeGI encodes artistic techniques in a grammar, thereby enabling multiple techniques to be combined and optimized via a many-objective evolutionary algorithm. Specific combinations of evolutionary objectives can help refine outputs reflecting the aesthetic preferences of the designer. Experimental results indicate that GenerativeGI can successfully produce more visually complex outputs than those found by random search.

KIRKHOF CENTER GRR 037

Taking a Quality Improvement Approach to Reduce Race and Gender Disparities in Nicotine Replacement Therapy Ordering and Administration

Participants attending 2:00 PM - 3:00 PM
Presenter: Kerri Stapley
Mentors: Elizabeth Davis, Kellie Riley

Inequities in healthcare are a known fact. Unfortunately little is being done at the unit level to address equity issues regarding race and gender for patients who are receiving care in a psychiatric medical unit. Behavioral health patients are identified as a vulnerable population, especially when hospitalized for psychiatric care, so steps should be taken to mitigate inequities throughout psychiatric hospitalizations. Nicotine withdrawal can manifest itself in behavioral symptoms, which can exacerbate the symptoms of patients experiencing acute psychiatric crises.

After reviewing quality metrics and variability among race and gender for patients who identify as current smokers and are receiving nicotine replacement therapy (NRT), the data revealed significant differences across race and gender. This demonstrates a lack of equity amongst patients receiving psychiatric care. The purpose of this project is to reduce the differences in NRT ordering and administration for patients admitted to the psychiatric medical unit, therefore improving equity in behavioral health.

We chose to implement nurse-driven protocols since NRT ordering is already a standardized, evidencebased orderset that is available as an orderset in the electronic health record. PDSA cycles will be utilized to assess and adjust the viability of the intervention.

KIRKHOF CENTER GRR 038

Investigation and Potential Clinical Applications of a Spinal Cord Stimulator

Participants attending 10:00 AM - 11:00 AM
Presenter: Naomi Cohen
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Laura Stroik

Chronic pain is an increasingly prevalent issue in health care, affecting approximately 20.4% of adults in the U.S. Although pharmacological interventions are effective for pain management, chronic opioid use is associated with negative side effects, including overdose and death. Spinal Cord Stimulation (SCS) is an effective alternative treatment for pain control and minimizes chronic opioid use. Metal contacts are placed in the epidural space, where an electric current passes through the contacts after being generated by a pulse generator. These electric currents initiate an action potential across the membrane, which enables a decrease in pain sensation. During routine dissection of a 77-year-old male cadaver, a speculated SCS device was discovered. The device was located deep to the thoracolumbar fascia with electrode leads located between the spinous processes of lower lumbar vertebrae. The subject's cause of death was noted as mesothelioma and coronary artery disease (CAD). CAD is linked to refractory angina pectoris, a condition resulting in severe chest pain. Bilateral, longitudinal scars above the cadaver's kneecaps were noted, suggesting a history of knee surgery and possible lower limb pain. SCS is an effective treatment for both conditions, and it is possible that this was the primary reason for its placement.

KIRKHOF CENTER GRR 039

Histamine-like Ilmunoreactivity in Secondary Cells of the Male Accessory Gland in *Drosophila melanogaster* Appears During Late Pupal Development

Participants attending 10:00 AM - 11:00 AM
Presenter: Jurrien Wilson
Mentor: Martin Burg

The accessory gland in *Drosophila melanogaster* is composed of primary cells and secondary cells (SCs). Secondary cells are specialized cells in which histamine (or histamine metabolite) immunoreactivity has been detected. Flies with a mutation in the *Hdc* gene, which disrupt histamine synthesis, do not have detectable levels of histamine immunoreactivity, establishing that histamine (or metabolites) are present in SCs. Mutations in the *Hdc* gene alters the male-induced post-mating response (PMR) of female receptivity as well as the number of accessory cells in males. Interestingly, expression of the *Hdc* gene has not been detected in SCs, so it is not known how or when histamine appears in SCs during development. Thus, this project was initiated to determine when histamine-like immunoreactivity (HLI) first becomes present in SCs. While the pupal developmental period lasts about 104 hrs, results indicate that HLI is first detected in the lumen of the AG late, at about 97 hours of pupal development. From 102 hrs to hatching, intensity of the HLI continues to increase in the SCs. This result suggests that either histamine (or metabolites) is synthesized by SCs over a short time period or that SCs take up histamine from the lumen of the AG.

KIRKHOF CENTER GRR 040

Alternative Therapies for Children with Cancer: A Systematic Review

Participants attending 1:00 PM - 2:00 PM
Presenter: Molly Scovic
Mentor: Chad Sutliffe

The research conducted is on varying alternative therapies and their efficacy in helping pediatric patients with neoplasms. We performed a systematic review to investigate the effect of alternative medicine on the quality of life of children who have been diagnosed with cancer. The team members searched for articles utilizing the databases PubMed and CINAHL. After narrowing it down using data filtration, the remaining articles were then evaluated based on the Hierarchy of Evidence. We then reviewed these articles and after performing abstract reviews, the exclusion criteria were applied to further narrow the results. This left us with a remaining total of 16 articles that we used. Based on our systematic review, it can be concluded that alternative therapies have a positive effect on children with neoplasms. Supporting this statement, 13 out of 16 of the studies on varying alternative medicines prove to have a positive association. This showed that there are other alternative therapies for treatment that healthcare providers should consider.

KIRKHOF CENTER GRR 041

Expressing *Candida albicans* genes in *Saccharomyces cerevisiae*

Participants attending 10:00 AM - 11:00 AM
Presenter: Bradley Tillier
Mentors: Ian Cleary, Derek Thomas

Non-pathogen *Saccharomyces cerevisiae* (baker's and brewer's yeast) and pathogen *Candida albicans* share a common ancestor but there are many differences between the two organisms. Notably, both can filament but,

whereas *C. albicans* forms true hyphae and pseudohyphae, *S. cerevisiae* forms only pseudohyphae. Filamentation is an important virulence trait in *C. albicans* and it is necessary for forming robust biofilms. We are interested in exploring the functional conservation of genes involved in morphology by expressing *C. albicans* genes in *S. cerevisiae*. This project began with optimizing *S. cerevisiae* transformation methods using our existing *C. albicans* integrating expression constructs. We will then grow the resulting S. cerevisiae strains in a variety of conditions and look for any changes in colony and cellular morphology.

KIRKHOF CENTER GRR 042

The Role of BrxA in the Redox Regulation of the Debacillithiolation Pathway in Firmicutes

Participants attending 2:00 PM - 3:00 PM
Presenter: Kian Barnes
Mentor: Paul Cook

Bacillithiol is a thiol antioxidant found in Gram-positive Firmicutes like the pathogens *Staphylococcus aureus* and *Bacillus subtilis*; and it plays a key role in these organisms' response to oxidative stress. Bacillithiol is used for detoxifying free oxidative species within the cell or by protecting residues of proteins sensitive to oxidative damage like in the glycolytic enzyme glyceraldehyde-3-phosphate dehydrogenase (GAPDH). For these proteins to revert to their unprotected state, bacillithiol must be removed when oxidative stress is no longer present. The enzyme BrxA removes bacillithiol from these sensitive residues as part of the debacillithiolation system and has been shown to form a homodimer in proportion to oxidant concentration. The redox sensitive responses of BrxA and GAPDH in addition to novel crystal structures suggest that the debacillithiolation system may be regulated by the redox environment as a way of responding to oxidative stress within the cell.

KIRKHOF CENTER GRR 043

Using Bibliotherapy to Enhance Preschool Students' Ability to Cope with Emotions

Participants attending 9:00 AM - 10:00 AM
Presenter: Isabelle Villanueva
Mentor: Cara Singer

This presentation will describe an experimental study that will explore the use of bibliotherapy (the use of books to help clients cope with challenges and emotional problems by connecting with a character in a book) with preschool-aged students and their ability to cope with their emotions. The study aims to identify if and how bibliotherapy enhances positive coping strategies in preschoolers and the impact of follow-up activities. This poster will discuss the study's specific research questions, methods and measures, and proposed changes to improve recruitment.

KIRKHOF CENTER GRR 044

Investigation of Potential Regioselectivity of Sulfur and Selenium with Bis(diphenylphosphino)methane Made by Either a Melt Reaction or in a Solution of NMR Grade Chloroform, Characterized Using 31P NMR

Participants attending 2:00 PM - 3:00 PM
Presenter: Addison Voss
Mentor: John Bender

Bis(diphenylphosphino)methane (dppm) was purchased by GVSU for the purposes of the reactions.

Phenylmaleimides with different substituents, on the phenyl groups, were prepared in the laboratory. The two were then reacted by either an NMR tube reaction with a solvent of NMR grade chloroform or by a melt reaction. After the reaction was allowed sufficient time to have been completed, either sulfur or selenium was then added. The resulting compound was then characterized by 31PNMR.

