



26th Annual

Student Scholars Day

- APRIL 13, 2022 -

Erica Wienczek

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SSD Committee

Feryal Alayont	Mathematics
Alice Chapman	History
Brett Colley	Visual and Media Arts
Elizabeth Flandreau	Psychology
Teegan Galdeen	Office of Undergraduate Research and Scholarship
Bill Hosterman	Visual and Media Arts
Lauren Keough	Mathematics
Andrew Lantz	Chemistry
Leifa Mayers	Women, Gender, and Sexuality Studies
Susan Mendoza	Center for Undergraduate Scholar Engagement
Debbie Morrow	Library
Ross Reynolds	Physics
Michael Scantlebury	Hospitality and Tourism Management
Shelley Sickrey	Center for Undergraduate Scholar Engagement
Richard Vallery	Physics
Todd Williams	Psychology

Welcome to Student Scholars Day 2022!

It is with great pleasure that we welcome you to celebrate the diversity and excellence of faculty mentored student research, scholarship, and creative activities at GVSU. In its 26th year, Student Scholars Day adapted to a hybrid of in-person and virtual world, where COVID-19 continued to pose a challenge for our large, in-person event. The SSD Committee decided to use the [Symposium by ForagerOne](#) website to host both recorded and live presentations via ZOOM, as well as offer in-person poster presentations and faculty-led sessions.

The format of this book has also been adjusted to accommodate the virtual state of SSD. Gone are the maps of the physical locations, and the usual format of the index. The index included here is a list of the student presenters and faculty mentors who presented for Student Scholars Day, whether it was in-person, recorded, or live via ZOOM. Although we are unsure how SSD will evolve in future years, the quality of student scholarship and the dedication of the faculty mentors is unwavering.

As always, many have contributed to make this growing event a success. We are especially grateful for the hard work and patience of Shelley Sickrey, Courtney Sherwood, Teegan Galdeen, Emily Morrison, and Ben Kallemeyn who made this process manageable and enjoyable. We thank the members of the 2022 SSD committee, Feryal Alayont, Alice Chapman, Brett Colley, Elizabeth Flandreau, Bill Hosterman, Lauren Keough, Andrew Lantz, Leifa Mayers, Debbie Morrow, Ross Reynolds, Michael Scantlebury, Richard Vallery, and Todd Williams, for their dedication and continuous flow of creative ideas. It takes an entire year to put together a program like this, and we appreciate the hours spent engaging with us in this process and pivoting in the final weeks before the event.

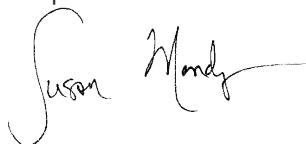
Once again, our deepest gratitude goes to Dan Slaughter for all of his work in the web registration for SSD, and especially for his help this year in using a new website to virtually host our event.

Thank you to Erica Wiencek for her artistic contributions to this abstract book. Her submission was one of several pieces submitted in response to a student competition hosted by the Office of Undergraduate Research and Scholarship. Erica's piece was selected to serve as the cover by the SSD committee.

Thanks to our student, faculty, and staff volunteers for their commitment to the university's mission and values, as evidenced by their involvement in this important activity. We value the time and effort given to this event.

A very special thank you goes to the faculty mentors who work collaboratively with undergraduate and graduate students in their scholarly and creative pursuits. We know it takes a great deal of time and dedication, but these experiences make a formidable impression on the education of GVSU students. We applaud your commitment and passion for teaching and learning.

And finally, a day like this does not happen without outstanding students like this year's SSD presenters. These students have sought ways to connect their classroom experiences with scholarly and creative practice. They have engaged in a process of discovery that is often difficult and demanding. We thank these students for taking full advantage of their liberal education at GVSU. We are proud of their achievements and excited to share their success.



Susan Mendoza, Ph.D.
Director, Center for Undergraduate Scholar Engagement

Schedule of Events

Live Presentations

9:00 a.m. - 5:00 p.m.

See page 12 for detailed schedule and abstracts.

Recorded Presentations

On Symposium April 11 - April 25

See page 74 for abstracts.

SSD Speaker Series

April 11, 5:00 PM; April 12, 5:00 PM; April 13, 5:00 PM

See page 5 for detailed schedule.

SSD and the Visual Arts at GVSU: Art Reception

April 14, 5:00 PM

Calder Art Center

Exhibitions of Art

April 5 - August 1, 2022

See page 11 for details.

Statement from the Cover Artist

Erica Wiencek

Student Scholars Day brings students across academic disciplines into one place in the spirit of research, scholarship, and intellectual curiosity. My design aims to represent several areas of interest to illustrate the diversity of research presented by students and their mentors. Through this piece, my intention is to highlight the passionate curiosity and academic excellence exemplified by Grand Valley's students through their academic pursuits.



SSD Speaker Series

April 11, 2022, 5:00 PM

Alumni Panel: Leveling Up: Making the Most of your Transition to Grad School

This SSD event will be a discussion about transitioning into graduate school. There will be an alumni panel to facilitate a conversation about what it is like to move far away for graduate school, how they made new friends, and discuss how they acquired essentials such as housing. Susan Proctor, Director of Alumni Relations at GVSU will moderate the panel. All GVSU students are invited to attend this session.

April 12, 2022, 5:00 PM

Jakia Marie: Soul work: Find Your "Why" Through Scholarship

As a first-generation college student, I began my higher education journey with no clear path. After being introduced to research, I learned how my personal experiences shape my scholarship. Little did I know that the questions I asked in my scholarship would also clarify my purpose, molding me into a Pan-Africanist and community-engaged scholar advocate. Join me as we discuss how scholars are informed by their work and how their work helps them find their why.

Dr. Jakia Marie is an assistant professor of Sociology, primarily teaching courses in anthropology and African and African American Diaspora studies.



April 13, 2022, 5:00 PM

Shaping Inclusive Communities Through Being Human in STEM (SSD Keynote Speaker)

Catalyzed by a 4-day student protest highlighting the impact of systemic racism on student experience, the "Being Human in STEM" (HSTEM) course (www.beinghumaninstem.com) started as a student-faculty collaboration to investigate the academic literature and lived experiences of marginalized students in STEM at Amherst College and beyond. Offered since Spring 2016, the course is an engine for student-led inquiry and action that has reshaped the STEM culture at Amherst, and has been adopted by over a dozen institutions. Join protein folding researchers Prof. Sheila Jaswal & Sam Young (Amherst '23) as they share their experiences with the HSTEM course from the faculty and student perspective and discuss HSTEM's impact on their individual STEM journeys and the broader Amherst STEM community. Dr. Sheila Jaswal will be presenting with Sam Young.

Dr. Sheila Jaswal is an Associate Professor in the Chemistry Department and Program in Biochemistry and Biophysics at Amherst College. Sam Young is a junior majoring in Biochemistry & Biophysics at Amherst College.



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.



Highlights of OURS Programs

Student Summer Scholars (S3) and Modified Student Summer Scholars (MS3)

The Student Summer Scholars (S3) program and Modified Student Summer Scholars (MS3) program provides funds for a student and faculty mentor to devote time to a research and/or creative project during the spring/summer semester. Generally, S3 and MS3 grants provide a student stipend, faculty stipend, and a small budget for supplies.

The Student Summer Scholars (S3) program provides funds for a student and faculty mentor to devote about twelve weeks/400 hours to a research and/or creative project during the spring/summer semester. The Modified Student Summer Scholars (MS3) program provides a part-time opportunity with funds for a student and faculty mentor to devote either about 200 hours over twelve weeks, or 200 hours during the Spring or Summer six week session to a research and/or creative project.

Through these grants and the mentorship of a faculty member, the S3/MS3 program offers a unique opportunity for undergraduate students to do hands-on, professional research and creative practice in their chosen field. Combining academics, field work, and a reflection component provides students with a meaningful learning experience that helps to prepare them for graduate school and future careers.

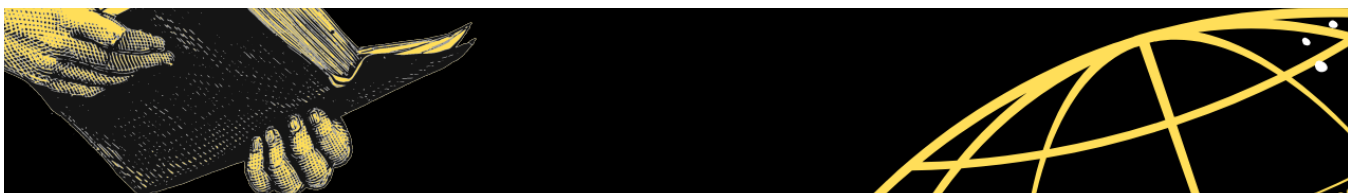
For each S3/MS3 participant, the project begins with an innovative and thoroughly researched proposal. With guidance from faculty mentors, students identify a research question or an area of creative practice and shape the structure of their project. The value of mentorship is an important part of S3. Experienced faculty mentors act as support and sounding boards for their students.

By building on a foundation of academic and critical thinking skills provided by undergraduate courses, self-motivated students can use S3/MS3 to further their knowledge in a specific area while learning to incorporate academics with professional work. S3/MS3 provides students with a new lens through which to view their long-term educational, work, and life plans.