KIRKHOF CENTER GRR 045

Investigation of the Reactivity and Regioselectivity of Sulfur, Selenium, and Silver with Various Phosphoranes

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenters: Joshua Gibbons, Travis Lubbers
Mentor: John Bender

Phosphorane compounds have applications in the synthetic and pharmaceutical worlds. These compounds are of interest as they are useful reagents in the preparation of various substances, such as alkenes or heterocyclic compounds. This investigation analyzes the regioselectivity and reactivity of phosphoranes with varying carbon chain lengths separating the two phosphorus atoms. To pursue this endeavor, the researchers reacted phosphoranes containing a host of N-substituted maleimides with sulfur, selenium, and silver. We gain insight on the relationship between the distance between the two phosphorus atoms and the phosphoranes general reactivity. Additionally we discover reaction conditions which promote or inhibit the regioselective interactions between phosphorane and various reagents. The results of this research broadly contribute to the understanding of phosphorane chemistry.

KIRKHOF CENTER GRR 046

^{15}N NMR Hammett Study and Analysis of Nitrogen-Containing Compounds

Participants attending 11:00 AM - 12:00 PM
Presenter: Faith Carlson
Mentor: John Bender

^{15}N NMR chemical shifts have previously been reported for many substituted anilines; additionally, Hammett constants have been successfully used for predicting the ^{15}N NMR chemical shifts of anilines with multiple substituents. Here, we extend the ^{15}N NMR research to include anilines, maleanilic acids, and N-phenylmaleimides. We performed an analysis of the ^{15}N NMR to determine if the chemical shift data can be used to predict both the structure and reactivity of nitrogen-containing compounds. We are particularly interested in investigating how the conclusions from our ^{15}N NMR analysis can be used for predicting the stability of bis(diphenylphosphino)methane-phosphorane products formed with Nphenylmaleimides.

KIRKHOF CENTER GRR 047

Developing an Accurate Method for Measuring the Thermal Conductivity of a Material

Participants attending 11:00 AM - 12:00 PM
Presenter: Noah Fuerst
Mentor: Geoffrey Lenters

By analyzing the mathematical expression for Fourier's law of thermal conduction, we can create an experiment that will measure the thermal conductivity of a low thermally conductive material, in our case Borosilicate Glass, to start with. The experiment, however, can be deceptively simple at first thought. This is due to the difficulty of measuring

the conduction of heat through a thermal conductor, even at room temperature. There are three ways in which heat can be transferred in a material: conduction, convection, and radiation. Since we wish to focus on the conduction pathway, we have to mitigate the heat transfer through the other pathways. In this capstone project, Lee's Disk Method will be used as well as the resources available for undergraduate-level physics experiments. We will continue to refine our apparatus in order to reduce this heat loss to effectively yield more accurate measurements of the thermal conductivity of Borosilicate Glass, as well as any other poorly conductive material, known or unknown to us.

KIRKHOF CENTER GRR 048

Monitoring and Quantitation of Bacterial Growth via Capillary Isotachophoresis

Participants attending 3:00 PM - 4:00 PM
Presenter: Joshua Gibbons
Mentor: Andrew Lantz

The quantitative analysis of bacterial cultures is essential for monitoring bacterial growth under varying conditions and in samples such as biological systems, water and food sources, and consumer products. Capillary electrophoresis has gained significant attention as a tool for the separation and detection of microorganisms due to its rapid analysis times, low cost, and method simplicity. Isotachophoresis is a mode of capillary electrophoresis that utilizes a heterogeneous buffer in the capillary to separate charged species by their electrophoretic mobilities. Recently, we have developed a method using capillary isotachophoresis to sort, focus, and quantify microorganisms based on their ranges of electrophoretic mobilities. Here, we evaluate this method for monitoring the growth of bacterial species under varying conditions and in mixed cell cultures. This work demonstrates that this capillary isotachophoresis method is capable of being used as a rapid cell quantitation tool.

KIRKHOF CENTER GRR 049

Quinones as Redox Electrolytes in pH Gradient Flow Batteries

Participants attending 9:00 AM - 10:00 AM
Presenter: Christina Jiang
Mentor: Andrew Lantz

Redox flow batteries have gained attention recently as potential large-scale, low-cost energy storage systems for environmentally friendly renewable energy sources. Energy is stored in these batteries by coupling two redox active species with a difference in reduction potential, which equals the standard voltage of the battery. Quinones are organic redox-active compounds that are attractive electrolyte candidates due to their redox reversibility and high energy densities. In addition, quinone derivatives have varying potentials due to the effects of their substituents. The large size of these molecules also avoids crossing over through the battery membrane, which can shorten the life of the battery. Reduction potentials and electrochemical characteristics of several quinone derivatives were studied using cyclic voltammetry in acidic or basic solutions to evaluate the effect of electrolyte pH. Electrolyte pairs that show proper potentials and reversibility were then tested in a small-scale battery to assess performance and pH stability.

KIRKHOF CENTER GRR 050

Learning by Doing: Service Learning with Exceptional Students

Participants attending 2:00 PM - 3:00 PM
Presenters: Grace Heiss, Emma Payton
Mentor: Katalin Zaszlavik

The poster presentation exhibits art education students' teaching practice with a group of students with special needs on a community project. Project design, preparation, implementation, reflective teaching practice, experienced-based understanding, emerging questions, and revision of the project for K-8 art classroom settings will illustrate the learning curve of art education students through this experience. The presentation advocates for the many abilities of students with special needs. Zoey Belk, Haley Tiesman, and Ethan Vales contributed to this work.

KIRKHOF CENTER GRR 051

Personalized Fitness Intervention: Wellness Coordinator

Participants attending 11:00 AM - 12:00 PM
Presenter: Claire Dunselman
Mentor: Anna Hammersmith

I plan to either create a poster or a written overview of my findings while conducting this health-related intervention throughout the duration of the semester. Over the past 6 weeks, I have been collaborating directly with 10 participants (ranging in gender and age) to help them achieve their health-related goals. This includes everything from mental to physical wellbeing. For most of my clients, I have coordinated personalized fitness plans to help assist them in the achievement of their specific goals. With this being said, over the course of the next 7 weeks I will be continuing to collect and monitor the outcomes of my intervention and hope to present my efforts as well as each individual’s progress throughout the course of the winter 2023 semester. I look forward to presenting my findings at the Student Scholars Day event on the 12th of April!

KIRKHOF CENTER GRR 052

The Luminescent Properties of Lanthanide Metal Complexes

Participants attending 1:00 PM - 2:00 PM
Presenter: Georgia Sands
Mentor: Shannon Biros

Lanthanide metals luminesce when excited with UV light; this property has been utilized in applications such as security markings and bioprobes. In order for lanthanide metals to luminesce efficiently, they must be coordinated with ligands that contain conjugated system which absorb UV light and transfer energy to the metal. In this study, four ligands have been synthesized and tested as antennas for lanthanide luminescence, all of which contain a phosphine oxide and carbonyl group. In order to determine the influence of the phosphine oxide and carbonyl groups independently, we have replaced the aryl groups with alkyl chains that do not allow for the initial absorption of UV light. The luminescent properties were investigated by quantum yield and luminescent lifetime experiments. The ligand with only a carbonyl aryl group had the highest quantum yield.

KIRKHOF CENTER GRR 053

Exploring New Coordination Modes in Metal Carbene Bis-Alkoxides

Participants attending 1:00 PM - 2:00 PM
Presenter: Sierra Hilditch
Mentor: Richard Lord

Using DFT calculations, the oxidation and spin state of LM^{II} (where L is a bis-alkoxide ligand and M is either Cr, Mn, Co, or Ni) are investigated for the complex coordinated with the ylide $PhI=C(CO_2Me)_2$, and after the loss of PhI. Mulliken spin, isosurface spin density, and molecular orbital analyses were used to determine the oxidation and spin state, as well as ligand radical character for each complex. For the lowest energy ylide complexes, the oxidation and spin states varied. For the lowest energy carbene complexes, each took the form of $^{HS}M^{III}$ (F). Thermodynamic analysis was used to determine the lowest energy complexes for each metal. The Cr complexes were the least exothermic and endergonic. The Ni complexes were the most exothermic and exergonic.

KIRKHOF CENTER GRR 054

Neurophysiological Alterations in Crayfish Using Common Inhibitory Drug

Participants attending 11:00 AM - 12:00 PM
Presenter: Grace Smith
Mentor: Daniel Bergman

Gabapentin is one of the most prescribed medications in the United States today. Its original use was for treating partial seizures; however, it gained popularity when it became approved for treating fibromyalgia and neuropathy. Many providers have grown to accept gabapentin more for its ability to treat other various pain syndromes off label than for its FDA accepted uses. The drug is continuing to gain popularity with new off label uses suggesting therapeutic effects in mood disorders. Currently, only 1% of outpatient use of gabapentin is compliant with FDA indications. It is known that gabapentin gains its anticonvulsant properties from its ability to slow electrical conductions within the brain, however its mechanisms for pain and mood stabilization remain unknown. Proposed is an experiment in two parts: a neurophysiological model and a behavioral model. The first will assess the contractibility of muscle fibers of crayfish in the presence of gabapentin using electrophysiology to confirm neuronal inhibition. Second, an assessment of variations in aggressive interactions among crayfish. We hope to establish a model system that allows for the better understanding of gabapentin's mechanisms of action.