The 2021 Student Summer Scholars presenting at this year's SSD include:

Colin Assenmacher, Gloria Baker, Ian Curtis, Rylie Dorman, Gabrielle Garlicki, Olivia Gordon, Liam Hart, Noah Holkeboer, Kelsey Inman-Carter, Lily Kedzuch, Elizabeth Kennard, Madeleine Lang, Matthew Martin, Olivia Maurer, Lillian Minnebo, Seth Ockerman, Madilynn Olenick, Allison Romanski, Maci Rozich, Georgia Sands, and Derek Tonello.

More information about the program can be found at www.gvsu.edu/ours/ssp



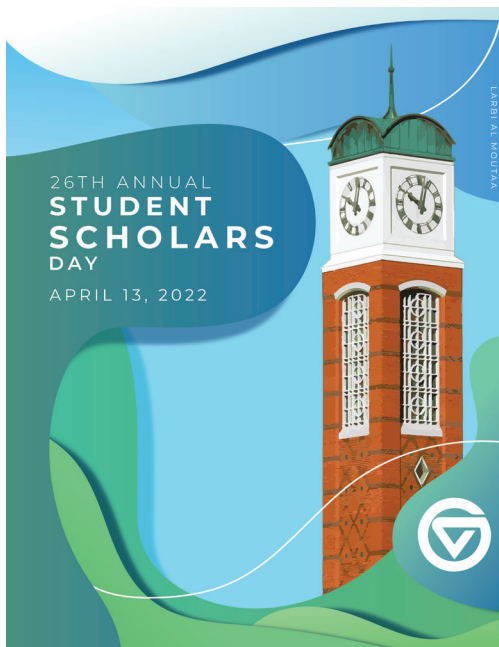
Highlights of Student Work

Student Scholars Day Abstract Book Cover

Each year, the Office of Undergraduate Research and Scholarship hosts a competition for artwork to be featured on the Student Scholars Day abstract book cover. All GVSU students are eligible to participate in the competition.

We always receive beautiful work, making it a tough job for the committee to choose just one. Here are just some of the wonderful submissions we received this year.

Larbi Al Moutaa



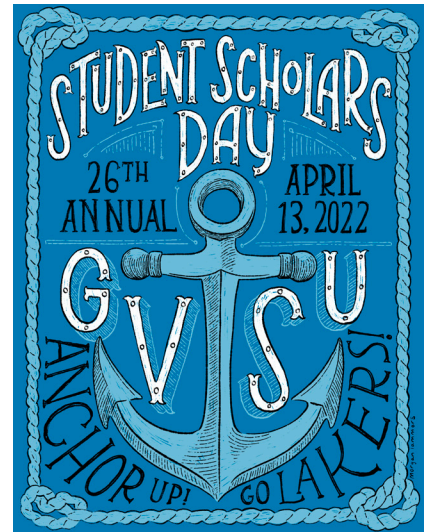
Katie Daiek



Xavier Golden



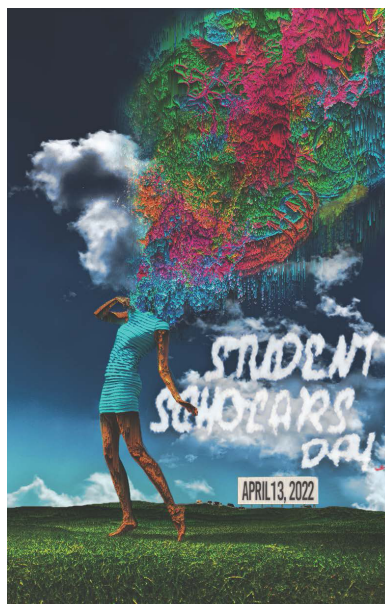
Morgan Lammers



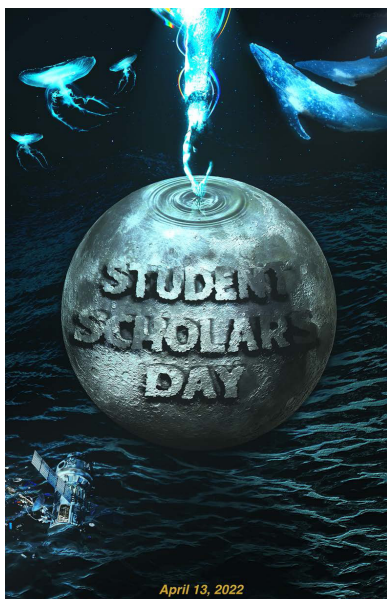
Akira Howard



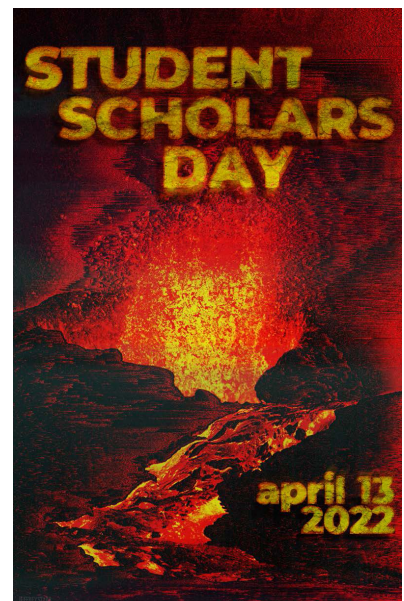
**Jeffrey Staub
Expression**



**Jeffrey Staub
Dive In**



**Jeffrey Staub
Lava**



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
Michigan Space Grant Consortium (MSGC)
OURS Ambassadors
Summer Research Orientation
Undergraduate Research Fair

Exhibitions of Art (Apr 5 - Aug 1)

The Visual and Media Arts Department presents student work displayed April 5 - August 1, 2022. Check it out in the Mary Idema Pew Library Exhibition Space, as well as the Calder Art Center.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE

Forecast

Student Artists: Brooklyn Graham & Micah Hill

Faculty Mentor: Anthony Thompson

Forecast is a photographic series depicting many college students experiences with isolation, heartache, and emotional struggle. The work enters into the discussion of mental health in college students and the emotions that pour down around them and can drown them. Emotions and their wounds are daunting enough to deal with, but more challenging can be the attempt to see a future where the struggle ceases. While we all have umbrellas and raincoats, we are still in the middle of a storm, and the validation of this position matters. This work seeks to bring this challenge and reality for college students in the last few years into the light. Through the striking yet mysterious detail of this stop motion flash photography, the viewer is encouraged to meditate on the human experiences of hard emotion, and their own struggle therein.

Jewelry and Metalsmithing Student Work

Student Artists: Michael Bair, Megan Cota, Kaylee Erikson, Cassidy Grevemeyer, Miranda Kornowicz, John Stuhldreier, BN Symons, Alexandra Ziebarth

Faculty Mentors: Laurel Fulton, William Hosterman, Renee Zettle-Sterling

This collection of work is a representation of work made in Introduction to Advanced Jewelry and Metals at GVSU.

Ceramics Through the Pandemic

Student Artistis: Veronica Clapp, Floria Mason, Sophia Nelson, Jacy Nichols, Mikaela OConnor, Alexandra Ziebarth

Faculty Mentor: Hoon Lee

This exhibition consists of artwork created by upper level ceramics students during the school years of 2021-22. During this time the students were working diligently, showing up everyday to create pieces to demonstrate perseverance through their creative practice. Through functional and sculptural ceramics each of the students expressed themselves with their unique artistic voices. Despite the obstacles of social distancing and diverse backgrounds they shared knowledge and grew together as strong female ceramicists.

CALDER ART CENTER

Drawing in the Visual and Media Arts Department

Student Artists: Max Briggs, Libby Haan, Max Havlik, Anna McGillicuddy, Kelly Morgan, Jennifer Perris, Kaitlyn Perry, Melanie Siebert, Dallas Siczka, Lisa Sonke, Ethan Vales

Faculty Mentor: William Hosterman

Outstanding drawing work from the Department of Visual and Media Arts. The work was created in the different level of drawing classes in the department. The work represents an essential aspect of the training of a visual artist. The drawing work will be from Drawing I, Drawing II, Life Drawing and Intermediate Drawing.

Live Sessions & Extended Sessions, Abstracts & Schedule

Beginning at 9:00 AM (In-Person)

KIRKHOF CENTER 2266

Integrating Historical Events into Collages with Collective Memory, and Time as Themes

Presenters: Caroline Bell, Sarah Sciaky

Mentor: Hsiao-ping Chen

This project focuses on designing an art curriculum for middle school students to explore the effects of collective historical memory through time. The theme of collective memory and time is integrated into the art project while incorporating social studies and historical connections to help students understand how historical events can impact and shape our collective memories. The contemporary artist Carrie Mae Weems' creative strategies are incorporated into the thematic and research-driven processes and creative thinking strategies to guide students' conceptual thinking of how the historical context and social events shape our memories. Guiding questions and worksheets are developed to guide students' artistic processes and understand memories as shared stories. The art of making collages and Elliot Hundley's work demonstrated how collages (cut-out images from magazines) could be used as an artistic medium to create meaning with memories.

KIRKHOF CENTER 2263

Statistical Consulting Experiences in STA 419

Presenters: Andrew Benedict, Carsen Boyink, Arthur Clark, Ryley Clark, Nicholas Duley, Jacob Dunivan, Kristina Gibbons, Katlyn Hamm, Nicholas Hehl, Zachary Knott, Arna Kristjansdottir, Stephanie Kruskie, Andrew Mason, Connor McNamee, Sydney Meyer, Stella Rodriguez, Stella Sterling

Mentor: John Gabrosek

9:00 AM: A Statistical Consulting Experience: The Relationship between Lumbosacral Angles and Gut Sizes (Nicholas Duley and Katlyn Hamm)

The human body is often seen as a complex machine where little is known about even the smallest of its functions and relationships. One such relationship is that of the human's gut volume and how it can influence the lumbosacral angle, or the angle of the S1 vertebrae of the human spine. Investigating the relationship between the gut volume and the lumbosacral angle is the goal of our statistical consulting project with Dr. Natalie Laudicina. As consultants we were asked to help Dr. Laudicina determine if the gut volume had any impact on the lumbosacral angle using data that she collected on about 100 different people.

9:30 AM: A Statistical Consulting Experience: Adverse Childhood Experiences, Lifetime Trauma Exposure, Well-being, and Resilience among social work education majors (Jacob Dunivan and Arna Kristjansdottir)

Dr. Joshua Bishop from the School of Social Work leads the study. The goal of the study is to determine whether having direct exposure to adversity and potentially traumatic events, along with secondary exposure to the trauma experienced by others, through Master's students' in Social Work work or field placements, increases the students' risk for experiencing traumatic stress. As a statistical consultant, our goal was to determine whether there is a significant correlation between those that experience direct exposure and those that experience traumatic stress.

10:30 AM: A Statistical Consulting Experience: Analysis of a Season of GVSU Football Tickets (Andrew Mason, Connor McNamee, and Stella Rodriguez)

Joe Verschueren, from GVSU Athletics, collects and records information about tickets sold and the number of spectators at every football game. He wants to investigate ticket data to determine more efficient marketing strategies for future football seasons. As the statistical consultants working on this project our task was to analyze the ticket data and create visualizations to determine the cities spectators are coming from, the groups that are most attending the games (student, faculty, general public), how long before the games people buy tickets, and whether certain time periods have higher traffic of tickets bought on game day. The results found and visualizations made will help with marketing and staffing strategies.

11:00 AM: A Statistical Consulting Experience: Analysis of a Survey of Michigan High School Athletic Directors and Implications for the Sports Management Degree (Andrew Benedict and Nicholas Hehl)

Grand Valley's Sport Management (SPM) program staff strives for excellence with all of their interactions with SPM students. As interest in high school sports continues to grow, making sure the program prepares students for excellence has become more crucial than ever. A survey was constructed and administered to the Athletic Directors of Michigan High Schools on the necessary skills required to be successful. Our job as statistical consultants is to analyze data to see what directions the SPM program should take to maximize the skills of graduates and increase their chances of becoming an Athletic Director. This will hopefully prove that being a teacher or coach is not a necessary requirement like it has been in the past.

11:30 AM: A Statistical Consulting Experience: Writing Center Usage Analysis (Zachary Knott and Sydney Meyer)

Since the pandemic, Patrick Johnson, Director of the Fred Meijer Center for Writing, has noticed changes in the students seeking his team's help with writing. Over the past few semesters he has collected data from those who use the Writing Center. Our goal is to better understand how the Writing Center is used, by whom the Center is used, and how to incorporate feedback to improve Writing Center services. As his statistical consultants, we were asked to use this data to find if students from particular courses or teachers tend to use the Writing Center more than others. The information we find will be used to reach out to departments and teachers who use the center less than others.

12:00 PM: A Statistical Consulting Experience: An Analysis of IT Service Desk Five9 Call Center Data (Carsen Boyink, Ryley Clark, Kristina Gibbons, and Stella Sterling)

Grand Valley's IT service desk aims to provide outstanding service to its customers. The director of IT services, Kenneth Cott, wanted to create the optimal schedule for the service desk to reduce call waiting traffic. This was accomplished with the data from their new call center software, Five9. As Mr. Cott's consultants, we compared call trends and any data relating to Five9 call center data to determine when to staff the call center. In our presentation, we will share our analysis and what we accomplished to come to a conclusion.

12:30 PM: A Statistical Consulting Experience: GVSU Employee Ombuds (A.J. Clark and Stephanie Kruskie)

In February 2021, Grand Valley State University hired Elisa Salazar as the first Employee Ombuds Officer. Salazar spent a year working with staff to resolve conflict and promote a healthy work environment among the GVSU community. Salazar is held accountable in her position through an annual report that discusses recurring concerns and issues from appointments. A report will be prepared in order to accurately represent the work that Salazar has worked so hard to accomplish. Salazar will work with Stephanie Kruskie and Arthur Clark in order to analyze and summarize data collected by survey from those who utilized the Employee Ombuds during the first year of the program. This report is discussed with President Mantella and is available for the GVSU community.

Beginning at 10:00 AM (In-Person)

KIRKHOF CENTER 2259

Microscale Biogeochemical Dance with Earth-scale Implications: Modern Mat Microbes Synchronize Migration to a Daily Tempo

Selected as part of the SSD Curated Theme: Ways of Knowing, Non-Traditional/Innovative Approaches to Knowledge Production

Presenter: Janelle Cook

Mentor: Bopaiah Biddanda

Colorful modern-day benthic microbial mats that resemble life on early Earth inhabit Lake Huron's cold, low-oxygen, high-sulfur submerged sinkholes. Mats are dominated by purple-pigmented cyanobacteria capable of oxygenic and anoxygenic photosynthesis, and pigment-free chemosynthetic sulfur-oxidizing bacteria. We captured time-lapse images of daily overturn between cyanobacteria and sulfur-oxidizing bacteria – turning the mat surface nearly entirely purple after dawn and white after dusk. Alternating layers of vertically migrating photosynthetic and chemosynthetic filaments climbed across μm gradients – exhibiting their fastest motility following dawn and dusk. Observations were corroborated with time-lapse imaging and microprofiling of intact mats under simulated day-night conditions. Such daily migrations of mat-dwelling microbes in the benthic biosphere of the Precambrian may have played a critical role in optimizing photosynthesis, chemosynthesis, carbon burial, and oxygenation.

Beginning at 11:00 AM (In-Person)

KIRKHOF CENTER 2259

Altius Praebentes: Reaching Higher at Grand Valley, 1963 to present

Presenters: M.E. McPhee, Jacob Petrosky, Joanna Stairs, Griffin Wilson

Mentor: Melissa Morison

The Foundations of It All: General Education 1963-1982 (M.E. McPhee)

Through the 1960s, 70s, and 80s the core courses that all students were required to take at GVSU changed with the values and culture of American society. As understanding of the skills a college-educated person should have and what it meant to be college-educated changed, so did the university's general education program. By looking at the GVSU course catalogs and Presidents' reports from the 60s-80s we can see shifts in general education requirements and the logic underlying those shifts. By examining this process, we can observe how the construction of a college-educated person evolved at GVSU. I chose to focus on this time period because the general education program underwent the most change in this era, and by 1982 the general education program had the bones of the current program. I also consider the catalogs of other institutions in the area to compare their general education program and values in this era.

Poluglossos: On Languages Offered at GVSU (Jacob Petrosky)

This paper investigates the languages offered at Grand Valley State University from its founding to the formal offering of the classical languages within a department of Classics in 2000. Particular attention is given to offerings of non-western languages, such as the foundation of the Japanese program in the 80s and to how GVSU's offerings compare to other Michigan institutions of higher education. This paper achieves this largely through work with primary source documents, with course catalogs forming a bulk of the sources. This study is important due to the continued prevalence of language instruction at GVSU, with all BA students required to reach third-semester

proficiency in a language. Profitable next steps would involve speaking with the professors who taught these courses, which would allow insight into how the courses themselves functioned, shedding light on issues such as teaching methodology and text selection.

Student Services Through the Years, 1963-Present (Joanna Stairs)

The student services offered at Grand Valley were initially small but as the university grew, this changed. Some services that I am discussing are the library and offices such as Disability Support Resources. I will also compare Grand Valley's services to those of other regional institutions. The evidence used is GVSU catalogs from 1963 to the present, websites, and the services provided at other small colleges, private and public, based on catalogs and reports. It is important to see what services were offered because GVSU is an institution of higher learning that should seek to understand the student as a whole. To think of the student as a human being with a full range of needs and concerns has become an integral part of Grand Valley's mission. As a next step, it would be interesting to explore the connection between the student services offered and changing aspects of American social values since 1963.

Why We Do It: Values and Goals of GVSU In the 60s Through 80s (Griffin Wilson)

As society changes over time the core values and social norms we hold shift to fit our ideal of what a productive member of society looks like. This shift is reflected in the goals of social institutions such as colleges and universities. Institutions of higher education shape younger generations by highlighting certain values and projecting constructions of what students should appear to be. The 60s-80s was a period when Grand Valley comprised several colleges different from those we have now, each with their own mission statement reflecting unique values. By examining the Presidents' reports, course catalogs, and various requirements at Grand Valley, we can see what values were prioritized and what goals GVSU was trying to reach. An important next step would be to examine the goals and values of other institutions in Michigan and see if the values held by Grand Valley align with other institutions in our state.