KIRKHOF CENTER GRR 055

Organic Ligands for the Extraction of Lanthanide and Actinide Metals

Participants attending 2:00 PM - 3:00 PM
Presenter: Katie Colesa
Mentor: Shannon Biros

Modern society has expanded the use of lanthanide and actinide metals in materials that most people use every day such as batteries, magnets, phones, and alloys. In addition, rising energy costs have increased the push for alternative energy sources such as nuclear power. Actinide metals are the radioactive elements found at the very bottom of the periodic table. Two of these, uranium and thorium, have found use as fuel for nuclear power. Often grouped together, lanthanide and actinide metals share similar properties and are studied together. The broad application of these metals emphasizes the growing need to recycle them from current materials and spent nuclear fuel as it accumulates. It is imperative to bridge the gaps in our fundamental understanding of these elements to

effectively address recycling them. This poster will describe our efforts to address the separation, isolation, and purification of both lanthanide and actinide metals by synthesizing organic ligands. Used in liquid-liquid extractions, these organic ligands act as instruments to isolate lanthanide and actinides metals from acidic aqueous media.

KIRKHOF CENTER GRR 056

Variations in *fimH* and Their Effects on Adherence and Invasion of *Salmonella enterica*

Participants attending 10:00 AM - 11:00 AM
Presenters: Miguel Gutierrez, Isaac Laucky
Mentor: Aaron Baxter

Salmonella enterica serovar Typhimurium is a Gram-negative bacterium which causes localized gastroenteritis in humans. This pathogen is usually ingested through contaminated water or improperly handled food items. In order to successfully invade a host, *Salmonella* Typhimurium must utilize a number of genes encoding for virulence and adherence factors. *Salmonella* Typhimurium initiates infection through colonization of the intestinal epithelium and invasion into underlying tissues. Part of the infection cycle involves expression of fimbriae. Bacterial fimbriae are rigid, filamentous proteins present on the exterior of a bacterium. Fimbriae are filamentous structures that aid in the physical attachment of a bacterium to a surface. Regulators within the chromosome control the expression of these structures dependent on a variety of signals received from the environment. At the tip of the tip of each fimbriae the protein FimH is attached and is responsible for the specific adherence to various targets. Previously, a *fimH* allele was created which allowed for more extensive biofilm formation. This study was undertaken to better characterize the extent this *fimH* allele has on biofilm formation and adherence in comparison to wild type *Salmonella*.

KIRKHOF CENTER GRR 057

Investigation of Instruments Measuring Students' Understanding of the Nature of Science

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenter: Madelyn Back
Mentor: Thomas Pentecost

The measurement of students understanding of the Nature of Science (NOS) has been done using a variety of survey instruments. These instruments have been developed using different theoretical definitions of NOS. These different NOS definitions make it difficult to compare the results of studies using different instruments. The goal of this study is to investigate the overlap of two commonly used NOS instruments. Data from students that completed two NOS instruments will be presented and the following research questions addressed:

1. What is the commonality in classification of a student's NOS when measured with two different instruments?

2. What is the relationship between level of NOS understanding and students current chemistry course, major (STEM or not), year in college, and number of previous college science courses.

KIRKHOF CENTER GRR 058

Effects of Cannabidiol on Compartment Specific Dopamine Release in the Striatum

Participants attending 12:00 PM - 1:00 PM
Presenter: Mason Kolanowski
Mentor: Eric Ramsson

Cannabidiol (CBD) is a non-psychoactive compound present in large amounts in *Cannabis sativa*, recreationally known as marijuana. Legalization of the use of marijuana contributed to the desire to know how specific substances in marijuna affect the physiology of the brain. Recently, CBD was identified as a modulator of the release of different neurotransmitters in different regions of the brain, such as GABA, glutamate, and dopamine. This behavior is attributed to CBD's interaction with the endocannabinoid system, a system known to be a homeostatic modulator. Previous studies carried out in our lab specifically examining how CBD affects dopamine neurotransmission in the dorsal striatum of *Mus musculus* showed a change in dopamine neurotransmission after CBD exposure, however, the direction of the change was inconsistent. Recent studies investigating neuortransmitter release have emphasized the importance of small structures of differential histochemical composition within the striatum, referred to as striosomes. Neurons within striosomes behave differently than non-patch neurons when exposed to different neruotransmitters. Measurements of dopamine neurotransmission in the dorsal striatum of *Mus musculus* were recorded in real time before and after exposure to CBD and categorized by striatal region to identify if there was compartment specific release of dopamine in repsonse to CBD exposure.

KIRKHOF CENTER GRR 059

Structural and Functional Characterization of ADC-73 β-lactamase: A New Clinical Variant Involved in Antibiotic Resistance

Participants attending 9:00 AM - 10:00 AM
Presenter: Jared Bengston
Mentor: Bradley Wallar

β-lactams continue to be the most widely prescribed class of antibiotics. Resistance to β-lactam antibiotics is becoming a serious health issue, primarily due to expression of β-lactamases, enzymes that can bind and inactivate β-lactam antibiotic molecules. Multi-drug resistant *Acinetobacter baumannii* is a pathogenic bacteria that has become a major concern to the World Health Organization, who have deemed it “top priority for new antibiotic development.” *A. baumannii* has multiple mechanisms of resistance to a wide range of antibiotics, with a significant contribution stemming from the β-lactamase, *Acinetobacter*-derived cephalosporinase (ADC). Unfortunately, a small number of amino acid mutations rapidly occur within ADC β-lactamases, which causes new clinical variants to form, often with increased antibiotic resistance properties. This research characterizes the functional and structural properties of two new clinical variants: ADC-73 and ADC-218. While ADC-73 is one of the most common forms in *A. baumannii*, kinetic analysis confirms that a newer ADC-218 has the ability to bind and inactivate larger cephalosporins. In order to understand how this new ability results from the minimal amino acid change, we have begun X-ray crystallographic studies to determine the structural differences between the variants.

KIRKHOF CENTER GRR 060

Characterization of the Nucleotide Structure Requirements for Aminoglycoside Nucleotidylyltransferase-6Ia from *Bacillus subtilis*

Participants attending 9:00 AM - 10:00 AM
Presenter: Natalie Grantham
Mentor: Brian Smith

The development of antibiotic resistance has imposed challenges to the treatment of bacterial infections. One form of resistance is caused by bacterial enzymes that modify the structure of antibiotic dugs via acetylation, phosphorylation and adenylylation. These modifications decrease the affinity of these drugs for their target thus rendering them inactive. The modification enzyme, aminoglycoside nucleotidylyltransferase-6Ia (ANT-6Ia) catalyzes the transfer of AMP from ATP to the hydroxyl group at position 6 in the antibiotic streptomycin in an adenylylation reaction. Despite the significance of this activity, the molecular mechanism of ANT-6Ia remains uncharacterized. Furthermore, a greater understanding of the structure of the ATP nucleotides that are recognized by the enzyme would be invaluable for developmenting inhibitory drugs. Here, using steady-state kinetics, we characterized the modification activity of ANT-6Ia from *Bacillus subtilis* with various nucleotide triphosphates and structural ATP analogs. These data demonstrate that the enzyme is purine specific, and that the triphosphate moiety is essential for catalysis. Whereas removal or methylation of the 2^1 and 3^1 hydroxyl groups and amino groups at positions 1, 6 and 7 have minimal effects on Km for the NTP, suggesting that there are likely no specific interactions between the enzyme-active site and the ribose or purine ring.

KIRKHOF CENTER GRR 061

The Calvarium That Exposed Cause of Death

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Halle Monroe
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Laura Stroik

Cerebral hemorrhage is a type of hemorrhagic stroke that has the highest disability rate among its survivors, with a 40-50% mortality rate within just 30 days. Usually caused by a diseased or a damaged vessel that bursts, the most common arteries involved include the basilar or anterior, middle, or posterior cerebral arteries. During the dissection of an 86-year-old female cadaver, the calvaria was removed along with the brain, exposing the site of a cerebral hemorrhage. A large intraparenchymal hematoma was located on the left, inferior side of the cerebrum. The location of this hematoma is what led to her death as it was pushing against her brainstem, the crucial organ that regulates breathing, heart rhythms, and blood pressure, along with eye movements, balance, and hearing. Once these functions are interrupted, there is no way of reserving it, inevitably leading to death.

KIRKHOF CENTER GRR 062

Right-to-Work Laws and Creativity

Participants attending 9:00 AM - 10:00 AM
Presenter: Owen Laverty
Mentors: Chandresh Baid, Vijay Gondhalekar

This study examines the relationship between Right-to-Work (RTW) laws and creativity. Using data from the Kickstarter crowdfunding platform for the period 2010–2019, we find that the number of projects launched, the probability of success, the average amount of capital pledged, the ratio of capital pledged to goal, and the average

number of backers are all significantly higher in states without RTW laws than in states with RTW laws. This finding holds for both Art as well as Product focused projects. Thus, the findings suggest that non-RTW states provide better environment for creativity than states with RTW laws.

KIRKHOF CENTER GRR 063

Effects of Dietary Phytoestrogens on Spermatogenesis and Male Reproductive Tract in Mice

Participants attending 11:00 AM - 12:00 PM, 3:00 PM - 4:00 PM
Presenters: Trenton Dalm, Marie Topolski
Mentor: Chris Pearl

Increases in infertility over the past 50 years are linked to factors such as poor diet, alcohol and tobacco consumption, and environmental exposures to endocrine disrupting chemicals (EDCs). One type of EDC is phytoestrogens, commonly found in soy-based diets and foods such as cauliflower, tofu, and broccoli. Phytoestrogens may bind estrogen receptors and act agonistically, or antagonistically, thus functioning as EDCs. The developing male reproductive tract is potentially susceptible to potential endocrine disruptors which would cause permanent changes in adult reproductive function and possibly infertility. We hypothesize that dietary phytoestrogen exposure will have a dose dependent effect with the high diet yielding the lowest sperm count and worst performance compared to the medium and low phytoestrogen diet. Male mice were assigned to a diet containing a low, medium or high concentration of phytoestrogens and remained on this diet during pubertal development. Sperm production and transit time are currently being investigated. However, serum FSH (follicle-stimulating hormone) was lowest in the high diet group indicating changes in pituitary hormone function. Epididymis weight was increased in the high diet group indicating changes in tissue development. These results suggest that high levels of dietary phytoestrogens alter during pubertal development and sexual maturation in mice.

KIRKHOF CENTER GRR 064

Numerical Solutions for the Application of Optimally Controlled Sweeping Processes to Crowd Motion

Participants attending 12:00 PM - 1:00 PM
Presenter: Andrew Regan
Mentor: Norma Ortiz-Robinson

This project represents a numerical implementation for solving a dynamic optimization model involving crowd motion with obstacles, which is an application of a class of optimal control problems governed by a sweeping process. This project is an extension of earlier work completed to solve the dynamic optimization problem for robotic movement. We show that due to a “degeneracy phenomenon” that occurs while determining key variables, the problem becomes unstable and produces erratic and incorrect solutions, ultimately demonstrating that the theoretical results on which the numerical work was based must be revised before successful solutions can be generated.

KIRKHOF CENTER GRR 065

Estrogen Effects on Epididymal Sperm Number and Transit Time

Participants attending 2:00 PM - 3:00 PM
Presenters: Aydia Cain, Delaney Sacra
Mentor: Chris Pearl

Male reproduction is dependent on adequate production of mature sperm, a process regulated by pituitary and steroid hormones. The epididymis is a lesser-known organ of the male reproductive tract responsible for sperm maturation, transport, and storage. Sperm are produced within the testis, but it is within the epididymis that spermatozoa gain motility and the ability to fertilize an egg. The mechanisms by which estrogen regulates sperm production and maturation remain largely unknown, but this knowledge is essential for further progress in understanding male fertility. This experiment addresses the hypothesis that estrogen has beneficial effects on epididymis sperm number and transit time during aging. Sprague Dawley rats were split into four groups and injected with either vehicle; 1 µg/kg; 5 µg/kg; or 10 µg/kg estradiol valerate from 15-16 months of age. Testicular sperm production was significantly higher in the 5 and 10 µg/kg groups indicating estrogen can increase sperm production during aging. Testosterone was similar suggesting results were a direct effect of estrogen treatment. There was a trend of higher sperm counts in the distal cauda with increasing estrogen. Transit time through distal cauda was similar between groups although differences in total epididymal transit time may vary with estrogen dose.

KIRKHOF CENTER GRR 066

The Impact of Community Engagement on Marginalized Youth

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Keylaiha Brown
Mentor: Mihaela Friedlmeier

Community engagement is a predictor of positive adolescent and adult development. Compared to their peers, marginalized youth are at higher risk for experiencing more negative developmental outcomes. The goal of this study was to investigate how a local afterschool center promotes positive youth development (PYD) by intentionally providing marginalized teenagers with paid internships to tutor and teach instruments to the children in the program. We developed a survey consisting of about 100 questions using well-established quantitative psychological measures (e.g., the Short PYD questionnaire developed by Lerner and colleagues examining Competence, Connection, Confidence, Caring and Character). We collected data from 47 teen interns (ages ranging from 13 to 18, M = 15.12), slightly more girls than boys, most of them either Hispanic or Black. About half of the teens lived in a single-mother household. Preliminary findings suggest that teens who have been involved as interns for more substantial periods of time also reported more beneficial outcomes. Results will be discussed from the perspective of gender and race, and their connection to positive youth development.

KIRKHOF CENTER GRR 067

Determining the Equilibrium Chloride Concentration in Sediments Exposed to Salt Pollution

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenter: Jacquelyn Molloseau
Mentor: Alan Steinman

The impact of road salt on freshwater systems has become increasingly prevalent. While the application of salt is necessary for road safety in winter, salt runoff has resulted in negative effects on these ecosystems. Studies indicate that salt pollution can prevent seasonal lake turnover, keeping nutrients from being distributed throughout the water column and leading to accumulation in the hypolimnion. As a result, biodiversity has decreased in these areas, which is worsened by the impact of chloride pollution on aquatic organisms. Past studies show salinity levels in streams can remain elevated into summer despite salt being applied in winter, raising questions about retention in freshwater systems. One potential sink previously identified is sediment. This study focused on sediments in a tributary flowing into Church Lake, a residential lake on the east side of Grand Rapids, MI that has been severely affected by salt runoff. Equilibrium chloride concentration was calculated, the concentration at which the sediment neither releases nor retains chloride. As higher chloride concentrations were applied, there was greater retention of chloride within the sediments, which may be influenced by sediment organic matter percentage. Sodium and calcium cation samples were also measured since cation exchange may be present.

KIRKHOF CENTER GRR 068

Progress Towards The Synthesis of the Linezolid Core Using a One-Pot Copper-Mediated Coupling

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Travis Lubbers
Mentor: Matthew Hart

The oxazolidinone antibacterial drug linezolid is used to treat infections of the skin and the lungs including pneumonia by stopping the growth of bacteria. Notably, linezolid can be used to treat several drug-resistant bacteria such as penicillin-resistant pneumonia and MRSA. Previously, the authors examined the use of a copper-mediated reaction to perform tandem Goldberg and Finkelstein reactions. Herein, we report an optimized catalytic system and progress toward the synthesis of the linezolid core in one reaction vessel. This catalytic system would include a trans-diamine, copper (I) iodide, potassium carbonate, and dimethylformamide (DMF) to induce a Goldberg coupling. Our goal is to complete a Goldberg coupling, followed by a Finkelstein reaction, followed by an additional Goldberg coupling. The efficient synthesis of this core would allow for the rapid synthesis of linezolid derivatives and potentially lead to novel antibiotics.

KIRKHOF CENTER GRR 069

The Ring of the Rainbow Dove

Participants attending 3:00 PM - 4:00 PM
Presenter: Rosie Caldwell
Mentor: Diane Wright

My presentation analyzes the theme of love in the Ring of the Dove (Tawq al-hamamah [c.1020]), written by the Muslim scholar Ibn Hazm, who lived in 11th-century Andalusian Spain (994-1064). The Ring of the Dove is a treatise

in verse and prose that includes autobiographical and historical details and explores the nature of love and knowing when true love is achieved. Hazm defines love and provides guidelines lovers should follow as well as examines different types of love such as that found in homosexual relationships. To analyze Ring of the Dove I use gender/queer theory to compare homosexual and heterosexual relationships described in the work. By looking further into how homosexual relationships play into Hazm's ideas about true love, I ultimately found that Ibn Hazm believes that true love is attained when love can overcome any boundary in its way, even with the disapproval of the outside world. I found his ideas that do not limit true love to conventional gender pairings still relevant today.

KIRKHOF CENTER GRR 070

Overexpressing a *Candida albicans* Membrane-Anchored Protein Increases Cell Adhesion.

Participants attending 11:00 AM - 12:00 PM, 2:00 PM - 3:00 PM
Presenter: Michael Hawkes
Mentors: Ian Cleary, Derek Thomas

Candida albicans is an opportunistic fungal pathogen that is a part of the normal human microbiota. In a study of *C. albicans* during space flight it was observed that some genes were upregulated and others downregulated. One of these genes, *PGA41*, was seen to be upregulated. *PGA41* is predicted to encode for a GPI-anchored surface protein. We constructed a strain that overexpresses this gene to test the effects it has on morphology, biofilm formation and stress responses. While over-expression doesn't appear to alter biofilm formation, it does influence colony morphology on solid media and aggregation in liquid media, suggesting that the adhesive properties of the cells are being increased.

KIRKHOF CENTER GRR 071

Self-Care and Wellbeing among Social Work Students during the COVID-19 Pandemic: The Role of Trauma

Participants attending 11:00 AM - 12:00 PM
Presenter: Sarah Hassan
Mentor: Joshua Bishop

The COVID-19 pandemic caused distress for students as this was a stressful time in which they had to navigate the pandemic while learning, working, and taking care of family responsibilities. Self-care can be an important tool in dealing with stress and promoting wellbeing. However, it is uncertain whether this tool remains relevant during a global pandemic. This cross-sectional, quantitative study explored the association of self-care during the COVID-19 pandemic with well-being among undergraduate/graduate social work students (n=195) when controlling for Adverse Childhood Experiences (ACEs).