KIRKHOF CENTER 2266

Mathematics and Applications

Presenters: Arthur Clark, Evan Henning, Mirza Komic, Lucas Smielewski

Mentor: Feryal Alayont, Lora Bailey

A Mathematical Analysis of Uno with Cheating Scenarios (Arthur Clark & Mirza Komic)

Atticus and Bartholomew have always wondered why they lose more games of Uno compared to Chad. After their last miserable game night, they finally decided to hire us as consultants to help them with the situation. We were hired to analyze various possible cheating scenarios that Chad might have employed, such as switching a card in his hand or playing two cards at once, and to determine how each of these cheating methods impacted the outcome of the Uno games using simulation and other techniques. In this presentation, we will report on our mathematical analysis of these cheating methods.

Edge Coverings of Graphs (Evan Henning)

A graph, composed of vertices (dots) and edges (lines connecting vertices), is a visual representation of relationships between objects. Vertices represent objects and an edge connecting two vertices shows a relationship between the two objects vertices represent. An edge covering of a graph is a selection of edges such that each vertex in the graph connects to at least one edge. The total number of edge coverings in families of graphs like path and cycle graphs turn out to be the famous Fibonacci and Lucas numbers. In this talk, we will investigate other

families of graphs and the sequences generated by the total numbers of their edge coverings.

Simulation Analysis of Major League Baseball's Rising Game Duration (Lucas Smielewski)

Major League Baseball (MLB) has seen a decline of viewership attributed to an increase in the duration of the average baseball game and limited action on the field. To combat this, rule changes have been proposed: defensive shifting limitations encouraging more action, pitch clocks to reduce the time between pitches, and an automated ball-strike calling system. We explore the effect that these proposal shave on game duration, activity on the bases, and the number of balls in play with the Monte Carlo Method. We use Python to simulate a realistic MLB game, gather MLB data to determine probabilities used in the simulation, code in the proposed rule changes, and perform repeated simulations to analyze their impact. Through this analysis, we hope to demonstrate the effect on the average MLB game and determine the best strategy for MLB officials to improve viewership without harming the integrity of the game.

Beginning at 12:00 PM (In-Person)

KIRKHOF CENTER 2270

Gendered Institutions, Practices, and Embodiments: Transforming Care, Education, and Engagement Amidst Shifting Digital and Material Environments

Presenters: Eliza Graham, Jillian Smith, Arly Winchester

Mentor: Leifa Mayers

(Eliza Graham)

In 2007, the film critic, Nathan Rabin, coined the term Manic Pixie Dream Girl (MPDG), to describe a rising film trope. Since then, the MPDG has become a potent post feminist masquerade. However, this phenomenon came to be as social media transformed the American cultural landscape, therefore has escaped academic interrogation. This study aims to characterize the distinct qualities of MPDG femininity, and examine its impact on young people. Using existing data sampled from the video-based social media app, TikTok, it argues that the Manic Pixie DreamGirl is a particularly dangerous form of feminine embodiment. The aim is to highlight how postfeminism operates online, and begin to understand how this has impacted the 'internet generation.'

(Jillian Smith)

In the US, men in fraternities are three times more likely to commit rape than other men on college campuses (Foubert et al 2007). This statistic has been linked to hypermasculinity, dominance, competition, and pornography. Although there has been an increase in preventative training modules, the statistic still rises. The purpose of this project is to assess fraternity members' perceptions of the efficacy of these current training modules and what can be done to improve them. I have administered a survey to gain information about fraternity members' experiences with these trainings and what they would like tosee out of this type of programming. I anticipate finding suggestions for how to create programming that is more engaging for members and what could leave a larger impact. The findings could have implications for the design of programming on sexual assault, consent, and healthy relationships.

(Arly Winchester)

Navigating healthcare in the US is difficult, especially for transgender and non-binary (TGNB) patients in West Michigan who seek care at one of the city's dozens of clinics and hospitals. I have administered a survey that

assesses the strengths and gaps in healthcare worker knowledge on transgender and non-binary identities, obstacles to care, and trainings that are vital to actively making healthcare accessible and safe. The responses came from healthcare workers in West MI through an online survey of 20 questions, asking about their credentials, workplace, and attitudes and training on treating TGNB patients. Based on previous research, attitudes towards caring for TGNB patients are anticipated to be more positive while training for treating them is still lacking (Nowaskie et al. 2020, Towns 2020). This study has potential implications for the participants, their patients and workplaces by building on best practices for the care of TGNB patients.

Beginning at 2:00 PM (In-Person)

KIRKHOF CENTER 2263

Reading Into Sleepovers?: A Historical Queer Analysis of the Sleepover Environment Through Parenting Magazines

Selected as part of the SSD Curated Theme: Centering Marginalized Voices: Stories of Self and Community

Presenter: Tate Johanek

Mentor: Krista Benson

The sleepover environment is an adolescent space that isolates itself from direct societal pressures yet is influenced by external factors that maintain expectations of heteronormativity. Parents are a primary influence in shaping their child's self-perception of identity and necessary skills for socialization, modeling ideal performances of gender and sexual identity and guiding their child's development in compliance with social expectations. Such influences damage the capacity for queer children to embrace their sexuality, causing feelings of isolation or identity repression through forced compliance with heterosexual norms. To assess the impact of heteronormative language and social pressures by parents regarding sleepovers, I analyzed articles from parenting magazines between 1950 and 2020. I will map the transition towards modernized expectations of identity and analyze patterns to understand how queer identities have maneuvered themselves to navigate sleepovers across time.

KIRKHOF CENTER 2270

Department of Psychology Oral Presentations

Presenters: Liam Hart, Lily Kedzuch, Greg Russell, Connor Thompson

Mentors: Todd Williams, Michael Wolfe

Information about Past Beliefs Influences Current Beliefs (Liam Hart and Greg Russell)

This experiment investigates the influence that information concerning past beliefs has on current beliefs.

Participants in the experiment were either believers or disbelievers in the effectiveness of gun control, according to responses on a pre-screening survey. In the study, participants read a text that was either consistent or inconsistent with their beliefs. Next, they verified initial beliefs on gun control from the pre-screen survey that were either accurate, the opposite of their initial beliefs, or they did not verify gun control beliefs. Finally, participants reported their current beliefs and wrote a 250-word essay explaining their beliefs. Verifying true initial beliefs resulted in less belief change. These results support the hypothesis that beliefs are subject to the influence of salient information in the recall context.

Two-Dimensional Machiavellianism and the Implications of Selected Coping Strategies on Satisfaction with Life (Lily Kedzuch)

Machiavellianism comprises two dimensions. Machiavellian views characterize others as untrustworthy. Machiavellian tactics represent a person's tendency to manipulate others for personal gain. Coping strategies can be grouped into constructive and destructive strategies. The purpose of this study was to examine how two-dimensional Machiavellianism is associated with coping strategies and differences in life satisfaction. Machiavellian views were associated with less life satisfaction, positively correlated with destructive coping strategies, and negatively correlated with constructive strategies. Machiavellian tactics shared similar associations with life satisfaction and destructive strategies but was not associated with constructive strategies. Results refine our theoretical understanding of Machiavellianism and its consequences.

Machiavellian Views and Tactics: Association with Workplace Values (Greg Russell)

Machiavellianism is associated with higher levels of moral disengagement, psychological entitlement, and misconduct (Ogunfowora et al., 2021); and less citizenship behavior at the workplace. Recent research differentiates between the views and tactics dimensions of the trait (Monaghan et al., 2020). The association between these dimensions, work values and vocational interests was examined in two undergraduate samples from Michigan (N= 225) and Florida (N= 450). The survey included the two-dimensional Machiavellianism scale (Monaghan et al., 2020), the Lyons work values (Lyons, 2003) and the Oregon vocational interest scales (Pozzebon et al., 2010). The results showed that views and tactics were negatively associated with altruism, and tactics predicted less emphasis on the social and intrinsic aspects of work.

Examining the Moral Foundations of Machiavellianism (Connor Thompson and Elise Richards)

Recent research indicates that Machiavellianism comprises two dimensions: views and tactics (Monaghan et al., 2020). The views dimension explains Machiavellians' untrustworthiness, cynical worldviews, and negative perception of others. The tactics dimension represents Machiavellians' willingness to manipulate and exploit others for selfish purposes. The goal of these correlational studies was to examine the relationship of these dimensions with moral foundations and values. Results indicate that Machiavellian tactics are related to both moral foundations and a preference for utilitarianism. Overall, these findings indicate that the aspects in which Machiavellianism relates to morality differ amongst views and tactics. While both are associated with lower levels of loyalty to others, we found that the tactics dimension most clearly predicts morality.

Beginning at 9:00 AM (Live via ZOOM)

[VIRTUAL SYMPOSIUM 526](#)

Psychodelics and Dementia: Can They Improve Sensory Functioning?

Presenter: Jeffrey Baldwin

Mentor: Dawn De Vries

This presentation will include a review of the literature on the use of psychodelics with people who have dementia. Implications for recreational therapy practice will be included.

Beginning at 10:00 AM (Live via ZOOM)

[VIRTUAL SYMPOSIUM 549](#)

Natural Resources Management Capstone - morning

Presenters: Emma Fitzgerald, Wade Foster, Collin Manninen, Alycia Peterson, Natasha Sokolow

Mentor: Griff Griffin

10:00 AM: The Effect of Climate Change on Lake Huron Shoreline Erosion (Collin Manninen)

Climate change can be observed along the shores of the Great Lakes, as water levels in the year 2020 broke previous record highs. This led to catastrophic erosion events along the Lake Huron shoreline. The purpose of this research is to model the future condition of the Lake Huron shoreline using Geographic Informational Systems. Understanding the natural cyclical water levels of the past help to predict future water levels. Data was collected from other scientific models that contained the predicted future water level scenarios of Lake Huron. The British Climate Centre predicts a wetter climate with possible higher than previously recorded water levels in the future. If these forecasts were to occur, the model results may assist land owners in the preparation and prevention of further catastrophic shoreline erosion events.

10:30 AM: The Effects of the Emerald Ash Borer on the Ecosystem, Economy, and Native American Culture in the U.S. (Natasha Sokolow)

The emerald ash borer (EAB) has killed millions of ash trees since its discovery in the U.S. in 2002. The death of these trees affects ecosystems and wildlife that depend on them, removes native ash species as available timber supply, and destroys a cultural resource for North American tribes. Current research shows that without new and effective methods to combat the spread of EAB, the U.S. will be left without an important resource. The reduction of ash trees has altered forest ecosystem successional rates and increased invasive plant species, subsequently decreasing native biodiversity. Native ash species comprise 12% of urban plantings and removal of infected trees and replanting new trees will cost billions of dollars. Wood from ash trees is also a resource for Indigenous tribes, it is used for basket-making, pipes and flutes, medicinal recipes, and lacrosse sticks.

11:00 AM: Differences Between Invasive Species Concentrations Near Hiking Trails in Wildwood Harbor Preserve, Boyne City, MI. (Wade Foster)

Invasive species adversely affect habitats and ecosystems. Disturbed areas are particularly vulnerable to colonization and spread of invasive species and becoming more so with changing climate. A large part of managing invasives is surveying for them, which is often difficult with little resources and a lot of ground to cover. Invasive species locations were collected in a survey conducted at the Wildwood Harbor Preserve to observe whether there

was a pattern in their distances from the trail running through the preserve. The purpose of this research was to determine whether some invasive species will spread significantly further from hiking trails than others to help guide future monitoring. I think that invasive honeysuckles will have larger concentrations closer to the trail, while Japanese barberry will be found further away from the hiking trail.

11:30 AM: How GIS can Identify Desirable Camping Locations that Follow Wilderness Regulations, and/or Leave No Trace guidelines (Emma Fitzgerald)

Campers consider the best camping sites in wildernesses to be flat and close to water and trails. Regulations from designated wildernesses and the suggested Leave No Trace Guidelines limit how close a camper should be to water and other sensitive or unsafe areas. The purpose of this research was to determine how many suitable camping locations are in selected wildernesses based on wilderness regulations, and/or Leave No Trace guidelines and desirability of camping locations. Desirability of camping locations was based on close proximity to water, trails, and having a slope less than 3%. Selected wilderness areas are South San Juan, Never Summer, and Lizard Head Wilderness Areas. I anticipate that some areas will not have campsites that meet the requirements.

12:00 PM: Efficiency and Variability of Different Aging Structures in Bluegill, Perch, and Bluegill/Sunfish Hybrids (Alycia Peterson)

The purpose of this research was to determine the efficiency and variability of different aging structures in bluegill, perch, and bluegill/sunfish hybrids. Knowledge about the age composition of fish populations is essential for effective management. Fifteen fish were collected and sampled from an electro-fishing survey conducted on Manistee Lake in Manistee County, Michigan. Fin rays, spines, and otoliths were all extracted, processed, and aged. At the same time, a timer was started for each procedure to help measure efficiency. The ages gathered from each structure were recorded and compared to assess variability in the age. Hopefully, the three aging structures will show little variability among them, and the most efficient aging structure will emerge. This information can help managers determine the best technique to use when aging large amounts of fish.

Beginning at 10:30 AM (Live via ZOOM)

[VIRTUAL SYMPOSIUM 531](#)

Climate Change Impacts, Vulnerability, and Adaptations

Presenters: Arna Kristjansdottir, Serena Kruithoff, Alycia Peterson, Hannah Zylman

Mentor: Elena Lioubimtseva

Impact of Climate Change in Iceland's Fish Stock (Arna Kristjansdottir)

The purpose of the study is to show the effects that global climate change has had on Iceland's fish stock. Being one of the country's largest industries, it is important to have predictability and be able to plan and make adaptations according to those. The disappearance of certain fish stocks due to global warming might prove detrimental to small fishing villages that count on them to make a living. This study will strive to point out trends in global warming in the ocean surrounding Iceland. Using data from IPCC, ACIA and NRM and scholarly reviewed articles, the study will try to find what has led to change in the composition of the fish stock in Iceland's jurisdiction over the past 50 years.

Climate Crisis and its Effects on the Great Lakes and Health (Serena Kruithoff)

The purpose of this study is to show the effects that global climate change is having on the Great Lakes region,

overall the health of the population surrounding this area. This study will strive to answer the following questions: what is causing these changes, what is being heavily affected by these changes and what can be done to help prevent the downfall of the Great Lakes (as well as other questions along the way). Overall, these lakes are very important to the overall climate of Michigan, as well as surrounding states / countries. Therefore, their downfall can also lead to the downfall of human health as well. Sadly, these health issues not only affect Michigan, due to the boarder of the Great Lakes. Therefore, this study will strive to address all areas affected by this downfall, but specifically Michigan.

The Impacts of Climate Change on the Production of Fruit Crops in the Great Lakes Region (Alycia Peterson)

This research project examines the impacts of climate change on fruit production in the Great Lakes region. Fruit production is a primary revenue source for many locations within the Great Lakes region and we examine here how it is likely to change because of global climatic changes. Fruit trees growing in a changing climate must cope with a rising CO₂ atmosphere, phenological changes occurring because of increased temperature, lower chilling hours, the impacts of deviating precipitation, and pests. We examined data from the Great Lakes Integrated Sciences and Assessment (GLISA) datasets and agricultural statistics from the USDA, IPCC, and US NCA climate data, and scholarly peer-reviewed literature to evaluate the impacts of climate change on the production of fruit crops.

Impact of Climate Change on Water Usage in the Pacific NorthWest (Hannah Zylman)

The Pacific NorthWest (PNW) experiences strong changes of seasonal weather annually, including strong differentiations of precipitation. This, in turn, interrupts the human consumption of water usage and natural cycles that rely on regular water levels. The Cascades mountain range that runs through the region also dictates much of the water cycle. Snowpack and melt from the mountains feed into the water system which controls much of the available water used further downstream. Throughout the region, there was variability in wetness within recent years, but the general trend for the climate was warmer and drier. Our goal is to identify hydrological trends caused by climate change in the PNW region using data from the IPCC, USGS, and NOAA that impact availability for drinking water, agriculture, fisheries, forestry, and hydropower in recent years.

Beginning at 2:00 PM (Live via ZOOM)

VIRTUAL SYMPOSIUM 008

Bio-Surveillance of COVID-19 Data using Statistical Process Control

Selected as part of the SSD Curated Theme: The Precarities and Possibilities of Pandemic Times

Presenter: Payton Miloser

Mentor: Paul Stephenson

The ability to predict virus outbreaks is important for assessing the spread of the virus and handling the impact of the spread on the population. The COVID-19 pandemic has provided data that can be studied at the county level that contributes to the knowledge and research surrounding the eradication of the virus; at the county level, the ability to track the spatial dependence of COVID-19 spread between counties across the United States can be done using the geospatial autocorrelation statistic, Moran's I. Using Moran's I this has been able to track the spatial dependence of the COVID-19 cases throughout the pandemic and visualize spikes in Coronavirus case rates to predict outbreaks. This study will present methods for tracking incident type data using Moran's I and Statistical Process Control to predict outbreaks.

Beginning at 3:30 PM (Live via ZOOM)

[VIRTUAL SYMPOSIUM 534](#)

Natural Resources Management - Afternoon

Presenters: Cody Krause, Alexander Richmond, Matthew Suehr

Mentor: Griff Griffin

3:30 PM: Reducing Phosphorus Loading to Lloyd's Bayou with Vegetative Buffers (Cody Krause)

The purpose of this research was to determine if adding vegetative buffers between an emergent wetland and private landowners' lawns would decrease phosphorus loading to the wetland. This research focused on the emergent wetland Lloyd's Bayou region of Spring Lake Michigan. Lloyd's Bayou is surrounded by lawns. GIS software was used to determine the area of potential fertilizer usage on private property. Current fertilizer usage was assumed to be at twice the recommended rate. Runoff was calculated using a rational runoff equation. Buffers were constructed with native wetland species. Cost to homeowners and conserving open lawn space for recreation were also considered. Buffer effectiveness was based on bufferwidth; a minimum effectiveness was considered to be fifteen feet wide. It is expected that by implementing the largest thirty-foot-wide buffer that Lloyd's Bayou will see a marked decrease in phosphorus loading.