Using the Self-Care in COVID-19 (SCOVID) scale, participants were asked to rate their self-care "during the past month" and then to retrospectively rate their self-care "during the first two months of the pandemic" (SCOVID Pandemic). Well-being was measured across seven domains (physical health, happiness, life satisfaction, self-mastery, self-esteem, mental health, and stress).

Bivariate analysis demonstrated that SCOVID scores and SCOVID Pandemic scores were significantly associated with most well-being variables. Preliminary multivariate models tested each well-being concept's association with self-care while controlling for ACEs. It is demonstrated that SCOVID scores were significantly associated with all

well-being variables, and SP scores were associated with most wellbeing variables. ACEs only moderated the association between self-care and mental health during the pandemic.

KIRKHOF CENTER GRR 072

Musical Life in Grand Rapids at the Turn of the 20th Century: An Archival Study

Participants attending 12:00 PM - 1:00 PM
Presenter: Thomas Stutz
Mentor: Lisa Feurzeig

This project focuses on painting a picture of the Grand Rapids soundscape in the first decade of the 20th century. We explored musical events and organizations, including a concert series called the May Festival (1903-5 and 1909); visits by world-famous musicians; the Schubert Club and St. Cecilia Society; music in church services; and the interest in American music, women composers, and Native American traditions. We produced a database of music in 1903 and analyzed it statistically, with attention to the balance of European/American music and older/contemporary music. We noted the focus of the all-male Schubert Club on large public events and sociability, and that of the mostly female St. Cecilia Society on a more nuanced intellectual approach to music that it shared with many other women's musical clubs in this period. Grand Rapids was a small Midwestern city with a diverse musical life and great cultural ambitions that were only partly fulfilled.

KIRKHOF CENTER GRR 073

The Integration of Performance Practice and Stylistic Understanding in the Realization of Schubert's Sonata D. 845, I. Moderato

Participants attending 10:00 AM - 11:00 AM
Presenter: Rebecca Hanson
Mentor: Sookkyung Cho

Franz Schubert's Piano Sonata in A minor, D. 845 was written in 1825 and is considered to be one of his late works. The first movement shows Schubert's mature and unique approach to Sonata Form while reflecting his song, dance, and orchestral writing styles. To develop an artistic and informed conception of this piece, a seasoned performer must have an approach that integrates numerous areas of music scholarship, including a stylistic comprehension of the music and its composer. One complication in interpreting this movement originates from the inconsistency between its original instrumentation—the fortepiano—and the most probable modern choice of instrumentation—the piano—as the fortepiano has unique sound capabilities that impact the work's affekt. This research explores a pianist's approach to D. 845, mvt. I that combines music scholarship, stylistic understanding, and conclusions from the fortepiano's impact on D. 845 to engender an informed interpretation of the movement.

KIRKHOF CENTER GRR 074

Connecting Communities Through Intergenerational Mentorship Programming

Participants attending 1:00 PM - 2:00 PM
Presenter: Allison Klimek
Mentor: Jing Chen

Age segregation has caused older and younger generations to be isolated from each other and the rest of society. Intergenerational programming bridges the gap between these groups by connecting older adults with younger adults or children in their communities. This presentation will review some intergenerational programs that involve

one-on-one mentoring and survey the activities involved in these programs. The benefits and practical implications of the intergenerational mentoring programs will also be discussed. I will also propose an intergenerational mentoring program that can be implemented in the public schools in Grand Rapids.

KIRKHOF CENTER GRR 075

Impacts of Intergenerational Interaction

Participants attending 1:00 PM - 2:00 PM
Presenter: Jack Reinwald
Mentor: Jing Chen

Ageism is a prevalent issue in our society today. It has led many older adults to embody agist beliefs, affecting their mental and physical health. Ageism has also created a divide between generations, increasing older adult's feelings of loneliness and isolation and reducing the chance for younger generations to tap into the wealth of older adults' life experiences and knowledge. However, there is hope. Intergenerational interaction has been shown to be effective in improving older adults' health and creating opportunities for younger generations to gain wisdom and knowledge. In this presentation I will share the work carried out by a GVSU student club on aging (SAGE-Students for Aging and Gerontology Enrichment) in their effort to promote intergenerational integration between college students and older adults from surrounding communities. Accomplishments, lessons learned, and future steps will be discussed.

KIRKHOF CENTER GRR 076

Wetland Perceptions: How Attitudes Impact Action

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenter: Grant Winenger
Mentor: Amanda Buday

Although the importance of wetlands and their benefits is becoming increasingly prioritized, there still remains an annual decline in total wetlands acreage. Conservation and regulations are a great way to keep our wetlands protected, but to further prevent this decline we must look deeper into how we advocate for conservation. The way a question is framed is crucial to the nature of the given response; thus, to encourage conservation it is important to understand the manner in which the community values the resource. This study examines a population's perceptions of its riparian resources and analyzes the potential viewpoints of wetlands, assessing the best way to address conservation.

KIRKHOF CENTER GRR 077

Does Copulation Result in Movement of Histamine-like Immunoreactivity From the Male to Female Reproductive Systems in *Drosophila melanogaster*?

Participants attending 12:00 PM - 1:00 PM
Presenters: Lydia Cruce, Carley Kenney
Mentor: Martin Burg

Histamine-like immunoreactivity (HLI) has been identified in vacuole-like compartments (VLCs) of secondary cells in the male accessory gland of *Drosophila melanogaster*. This histamine-like immunoreactivity is dependent on the Hdc gene, as no histamine is detected in secondary cells of *Hdc* mutant accessory glands. To further investigate the role that histamine plays in secondary cell function, we have investigated whether copulation can result in

the transfer of histamine from secondary cells of males to the female reproductive system via seminal fluid. A four-day old virgin wild-type male and *Hdc*^{JK910} mutant female (unable to synthesize histamine) were placed in a mating chamber until copulation occurred. Histamine immunostaining was performed on the reproductive system of the *Hdc*^{JK910} mutant females (and males) that did copulate, ranging from 10 minutes after copulation initiation, immediately after copulation had finished, and 30 minutes after copulation had finished. Histamine immunostaining indicated that there was no significant transfer of HLI into the female from the male, unlike other components of the male ejaculate which clearly move into the female and can be detected at the times examined. Histamine immunoreactivity did translocate in the male after copulation, moving from the accessory gland to the ejaculatory duct.

KIRKHOF CENTER GRR 079

Improving Care for Children and Adolescents in Foster Care Through Education and Advocacy

Participants attending 1:00 PM - 2:00 PM
Presenter: Emma Buchele
Mentor: Christina Quick

Children and adolescents in foster care are recognized as a vulnerable population with unique and complex healthcare needs that are often inadequately addressed, unrecognized, or untreated. Evidence shows that children in foster care experience disproportionately more adverse childhood events and barriers to care than other children. These factors contribute to their experience of higher rates of developmental, behavioral, physical, and mental health concerns. Advanced practice providers are uniquely positioned to address these health disparities and promote health outcomes for this vulnerable population through evidence-based and trauma-informed care. However, gaps in knowledge and care processes persist, contributing to poorer health outcomes for children and adolescents in foster care. This project aims to understand problems and challenges advanced practice providers (APPs) experience when caring for this vulnerable population. A survey will be created to assess pediatric-focused APPs' understanding of the needs of children in foster care. Evidence-based resources and guidelines addressing the identified challenges and knowledge deficits will be developed and disseminated to provide clinicians with the resources and skills necessary to provide trauma-informed care to children in foster care. This will ultimately help promote equitable, optimal, and evidence-based care that improves health outcomes for all children and adolescents in foster care.

KIRKHOF CENTER GRR 080

Rewards Systems in Massively Multiplayer Online Role-Playing Games

Participants attending 9:00 AM - 10:00 AM
Presenter: Korey Stamper
Mentor: Alisha Karabinus

The Massively Multiplayer Online Role-Playing Game (MMORPG) industry is growing all over the world. One of the ways MMORPGs maintain a consistently growing playerbase is by designing (and sometimes redesigning) rewards or reward systems that entice players.

Old School RuneScape (OSRS), an MMORPG developed by Jagex Limited, has a robust rewards system that millions of players enjoy today that consists of: interacting with non-playable characters (NPCs), increasing your skill levels, and increasing your bank size with valuable items and gold, and more.

My goal for the project is to brief the audience on the common conventions of rewards in video games, specifically MMORPGs, analyze OSRS update and forum posts that contain relevant information about a reward, and cross-reference conventions to the game's rewards. The Jagex development team is also open to communicating with the playerbase, and I plan on emailing them about my research once it is more developed.

Understanding how rewards systems work in MMORPGs can positively affect the game's designers, the game's players, and the game's company shareholders. Game designers and their company shareholders can deliver a better quality product by containing a reward system that can increase revenue yet be perceived as non-predatory to the game's playerbase.