4:00 PM: Fragmentation of Wilderness by Established Trails (Alexander Richmond)

Trails in wilderness areas are advantageous due to the fact that they concentrate use, limiting the impact on the wilderness as a whole. This analysis will be used to determine the extent of impacts from fragmentation on wildlife in the areas surrounding the established trails. In order to determine the extent of fragmentation by established wilderness trails, GIS analysis has been used. GIS data was collected from BLM.Gov. Individual wilderness areas in the Western U.S. were examined and the corresponding trail maps were overlaid to analyze how much of the area is impacted by trails. The impacts of this fragmentation will include potential habitat impacts, as well as changes in wildlife behavior.

4:30 PM: Ecological Condition of the Dakota Prairie Grasslands (Matthew Suehr)

The purpose of this research is to determine the ecological condition of the Dakota Prairie Grasslands. All areas were grazed by cattle to varying degrees. Oil and gas extraction takes place on this land, and some of these plots can show how effective their remediation efforts were. Vegetation data was collected in McKenzie County, North Dakota. Plots were chosen at random on Forest Service land where the presence of graminoids and the density of forbs was determined. Soil pits were dug as well to measure the depth of soil horizons and weak acids were used to detect the presence of carbonates. Knowing the ecological condition of these grasslands is important for the Forest Service to make management decisions and detect the presence of invasive species. This research can help determine stocking rates, evaluate the success of oil field remediation, and identify ecological sites that are most resistant to invasive species.

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Poster Presentations, Abstracts & Schedule

HENRY HALL ATRIUM 001

A Design Thinking Response to Disruptions: COVID in the Small Business Social/Communication Landscape

Participants attending 2:00 PM - 3:00 PM

Presenter: Ashten Duncan

Mentors: Hollie Blagg, Kevin Lehnert

The gap between small business capabilities and customer interactions was exasperated by the COVID-19 pandemic. Small businesses had to pivot quickly, to build or grow their digital marketing capabilities and manage diverse strategies to deal with the crisis. This ability to quickly adapt and formulate strategies became necessary to help small businesses maintain sales and continue to engage with their clients, especially in light of the pandemic's disruption. This research investigates one method to help small businesses address crises, such as the pandemic: design thinking. Focusing on leveraging design thinking strategies such as Empathizing, Defining, Ideating, Prototyping, and Testing (EDIPT), divergence/convergence, and customer journey mapping design thinking tools, we provide propositions and strategies to help firms adapt their strategies to the demands of clients during crises such as the recent COVID-19 pandemic.

HENRY HALL ATRIUM 002

Lifespace Measurements of Older Adults Using Real Time Tracking: A Descriptive Analysis

Participants attending 9:00 AM - 10:00 AM, 4:00 PM - 5:00 PM

Presenters: Viktoria Basso, Elizabeth Martin

Mentor: Rebecca Davis

Lifespace is defined as the total space people purposely travel in their lives. Residential community-dwelling older adults are at risk for reduced lifespace, increasing potential for negative outcomes such as immobility and decreased quality of life. Lifespace in older adults has been investigated utilizing self-reporting, but objective measurements are lacking. The purpose of this pilot study is to explore measurements of lifespace utilizing real-time tracking data in long-term care community dwelling older adults, with the aim of exploring factors that impact life-space in this population. The theoretical framework for this study is Lawton's environmental press model, proposing an interaction between an individual's level of competence and the environmental press. Measurement of lifespace was obtained for a five-day period using a real time location tracking system (RTLTS) and measures of spread and graphical representation were created utilizing data collected.

HENRY HALL ATRIUM 003

Low-energy Enhancement of the Gamma-ray Strength Function

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM

Presenter: Jonathon Noteboom

Mentor: Sofia Karampagia

The gamma ray strength function (γ -SF) describes the probability of gamma radiation being absorbed or emitted during energy transitions of nucleons within the nucleus of an atom as a function of the energy of the transitions.

The higher the value of the γ -SF (probability) for a specified gamma ray energy, the more gamma rays are probable to occur for that energy level. The basic model of the nucleus is the shell model, which is similar to the shell model in atoms where electrons occupy specific orbitals and the atom can be in discrete energy levels. Transitions of protons and neutrons between these energy levels are associated with gamma ray absorption and emission. Typically as the energy of the gamma ray (E_γ) increases the γ -SF increases as well, and it is expected to drop to zero for low energy gamma rays. Recent experimental data taken from several nuclei, however, suggest a sharp increase in the γ -SF for low energy gamma rays.

HENRY HALL ATRIUM 004

Sustainable Extraction of d-Limonene from Orange Peels using Supercritical Carbon dioxide Extraction

Participants attending 12:00 PM - 1:00 PM, 4:00 PM - 5:00 PM

Presenter: Emma Tiongson

Mentor: Dalila Kovacs

Supercritical CO₂ (sCO₂) extraction is used industrially for the decaffeination of coffee and for cannabis and other essential oil extraction. The feasibility of (d)-limonene extraction from orange peels using sCO₂ is evaluated as a teaching tool. If feasible, the sCO₂ extraction is recommended as a replacement for a steam distillation extraction of (d)-limonene currently used in GVSU undergraduate organic chemistry laboratories. The use of sCO₂ extraction would allow for introduction of topics such as alternative solvents, life cycle analysis, energy conservations, and others pertaining to application of green and sustainable chemistry. Repeated control trials evaluate the efficacy of extraction, and gas chromatography coupled with mass spectrometry analysis (GC/MS) is used to evaluate the selectivity of the extraction. Variables such as cost, time, and educational value are considered in the design and recommendation of this method as a teaching tool in organic laboratory at GVSU.

HENRY HALL ATRIUM 005

How Exogenous Absciscic Acid Exposure Impacts the Rate of Selective Protein Degradation in *Arabidopsis thaliana*

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM

Presenter: Gloria Baker

Mentor: Matthew Christians

Protein degradation is a highly regulated process in organisms and plays a major role in general cell function. One of the key events in selective protein degradation is the addition of ubiquitin (Ub) to the target protein which signals the cell to degrade that protein using the proteasome. This allows the cell to reuse components of proteins that are no longer functioning or necessary for cellular function. E3 ligase protein complexes select specific target proteins for degradation and adds Ub to them, but in order for the E3 ligase complex to become active, Rub (related to ubiquitin) must be covalently ligated to the Cullin protein of the E3 complex. This project investigates the impact that exogenous Absciscic Acid (ABA) has on the ratio of Rubbylated (active) to unRubbylated (inactive) Cullin3 proteins present in *Arabidopsis thaliana*. Investigating this question allows for further understanding of how *A. thaliana*'s growth environment can impact its rates of protein degradation.

HENRY HALL ATRIUM 006

Plagiarism of the Plates: The Validity of Accusations Against Diderot's *Encyclopédie* (1751-1772)

Participants attending 3:00 PM - 4:00 PM

Presenter: Ian Curtis

Mentor: David Eick

A literary monument of the eighteenth century, the French *Encyclopédie* (1751–1772) was a massive reference work written by a team of experts that aimed to depict arts and crafts in unprecedented detail. It eventually grew to contain twenty-eight large folio volumes but the journey there was filled with uncertainty due to royal suppressions from seditious and anti-religious ideas and accusations of plagiarism. Since 1951, scholars have studied one of these accusations, made by architect Pierre Patte against the plates, editor Denis Diderot, and the four publishers. This scandal, which is critical in the history of the *Encyclopédie*, has faded from scholarship. While exaggerated, Patte's observations are sound, but is his label of "plagiarism" correct? Differing views of copying, authorship, and property in eighteenth-century France complicate matters. The connotations of plagiarism then are different from today's and must be analyzed from the correct lens to analyze Patte's allegations.

HENRY HALL ATRIUM 007

Fault-Free Tilings

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenters: Elise Dettling, Amelia Goetzinger

Mentor: Lauren Keough

Given a board of length p and width q , we may fill in the area with 2 by 1 tiles. We say the board is tileable if the board can be filled leaving no open space and overlap. Not all boards are tileable, for example a 5 by 5 board is not tileable because it has an odd area. A *fault-free* tiling exists on the board if every line through the board parallel to a side goes through a tile. Previous work on this subject has been completed by Ron Graham in "Fault-Free Tilings of Rectangles" and Emily Montelius in "Fault-Free Tileability of Rectangles, Cylinders, Tori, and Möbius Strips with Dominoes". We discuss and extend existing research by considering 1 by k tiles for any $k \geq 2$.

HENRY HALL ATRIUM 008

Investigation into the Regenerative Properties of the PTPR Gene within Planaria

Participants attending 9:00 AM - 10:00 AM

Presenter: Daniel Dyer

Mentor: Matthew Christians

Planaria are unique organisms that can regenerate their tissue via adult stem cells, yet we are unaware of all the genes that are involved in their regeneration. Many researchers have isolated specific DNA sequences to determine what genes are involved in this process, but there is limited data regarding if the PTPR gene is linked to regeneration. By utilizing RNAi, we produced enough double stranded RNA to feed the planaria. This will disrupt their ability to code for the PTPR gene. After amputating the planaria and analyzing their tissue, our data has shown that PTPR may inhibit cell growth and regeneration due to greater tissue regeneration in our experimental group than in our negative control group. We can conclude that the PTPR could have a role in regeneration, therefore conducting further research on this gene will be beneficial.