KIRKHOF CENTER GRR 081

NMR Tube Reactions of Different Maleimides with Bis(Diphenylphosphino)Methane and Silver/Platinum

Participants attending 9:00 AM - 10:00 AM, 2:00 PM - 3:00 PM
Presenters: Caitlin Miller, Kelsey Somers
Mentor: John Bender

This experiment will take silver(Ag) or platinum (Pt) and go through an NMR tube reaction with a maleimide and 1,1-Bis(Diphenylphosphino)Methane (dppm). The selected amount of silver or platinum will be used to calculate the amount of each maleimide and dppm needed. The maleimide and dppm will be combined in a small vial with CDCl3 The maleimide and dppm should dissolve in the CDCl3 and if not then more CDCl3 can be added or the solution can be sonicated. Once the maleimide and dppm have reacted in the CDCl3, the silver or platinum is added and should react as well. Finally, the solution is pipetted into an NMR tube and a spectrum is taken.

KIRKHOF CENTER GRR 082

Reacting to the Past: Rousseau, Burke, and Revolution in France 1791

Participants attending 11:00 AM - 12:00 PM
Presenter: Simon Kailing
Mentor: Amber Dierking

This project was created to provide students playing the Reacting to the Past game 'Rousseau, Burke, and Revolution in France 1791' with research guides tailored to their characters and to the factions to which those characters belong. The documents included are one main Research Guide for the whole game, which contains broad information for all factions and background on the game itself, and forty-one individual Reading Guides paired with each of the in-game Character Role Sheets. The main Research Guide includes: An introduction to the document's purpose and to the game itself, a section titled "Disclaimers" designed to outline the limits of the document, a section titled "Databases" which provides information on the use of the library's various databases, a section titled "Research Tips" that contain the author's best research-related advice, a list of the game's five factions and a brief description of each along with a few recommended readings for each, and a Works Cited page for the documents listed in the Suggested Reading sections for the factions.

KIRKHOF CENTER GRR 083

Effect of Instability Training on Compensatory Muscle Activation During an Instability Challenge

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenters: Sydney Bitar, Leah Converse, Edward Finos, Megan Fischette, Kristen Lord, Kamryn Wisneski
Mentor: Stephen Glass

Muscle instability is a common issue with older adults. In order to address these balance issues the body needs to make rapid muscular adjustments. Few studies have looked at instability training and its effect on compensatory activation as a rehabilitation or sport performance mechanism. The purpose of this study was to examine the effects of two weeks of training using an unstable instrument that will provide the necessary perturbations to the body to force it to make rapid muscular adjustments. This is a significant issue with certain populations, so we would like to see increased adjustments. Balance is an understudied area, however, in relation to sports performance, so our study can have potential impacts regarding instability while on a field. Data that has been compiled to date will be shown.

KIRKHOF CENTER GRR 084

Structural and Functional Analysis of Novel ADC Variants from Carbapenem-resistant *A. baumannii*

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM
Presenter: Rachelle Baumann
Mentor: Bradley Wallar

While multiple mechanisms exist to contribute to the resistance of antibiotics, one of the most prevalent is through β-lactamase enzymes, such as *Acinetobacter*-derived cephalosporinases (ADCs). Emerging variants of ADCs in *A. baumannii* are expanding this threat, making it a more critical issue. As most ADC variants are ~99% identical with just one to a few amino acid alterations, it is important to elucidate if these changes allow them to gain resistance to antibiotics. Interestingly, one of these main areas of variance exists in a region (Ω-loop) near the site of antibiotic binding. Here, a combination of X-ray crystallography and steady state kinetics characterize the structure and function of ADC variants. ADC variants that contained an alanine insertion in the Ω-loop (such as ADC-33 and ADC-212) showed an increased ability to bind and turn over larger cephalosporins, as compared the ADCs that do not contain the alanine duplication (ADC-7, ADC-30). Some variants also contained single mutations in another Ω-loop region, resulting in smaller kinetic differences. The structures of multiple ADCs were determined by X-ray crystallography to assess how these unique mutations affect the substrate binding region and active site residues.

KIRKHOF CENTER GRR 085

Co-activation of Trace Amine-associated Receptor 1 and Mu-opioid Receptor to Induce Locomotor Suppression and Profound Hypothermia

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Joshua Britton, Jaysen Holly, Elettra Rizzo
Mentor: Shkelzen Shabani

Opioids are often used to manage pain though they also activate rewarding brain centers which mediate addiction. One genetic risk factor for drug use known as the trace-amine associated receptor (TAAR-1) could be targeted for reducing opioid use. Activation of TAAR-1 is aversive and can curb the rewarding effects of specific drugs. In this

study, we explored whether TAAR1 activation with RO-5256390, a drug that selectively binds to TAAR1, would block the rewarding effects of morphine. These rewarding effects were tested with a conditioned placed preference procedure using a mouse model. In this procedure we measured drug preference, locomotor activity and thermic responses. Our results showed that RO-5256390 failed to block the rewarding effects of morphine. TAAR1 drugs may not be effective treatments for opioid use disorders. A significant drop in body temperature and suppression of locomotor activity was also observed. This data suggests that TAAR-1 drugs and opioids can interact to compromise motor activity and body temperature.

KIRKHOF CENTER GRR 086

Using 3D Print Modeling to Design a Muscle Instability Training Device

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenters: Leah Converse, Edward Finos, Rebecca Haggerty, Kamryn Wisneski
Mentor: Stephen Glass

Balance, posture and core strength are essential for day-to-day function. Factors such as age, lack of training and chronic conditions that cause muscle strength degeneration can produce instability during walking and other activity. Stability can be enhanced if the muscle can be trained to make small but fast adjustments in balance through contraction. This “compensatory muscle activation” can be induced with a unique instability training tube. We describe a process to create a new instability training device using 3D print modeling. The training tube is partially filled with water, and a special valve is at the center of the device, in line with the spine, to induce movement causing muscle around the spine to control. We will demonstrate to iterative process of creating this “slosh tube”

KIRKHOF CENTER GRR 087

Identification of an Unknown Solid Byproduct of a Brewing Process

Participants attending 2:00 PM - 3:00 PM
Presenters: Edward Fowler, Logan Mardlin
Mentor: John Bender

The Trail Point Brewery underwent a few changes to their brewing process and the change resulted in a solid that would form at the bottom of the tanks. This solid needs to be removed from the tanks causing a backup in production. Identifying the solid is the first step in determining what causes this solid to form. IR, phosphorus NMR and mass spectroscopy were used to identify different elements and compounds within the solid. Phosphorus NMR showed a single peak, proving that phosphate was present. IR contained a big peak at 1500, pointing towards the existence of carbonate. The most likely cation is calcium from the water supply.

KIRKHOF CENTER GRR 088

The Neighborhood Lights Out! Game on Tournaments

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Elise Dettling
Mentor: Darren Parker

The Neighborhood Lights Out! game can be played on tournaments. We give each vertex a label from the set {0, 1, 2, ... , m -1 } for m∈. The game is played by toggling vertices. When a vertex is toggled, the label of that vertex and each of its neighbors increase by 1 (mod m). The game is won when every vertex has a label of 0. We aim to investigate the circumstances in which the game can be won.

KIRKHOF CENTER GRR 089

Edge Covers of Graphs and their Sequences

Participants attending 3:00 PM - 4:00 PM
Presenter: Jacob Ritsema
Mentor: Feryal Alayont

In discrete math, graphs are used to represent relationships between distinct objects. Visually, we represent objects by dots (vertices), and relationships between objects are represented by lines (edges) between them. Such a graph could model how projects are assigned to employees in a workplace. We can use edges to connect employees to projects for which they are qualified. If we require that all projects assigned to at least one employee and that no employee is without a project to work on, this would correspond to choosing edges in such a way that all vertices are in at least one edge. We call this the edge cover of a graph. Edge covers arise in applications when counting elements between two fixed elements in Hausdorff metric geometry and when estimating the relevance of communication lines in a network. It is known that the total number of edge covers of path and cycle graphs are the famous Fibonacci and Lucas numbers, respectively. The poster will focus on the sequences of edge covers of certain graph families, and describe the methods we employed to investigate these sequences.

KIRKHOF CENTER GRR 091

The Style Effect on the TRAP Phonemic Split in UP English

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM
Presenters: Lauren McKenzie, Payton Westedt
Mentor: Wil Rankinen

The short-a system, or the phonemic split of the TRAP vowel (i.e., /æ/), refers to the raised position of the vowel in pre-nasal and pre-velar phonological environments (Labov 2007; Labov et al, 2006, Becker et. al, 2010, Labov et al, 2015, Wagner et. al, 2016). The present study builds upon these previous studies by examining the TRAP-system in rural, under-documented American English speech communities across Michigan's Upper Peninsula (UP). Previous work on this feature in reading passage data has revealed UP speech communities on the east- and west-sides of the peninsula have strikingly different systems (i.e., a two-way phonemic split in eastern UP, while a three-way split in western UP). The present sociophonetic talk examines the apparent-time change of the phonemic split of an 87-speaker sample as an interaction of task types (passage/word list/minimal pairs), area (east/west), age groups (18-39/40-59/60+), and self-gender (female/male). The three-way phonemic split of TRAP only occurs in informal speech styles in western UP; in contrast, the two-phonemic split is preferred in eastern UP irrespective of speech style. The two-way phonemic split is preferred in more formal speech styles and is stable in the eastern UP suggesting an external influence from outside Michigan's Upper Peninsula.