HENRY HALL ATRIUM 009

The Role of Perceived Organizational Support in Anxiety and Depression

Participants attending 3:00 PM - 4:00 PM

Presenters: Chloe Dingens, Brittany Heighton
Mentor: Benjamin Walsh

We examined relationships between employees' levels of perceived organizational support (POS) and their levels of anxiety and depression. POS is the extent to which an employee believes their organization values their contributions and well-being. We hypothesized that workers who experience higher POS will report lower anxiety and depression. Survey data were collected from 494 adults who worked an average of 39.9 hours per week (SD = 8.3). Participants completed survey measures of POS, anxiety, and depression, and reported demographics (e.g., job tenure) that were included as controls. We tested our hypotheses using ordinary least squares regression. After control variables were included, POS explained a significant portion of the variability in both anxiety and depression, and POS was associated with anxiety and depression in the hypothesized direction. Understanding the correlates of POS is important for work success, employee well being, and overall mental health.

HENRY HALL ATRIUM 010

Social Justice Begins with Me! (SJB) Gender Equity

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 4:00 PM - 5:00 PM

Presenters: Sonrisa Cortes, Darby Tallon, Darcy Walker

Mentors: Jamie Langlois, Paola Leon

By three months old, infants develop a preference for faces from their own ethnic group, and by three years, they develop basic stereotypes. SJB is a reading program that originates at the School of Social Work at Grand Valley State University and is hosted by the Grand Rapids Public Library. The SJB program creates a learning environment designed to promote critical thinking in young children about the social injustices they see in the world around them. Our project involved curating books for the Fall 2022 program on the topic of gender equity. From our research and analysis, we proposed new books for use in SJB, as well as created accompanying discussion guides and caregiver handouts. Learning more about these injustices and engaging in critical discussion and reflection allows the children in the program to participate in and initiate social transformation throughout their lifetimes. Our goal is to have our proposed materials utilized in the Fall 2022 program.

HENRY HALL ATRIUM 011

Social Justice Begins with ME!: Racial Justice

Participants attending 12:00 PM - 1:00 PM

Presenter: Caitlin Gunst

Mentors: Jamie Langlois, Paola Leon

Research suggests that critical consciousness - the ability to acknowledge and analyze systems of inequality and the responsibility to take in response to these systems - can allow marginalized children to succeed. With the country being as divided as it currently is, allowing for critical consciousness guides all children toward academic and social emotional success. Social Justice Begins with ME! is a monthly bookclub and program developed in partnership between the Grand Rapids Public Library and GVSU School of Social Work. Contributions to this program will include the selection of literature related to racial justice for the ages of 4-5, 6-8 and 9-11, in addition to parent/family resources aimed at increasing critical consciousness in the home. These contributions will add to the profound social change and development to critical consciousness in the West Michigan area. The involvement of local youth and families is necessary to dismantle global racial oppression.

HENRY HALL ATRIUM 012

Overexpression and Analysis of Genes Impacted During Spaceflight in *Candida albicans*

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenter: Gabrielle Garlicki

Mentors: Ian Cleary, Derek Thomas

Candida albicans is an opportunistic fungal pathogen that naturally resides in mucosal surfaces and is a part of the human microbiota. This project explores multiple genes, *orf19.3115*, *FRE8* and *MRV2*, that were found to have either been up or down regulated in *C. albicans* found during spaceflight. The main scope of this project is to characterize these genes through differences in morphology and adhesion, which can relate back to the virulence of *C. albicans*. Filamentation, biofilm, and glass adhesion assays were done, and we have observed some changes in adhesion in our overexpression strains. We are constructing overexpression strains to examine the effects of additional genes on these cellular characteristics.

HENRY HALL ATRIUM 013

Undergraduate Students' Public Opinion of Human Trafficking in West Michigan

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenter: Joie Carter

Mentor: Tonisha Jones

Controversial and sensationalized human rights issues such as human trafficking are often encompassed in misinformation. This study looked at what those misconceptions are along with how those may impact how undergraduate students would venture to solve the issue of human trafficking. This study asks if any possible misconceptions held by students have any impact on how they would approach solving the issue of human trafficking.

This study was conducted via an online questionnaire using a random sample of undergraduate students from Grand Valley State University.

HENRY HALL ATRIUM 014

Assessment of Kirkhof College of Nursing's Choosing a Statistical Test Tool by Doctorate of Nursing Practice Students

Participants attending 10:00 AM - 11:00 AM

Presenter: Viktoria Basso

Mentor: Rebecca Davis

Doctorate of Nursing Practice (DNP) students in the Kirkhof College of Nursing (KCON) lack electronic resources to guide them to the correct statistical test for their final projects. There are free websites to assist in choosing a statistical test, but they can be hard to understand for non-statistical students. Nursing-specific tools do not include GVSU's nursing project types: Quality Improvement and Evidence-Based Practice, Program Development and Evaluation, Policy Analysis, and Research. The *Choosing a Statistical Test Tool* is a Qualtrics survey with decision-tree logic to help students review statistical concepts, gain further clarity on the project, and lead them to the correct statistical test and resources. The tool was given to DNP students who are in their final semester and have had their project approved. After using the tool, the DNP students completed a survey to assess the usefulness and validity of the tool. This poster will present the results of this survey.

HENRY HALL ATRIUM 015

Examining the Relationship between Gut Size and Pubic Symphysis Width

Participants attending 2:00 PM - 3:00 PM

Presenter: Emma Piasecki

Mentor: Natalie Laudicina

This project examines the relationship between gut size and pubic symphysis width. The pubic symphysis is a unique joint that forms the anterior connection between the two hip bones of the pelvis, absorbs forces while walking, and allows for the natural delivery of offspring. Excessive widening of this joint can lead to pain which can be an extreme barrier to everyday life. It's important to standardize methodology surrounding the measurement of pubic symphysis width to help with diagnostics and treatment of symphyseal pain. In this project, I hypothesize that as gut size increases, so does pubic symphysis width to accommodate this increased mass. Pubic symphysis widths were measured at three locations on ~100 de-identified CT scans. The goal of this project is to compare the pubic symphysis width data to gut volume in-order to provide a more comprehensive understanding of symphyseal pain related to this joint.

HENRY HALL ATRIUM 016

Speech-Language Pathologists' Knowledge and Use of Bibliotherapy

Participants attending 11:00 AM - 12:00 PM

Presenters: Jhay-Lah Kennell, Isabelle Villanueva

Mentor: Cara Singer

Bibliotherapy is an evidence-based technique that uses books, or forms of literature, to elicit positive emotions, behaviors, and attitudes. Research shows that bibliotherapy is a useful tool in helping children overcome challenges such as behavioral issues, speech and language impairments, and learning disabilities. Speech-language pathologists (SLPs) should be using bibliotherapy as a way to alleviate mental challenges that are often associated with speech and language disorders. Research does not always associate SLPs' use of books as bibliotherapy due to the specificity of the intervention. Further research needs to explore if and how bibliotherapy is being used within the speech-language pathology profession. The project entails developing a survey, for speech-language pathologists to investigate are SLPs using bibliotherapy, how are they using it, are they being trained, what populations are they using it with, and what challenges are commonly presented?

HENRY HALL ATRIUM 017

The Effect of the Carbonyl and Phosphine Oxide Aryl Groups on the Luminescence Properties of Lanthanide Metals

Participants attending 1:00 PM - 2:00 PM

Presenter: Georgia Sands

Mentor: Shannon Biros

Lanthanide metals luminesce in sharp emission bands when excited with UV light which has allowed them to be used for applications such as optical devices. In order for them to luminesce efficiently, they must be coordinated with organic molecules called ligands that transfer energy to the lanthanide metal. Arylcarbonyl groups have been studied extensively for this application, but phosphine oxide aryl groups have been less studied. Previous work has included the synthesis and luminescence studies of a ligand with both of these aryl groups. We have synthesized four ligands with different numbers of the aryl groups replaced with alkyl chains that do not promote luminescence.

This allowed us to investigate the effect of each of the aryl groups independently. Quantum yields of the ligands coordinated with the lanthanide metals Eu^{3+} and Tb^{3+} determined that the aryl carbonyl group promoted luminescence much more efficiently than the aryl phosphine oxide group.

HENRY HALL ATRIUM 018

Geometry Effects on Microwave Induced Microplasma in Re-Entrant Cavity Resonators

Participants attending 2:00 PM - 3:00 PM

Presenter: Seth Woodwyk

Mentor: Geoffrey Lenters

Microplasmas are a topic of mounting interest in numerous fields, spawning a variety of applications. Given the significance of these applications, it is crucial that microplasma behavior is explored at a fundamental level. Therefore, the initial process of forming a microplasma, referred to as breakdown, will be our subject of investigation. Our method for inciting breakdown will involve a re-entrant microwave resonator. In earlier work done in our group using this method, the breakdown curve of argon in a microgap, was shown to be separated into two distinct regimes, where the transition between them occurs at the point where boundary processes become significant. In this project, a variety of stepped and inclined gap faces will be used to investigate the geometric effects on breakdown. Under our current model, stepped gap faces would have multiple sharp transitions in their breakdown curves, whereas inclined gap faces would display a single transition over a range of pressures.