KIRKHOF CENTER GRR 092

Mapping Health Outcomes Associated with Antibiotic Misuse

Participants attending 9:00 AM - 10:00 AM
Presenter: Evan Hodson
Mentors: Babasola Fateye, Wanxiao Sun, Gang Xu

Antibiotics do not treat viral infections; however, millions of courses of antibiotic treatments are prescribed in response to the diagnosis of a viral infection. This practice is not only unproductive, but it is also counterproductive as antibiotic use is strongly correlated with antibiotic resistance in bacteria and is likely the main selective

pressure accelerating its development (Albrich et al., 2004; WHO, 2020). To combat antibiotic resistance, many health organizations have launched campaigns to reduce the misuse of antibiotics. These campaigns have been successful, but antibiotic misuse remains high in certain areas nationally and locally (CDC, 2021, November). Our analysis of 44 socioeconomic and demographic variables from the U.S. Census and health variables from the Centers for Disease Control and Prevention has found that antibiotic misuse is associated with a number of other health factors, especially binge drinking which explains 26% of observed variation in antibiotic prescriptions. The predictive power of binge drinking is similar to that of socioeconomic status observed by Volpi and colleagues (2014) in a similar study of Medicare Part D prescriptions nationwide.

KIRKHOF CENTER GRR 093

Language Regard of Michiganders from Lower Michigan using Localized Mental Map

Participants attending 1:00 PM - 2:00 PM

Presenter: Julia Wintermantel
Mentor: Wil Rankinen

People's beliefs and attitudes about language, known as language regard, can and do shape how they use language in a geographical region. The guiding question of this study is "How do locals in Michigan's Lower Peninsula, comparing participants from the east- and west-side of the peninsula, perceive the language of their own speech community and those in the surrounding areas of the state?". The study presented analyzes digitized mental map data of Michigan focusing on the language regard of speech communities located on the east- and west-side of Lower Michigan. Data used for examination were collected from a 56-participant corpus stratified by county of origin (west-side: Muskegon, east-east: St. Clair), age (18-39, 40-59, 60+), and gender (female, male). Five different notable language attributes were found and analyzed in this study. These five attributes include "Yooper", "Up North", "Canadian", "West", and "East". The attributes were analyzed regarding the corpus as a whole, but also in terms of comparing how east- and west-side Michiganders perceived the attributes differently. The study's findings reveal language regard differences between west- and east-side Lower Michigan residents.

Recorded Presentation Abstracts

VIRTUAL 005

Girl Scout Voices Count (GSVC) Through Troop Leader 2020-2022

Presenters: Damon Schneider, Jeffrey Trost
Mentor: Sango Otieno

The purpose of this project is to provide an analysis of survey data collected from an online survey instrument distributed to troop leaders from 2020 to 2022 for the Girl Scouts of Michigan Shore to Shore (GSMISTS). The overall goal is to find improvements for the organization using key performance indicators, namely the Net Promoter Scores to check for satisfaction levels of troop leaders along with their recommendations for joining girl scouts. These ideas continued to be explored in other questions and ideas to get more of an idea of the troop leader's experience. The areas of particular interest to the client were Kent, Ottawa, and Muskegon counties, to focus research and analyses with the goal of creating understandable figures that the organization could use to both better improve their internal efficiency and advertise their success to others. *This project is part of STA 419 course designed to provide an opportunity to gain experience in statistical consulting.*

VIRTUAL 006

Girl Scout Voices Count (GSVC) Through Parents/Caregivers 2020-2022 Surveys

Presenters: Autumn Halvorsen, Collin Rogers
Mentor: Sango Otieno

The purpose of this project is to provide an analysis of survey data collected from an online survey instrument distributed to parents/caregivers from 2020 to 2022 for the Girl Scouts of Michigan Shore to Shore (GSMISTS). The overall goal was to find improvements for the organization using key performance indicators, namely: what they want their child to experience (and if they're getting that experience), what they value most about Girl Scouts, their perceptions about Girl Scouts, how they feel about their family's experiences, and if their experiences differ based on different demographic groupings. Of particular interest to the client were Kent, Ottawa, and Muskegon counties, to focus research and analyses with the goal of creating understandable figures that the organization could use to both better improve their internal efficiency and advertise their success to others. *This project is part of STA 419 course designed to provide an opportunity to gain experience in statistical consulting.*

VIRTUAL 007

Social Justice Begins with Me!: Disability Rights are Human Rights

Presenters: Cody Katerberg, Madelyn Roop
Mentor: Jamie Langlois

Sixty-one million adults in the United States live with some form of disability. Children are likely than not to have a relationship with a person with a disability throughout their lifetime. Social Justice Begins with ME! encourages children and families to enter into conversations in order to better understand others and foster communication. Social Justice Begins with ME!'s purpose is to advance human rights by engaging in empathic and educational "book club"-like conversations that address the unequal distribution of resources, rights and opportunities with children. Investing in children's empathy could change the world.

VIRTUAL 008

ICWA Panel

Presenter: Breanna Carter
Mentor: Jamie Langlois

Throughout the course of United States history, American Indian/Alaska Native (AI/AN) populations were subjected to cultural loss and intergenerational trauma as a result of colonialism. In 1978 congress implemented the Indian Child Welfare Act (ICWA) to protect AI/AN children, preserve families, and prevent further cultural loss. The status of ICWA is currently under review and at risk of being federally overturned. The goal of my community-based senior project is to bridge the gap between current and future social workers and American Indian/Alaska Native communities. By participating in a panel discussion regarding the past, present, and future of the Indian Child Welfare Act (ICWA), social workers will gain a better understanding of the policy's history, intended purpose, cultural implications, and tribal sovereignty. It invites tribal leaders to provide their perspectives on ICWA and the importance of the act for the preservation of AI/AN culture.

VIRTUAL 009

Surveying Clinical Practice Patterns on Swallowing Intervention in Adults with Intellectual Disability

Presenters: Trenton Berry, Cameron Esman, Andrew Howard
Mentors: Srihimaja Nandamudi, Sango Otieno

Dysphagia is a complex medical condition that increases the risk of choking on foods/liquids and thereby causing life-threatening pneumonia if left undiagnosed and untreated. The clinical practice patterns should be studied to explore the barriers of healthcare especially on individuals with intellectual disabilities and challenging behaviors as these conditions may interfere with the examination process and can alter the type of care provided by the clinicians. We present analysis of survey data collected from speech-language pathologists about their clinical practices on evaluation and management of swallowing disorders along with other barriers that could interfere with quality of care and healthcare access. Overall, this project is part of the STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting.

VIRTUAL 010

Using Hdc -Gal4 Hybrid Genes to Identify Cells Expressing *Hdc* and Containing Histamine in *Drosophila melanogaster*

Presenters: Judith Essemiah, Annabel Maag, Katie Westfall
Mentor: Martin Burg

The purpose of this project was to determine whether expression of the *Hdc* gene can be identified using recently modified *Hdc*-Gal4 genes in *Drosophila melanogaster*. The expression of Gal4, directed by the *Hdc* gene, should enable Gal4 to interact with the UAS-GFP transgene. This interaction results in the induction of Green Fluorescent Protein (GFP) expression, to detect *Hdc* expression in living cells. Males that contained one of three *Hdc*-Gal4 hybrid genes were mated with females that contained one of several UAS-GFP transgenes. Histamine immunostaining was performed on larval brains dissected from progeny of these crosses and analyzed for a histamine immunosignal and GFP using fluorescent microscopy. This enabled the identification of cells in the larval brain which expressed the *Hdc* gene (indicated by GFP) and contained histamine, demonstrating that the *Hdc*-Gal4 gene reflects *Hdc* expression. This analysis was also done in non-neuronal tissue, such as the male accessory

gland, which contains high levels of histamine-like immunoreactivity. Currently, it appears that there is no *Hdc* expression in accessory glands, despite the presence of large amounts of histamine immunoreactivty. This result suggests that in secondary cells, histamine may be taken up and not synthesized by these cells.

VIRTUAL 011

Life (Re)Cycle of Recycling

Presenter: Kayla Myers
Mentor: Ramya Swayamprakash

Recycling starts with each and every single one of us as individual human beings. The “Three R’s”, Reduce, Reuse, and Recycle, were drilled into our brains since the day we started Kindergarten. But did grade school curriculum ever go beyond a basic understanding of recycling? Where do our recyclables go? Who deems what is recyclable and what isn’t? How much of our recyclables can and will be reused? What do larger corporations do to emphasize recycling? Do they follow through with these plans that are put in place? What about the recycling and waste we don’t typically think about like chemical waste? For my project, I plan to analyze the overall life cycle of recycling and find just where each step of the process lies in my own life as well as where different organizations lie in the process. I plan to contact businesses and see what they do regarding recycling at their “step” in the life cycle and where they may be able to improve. I hope this project will help build a stronger base for recycling in the community and push more people to take appropriate action in keeping our planet clean.

VIRTUAL 012

Girl Scouts - Girls Survey (GSMISTS)

Presenters: Hailey Asmus, Kyle Knapp
Mentor: Sango Otieno

The purpose of this project is to provide an analysis of survey data collected from an online survey instrument distributed to the girls during 2020 to 2022 for the Girl Scouts of Michigan Shore to Shore (GSMISTS). The overall goal is to find improvements for the organization using key performance indicators including: satisfaction, net promoter score (NPS), and intent to stay. Of particular interest to the client were Kent, Ottawa, and Muskegon counties, to focus research and analyses with the goal of creating understandable figures that the organization could use to both better improve their internal efficiency and advertise their success to others. This project is part of STA 419 course designed to provide an opportunity to gain experience in statistical consulting.

VIRTUAL 013

Dysphagia IPE Lab Survey Comparison from 2021 to 2022

Presenters: Sarah Stuck, Austin Whitcomb
Mentors: Srihimaja Nandamudi, Sango Otieno

This presentation is about surveys regarding 2021 and 2022 dysphagia IPE labs for OT (Occupational Therapy), SLP (Speech and Language Pathology), and Clinical Dietitians. Students were asked a variety of questions pertaining to how they felt before and after participating in the labs. Using Cronbach’s Alpha, we assess if the questions on a scale from 1-5 can be collapsed into a single score for each subscale and thereafter investigate to see if on average the participants had more improvement within the year and if the magnitude of improvement differs between the two years. This project is part of the STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting.

VIRTUAL 014

New Music Initiative

Presenter: Stephanie Bueche
Mentor: William Ryan

The New Music Initiative is an on-going project founded in 2021 by undergraduate student Stephanie Bueche that seeks to expand the classical music repertoire through the process of commissioning and premiering new music. Each installment of the project has involved the entire commission process, from initial composer contact, to contracts, to the premieres.

Previous project work includes a solo composition, Layers of Loss by Beck Turro, premiered in April 2022, and chamber works by Logan Rutledge, Adam Cuthbert, John Jansen, premiered in November 2022.

This particular installment of the project aims to highlight a current GVSU student composer, providing an educational and practical opportunity for a young career. Selected composer Noah Braley is in his fifth year at GVSU and has been in the composition studio for three years. Braley had a work premiered on the GVSU New Music Ensemble's National Parks Tour and will be pursuing a Masters in Composition postgraduation. As part of the Initiative, Braley has written a new work for flute and clarinet with electronics to be premiered in late April 2023.

Funding for the Initiative has come from multiple awards from the Office of Undergraduate Research as well as the Haas Endowment for the Arts.

VIRTUAL 015

The Sphere of Influence and Single-Use Plastic

Presenter: Delaney Allan
Mentor: Ramya Swayamprakash

Half of all the plastic produced today is single-use. If nothing is done to reduce the amount of plastic waste being produced, the environment will greatly be impacted. While single-use plastics like grocery bags, cutlery, and water bottles are convenient in our daily-lives, they are extremely harmful to our environment. Many may think that these disposable plastics are being recycled, but in reality only a small percentage of plastic waste is. Instead, it often goes to landfills or incinerators, contaminating our air and water. Each year, millions of tons of plastic waste end up in our oceans. This waste is very harmful and responsible for the deaths of millions of sea animals every year. At all stages of plastic production we see the release of planet-warming greenhouse gasses. Governments around the world have taken small steps toward banning single-use plastics but it is still important to take individual action. The manufacturing of plastic warms our planet through greenhouse gas emissions, and once it is made it ends up in our environment, polluting our oceans. While it may seem hard to live sustainably, reducing our personal consumption of single-use plastics is one of the first steps we can take.

VIRTUAL 033

Sphere of Influence: Lowering CO_2 Consumption

Presenter: Angela Bazan
Mentor: Ramya Swayamprakash

I want to lower CO_2 consumption locally, specifically in relation to transportation, food consumption/production

and fast fashion. The lowering of CO2 beginning on the local level not only encourages healthier air but reduces future risks of climate change. I plan to begin this journey in my household by focusing on carpooling and using more public transportation to reduce the amount of CO2 emitted from our cars. Eventually, I will reach out further by identifying the financial benefits of decreased car use. I will implement lower meat consumption, limiting meals with meat to once a day or less. I will encourage this by informing people about the health benefits. Finally, I will shift our clothing purchases to primarily thrift shops, and repair our clothes until they are no longer functioning. I will encourage this actioin by highlighting the financial benefit and the opportunity to save more space in the home, while also encouraging the acquistion of basic sewing skills.

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Saini, Ramnit	Student
Salas, Allison	Student
Salas, Nora	Mentor
Sanchez-Lagunas, Sandra	Student
Sanderson, Emma	Student
Sands, Georgia	Student
Scameheorn, Hannah	Student
Schafer, Hannah	Student
Schmidt, Lindsey	Student
Schneider, Damon	Student
Schnyders, Anna	Student
Schriedel, Miranda	Student
Scovic, Molly	Student
Shabani, Shkelzen	Mentor
Shaffer, Emily	Student
Shen, Lisa	Student
Shields, Kayla	Student
Shreve, Julia	Student
Shull, Hannah	Student
Sidebotham, Evan	Student

Singer, Cara	Mentor
Slanger, Samantha	Student
Smith, Brian	Mentor
Smith, Grace	Student
Smith, Megan	Student
Smith, Sarah	Student
Somers, Kelsey	Student
Spotts, Sydney	Student
Squires, Jade	Student
Stamper, Korey	Student
Stapley, Kerri	Student
Starks, D'Angelo	Student
Staves, Mark	Mentor
Steinman, Alan	Mentor
Stoops, Carly	Student
Stowe, Marjorie	Student
Stroik, Laura	Mentor
Strouse, Susan	Mentor
Stuck, Jake	Student
Stuck, Sarah	Student
Studabaker, Alexis	Student
Stutz, Thomas	Student
Suh, Jiyeon	Mentor
Summerville, Naiya	Student
Sun, Wanxiao	Mentor
Sutliffe, Chad	Mentor
Swayamprakash, Ramya	Mentor
Swets, Benjamin	Mentor
Sylvester, Francis	Mentor

T

Terryberry, Rebecca	Student
Thomas, Derek	Mentor
Thompson, Cynthia	Mentor
Thornton, Kathryn	Student
Tillier, Bradley	Student
Topic, Courtney	Mentor
Topolski, Marie	Student
Townshend, Samuel	Student
Trost, Jeffrey	Student
Tunnell, Marc	Student

U

V

Vallery, Richard	Mentor
Van Nortwick, Mya	Student
VandenPlas, Jessica	Mentor
Vander Wall, Nolan	Student
VanderMolen, Julia	Mentor
Vann, Christina	Student
Varela, Maya	Student
Veen, Connor	Student
Villanueva, Isabelle	Student
Vincent, Brett	Student
Voss, Addison	Student

W

Waldron, Lillie	Student
Wallar, Bradley	Mentor
Walsh, Benjamin	Mentor
Walter, Kailey	Student
Walters, Zane	Student
Wardrop, Connor	Student
Warren, Stephanie	Student
Weatherby, Nolan	Student
Webb, Jessie	Student
Weber-Bailey, Lily	Student
Welindt, Hayden	Student
Westedt, Payton	Student
Westerink, Alyssa	Student
Westfall, Katie	Student
Wheeler, Madison	Student
Whelpley, Lillibeth	Student
Whitcomb, Austin	Student

White, Jillian	Student
Wiggins, Marcel	Student
Williams, Rhian	Student
Williams, Todd	Mentor
Williamson, Faith	Student
Wilmore, Lauren	Student
Wilson, Andrew	Student
Wilson, Jurrien	Student
Winenger, Grant	Student
Winkelstern, Ian	Mentor
Wintermantel, Julia	Student
Winther, Jennifer	Mentor
Wisneski, Kamryn	Student
Wolfe, Michael	Mentor
Wolfgang, Seth	Student
Wright, Diane	Mentor
Wroblewski, Michael	Mentor
Wyniemko, Katherine	Student

X

Xu, Gang	Mentor

Y

Yingling, Jacob	Student

Z

Zaszlavik, Katalin	Mentor
Zelenak, Isabella	Student
Ziegler, Emmerika	Student
Zylman, Hannah	Student

Online Schedule Builder

Updated Presentation Information in lieu of Printed Addendum

This book is printed with information current as of mid-February. Changes often occur after the print date, and are reflected online on the Schedule Builder.

To access the Schedule Builder:

1. Go to gvsu.edu/ours/ssd
2. Click on the “Schedule Builder” link
3. Login and follow instructions

We are here to help. Please let any SSD committee member or SSD volunteer know if you have any questions. You may also contact the Office of Undergraduate Research and Scholarship at ours@gvsu.edu and/or 616-331-8100.

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