HENRY HALL ATRIUM 019

Identification of Rab Protein Association with Histamine-Containing Vacuole-Like Compartment (VLC) in the Secondary Cells of the Accessory Glands in *Drosophila melanogaster*

Participants attending 9:00 AM - 10:00 AM

Presenter: Pranav Nalam

Mentor: Martin Burg

The accessory gland of *Drosophila melanogaster*, analogous to the mammalian prostate gland, is composed of two cell types: main cells and secondary cells. The secondary cells contain large vacuole-like compartments (VLC's), one of which has been shown to contain histamine. We sought to associate specific rab proteins that have been shown to be involved in specific steps of membrane trafficking, with histamine in the VLCs. The rab4, rab7, and rab11 proteins were "tagged" with a fluorescent protein, while histamine was imaged using fluorescent immunolocalization techniques, enabling visualization of both within the secondary cell. We examined the localization of each rab protein with the histamine containing VLC using laser-scanning confocal microscopy. Results indicate that rab4 and rab11 appear to be associated with the histamine VLC, suggesting that histamine may be released by the secondary cell, as rab4 and rab11 are known to be involved in endocytic and exocytic processes.

HENRY HALL ATRIUM 020

Factorization of Finite Semigroups

Participants attending 4:00 PM - 5:00 PM

Presenter: Robert Dolan

Mentor: Rene Ardila

When algebraic objects such as rings are bifurcus, they exhibit the powerful property that every non-atom, non-unit of the object may be factored into two irreducible elements. We study finite semigroups of matrices whose entries belong to congruence classes and expound on their properties. We then use this type of semigroup to construct the first verified finite bifurcus semigroup and subsequently use the Cartesian Product to construct other examples of finite bifurcus semigroups from non-bifurcus, atomic semigroups of this form.

HENRY HALL ATRIUM 021

Lipopolysaccharide Stimulation of NF-kappa B Signaling Pathway in Mouse Brain Endothelial Cells

Participants attending 11:00 AM - 12:00 PM

Presenter: Jared Fennema

Mentor: Dave Kurjiaka

The release of lipopolysaccharides from bacteria are an essential stimulator in an inflammatory response. In endothelial cells, inflammatory responses play an important role in the endothelial damage that leads to the development of atherosclerotic plaques. Inflammation activates the NF-kappa B pathway which induces the expression of pro-inflammatory genes such as vascular cell adhesion molecule -1 (VCAM-1) in endothelial cells to draw immune cells to the pathogen. Mouse brain endothelial cells (bEND.3) were treated with lipopolysaccharide (1 and 10 ng/ml) and had protein isolated at 0.5, 1.5, 3 and 6 hours. Those proteins were separated by Western Blot analysis and samples were probed for changes in inflammatory signaling (I κ B and pIKK) along with VCAM-1. Preliminary data suggests an upregulation of VCAM-1 and pIKK while I κ B decreased. The goal is to better understand the inflammatory response in these cells in order to try to inhibit that inflammation with omega3 fatty acids.

HENRY HALL ATRIUM 022

Women of Color and Their Participation in Second Wave US Feminism

Participants attending 11:00 AM - 12:00 PM

Presenter: Abigail Jenkins

Mentor: Nora Salas

In the 1960s, a new "wave" of feminism began in the United States. Now called the "second wave" of feminism, the main goals were to focus on the workplace, home, and legal issues, while also building on the equality the suffragists brought. Many now criticize the second wave as being whitewashed, so the goal of my presentation is to dispute the idea that it was only white feminists actively working for this movement. Through primary and secondary sources, I will analyze the women of color feminists during this time and their goals. What groups did women of color form? How did their goals differ from white feminists? Were their means of bringing attention to inequality different? All of these questions will be answered with my poster.

HENRY HALL ATRIUM 023

The Impact of Nonylphenol on Neurogenesis in Crayfish

Participants attending 9:00 AM - 10:00 AM

Presenters: Jonathan McCabe, Ian Pope

Mentor: Daniel Bergman

Neurogenesis is the formation of new neurons, and historically was thought to occur only during development.

Molecular biology has provided the tools which have broken this paradigm, and it is now evident that in many animals neurons are created into adulthood. In crayfish, neurogenesis occurs in areas of the brain involved in olfaction. Neural progenitor cells undergo proliferation and differentiation, where they become integrated into the olfactory lobes. This process has been shown to be positively or negatively controlled through both intrinsic and extrinsic factors. Here, we explore the impact of the extrinsic compound nonylphenol on neurogenesis. Nonylphenol is found in products such as detergents and ends up in the sediment of streams that crayfish live. Using the thymidine analog BrdU, we track the synthesis of new DNA through proliferation of NP cells using immunohistochemistry. Thus, we are able to ascertain the impact of nonylphenol exposure on olfactory neurogenesis.

HENRY HALL ATRIUM 024

Purification and Kinetic Characterization of ADC-7 with a Boronic Acid Transition State Inhibitor

Participants attending 11:00 AM - 12:00 PM

Presenter: John Mckeough

Mentor: Rachel Powers

β -lactams are the most commonly prescribed antibiotics that are important to the treatment of bacterial infections. The β -lactam ring is the defining feature of these drugs, consisting of a four-membered cyclic amide. Resistance to β -lactams is an increasingly important issue. β -lactamases are a common resistance mechanism that hydrolyze the β -lactam ring, rendering the drug inactive. Current inhibitors are ineffective against class C β -lactamases, due to the presence of the β -lactam ring in both the antibiotic and the inhibitor. Boronic acids (BATSI) have proven to be good candidates as non- β -lactam inhibitors that mimic the tetrahedral transition state. To characterize a new BATSI, ADC-7, a class C β -lactamase found in *A. baumannii*, was expressed and purified via ion exchange chromatography then tested for its ability to inhibit ADC-7. These discoveries will provide insight into the compatibility of this new BATSI with ADC-7 and aid in the search for a novel β -lactam inhibitor.

HENRY HALL ATRIUM 025

Mitigating the Impact of Run-Time Software Engineering

Participants attending 1:00 PM - 2:00 PM

Presenter: Abigail Diller

Mentor: Erik Fredericks

Cyber-physical systems (CPSs) experience uncertainty in all phases of the software development life cycle, generally stemming from real-world concerns such as minimizing the impact of environmental interactions and ensuring the safety of human participants. These systems are often described as safety-critical and therefore must continuously exhibit correct behaviors. Run-time testing can provide assurance that system requirements are satisfied even in the face of uncertainty. Previously we introduced GreenRoom, a proof-of-concept experimental CPS testbed for monitoring the impact of run-time testing on power consumption of a target CPS. This project extends GreenRoom's capabilities to enable deeper studies into monitoring power consumption by including additional mechanical components. We also intend to investigate how search-based testing techniques can extend CPS abilities, and to monitor their impact on power consumption at run time.

HENRY HALL ATRIUM 026

Blocking Behavior in Brass Players: Connections Between Fluency in Speech and

Music

Participants attending 4:00 PM - 5:00 PM

Presenter: Marissa Gonzales

Mentor: Beth Macauley

Typically, brass musicians push air through their instrument and play easily. Other times, the musician's muscles tighten, airflow stops, and the note is blocked. Many professional brass musicians deal with this "blocking" issue, sometimes called the Valsalva maneuver, musical stuttering, or dystonia. When people speak, they push air through the vocal folds and speak easily. Other times, their muscles tighten and the word is blocked, which is called stuttering. The goal of this study was to describe blocking in brass players and compare and contrast blocking in music and speech. A survey about the physical and emotional symptoms, onset descriptions, and fluent or disfluent environments of blocking was sent to brass musicians via Facebook and email. 33 responses were received and descriptions of brass blocking were compared with known information on speech stuttering. Results suggest that blocking behaviors while playing a brass instrument and speaking are more similar than different.

HENRY HALL ATRIUM 027

Using Colored Light to Test and Illuminate Plant Gravity Sensing

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Grace Miller

Mentor: Mark Staves

Gravity and light are two of the most important environmental stimuli influencing plant growth and development. Although the blue-light sensing mechanism is well understood, the mechanism of plant gravity sensing remains obscure. To test between the statolith and gravitational pressure models of gravisensing, we grew rice roots parallel to the vector of gravity in solutions of different densities and exposed them to unidirectional light perpendicular to the vector of gravity. We found that roots grown in water with red light grew parallel to the vector of gravity, but when they were exposed to blue light they grew *ca* 25 degrees away from the vector of gravity. In a denser medium, 1038 kg m⁻³, growth in red light was unchanged, but in blue light, *curvature increased to ca 44 degrees away from the vector of gravity*. This diminution of the gravity effect in dense solutions is incompatible with the statolith model but predicted by the gravitational pressure model for gravity sensing.

HENRY HALL ATRIUM 028

Effects of Serotonin on the Chronic Stress Response in Crayfish following Nonylphenol Exposure

Participants attending 12:00 PM - 1:00 PM

Presenters: Nina Alpers, Madelyn Maurer, Abby Niessink, 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 chronic anxiety-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 029

The Production of Eight Plasmid Expression Vectors through Gibson Assembly and the Optimization of the Enzymatic Cleavage Reaction between Tobacco Etch Virus (TEV) and the Model Fusion Protein, Nus-G

Participants attending 1:00 PM - 2:00 PM

Presenter: Elizabeth Kennard

Mentor: Robert Werner

The North American Opossum (*D. virginiana*) produces proteins that inhibit snake venom metalloproteinases (SVMPs) and phospholipase 2As (PLA2s). Eight plasmid expression vectors containing 6-histidine tags and maltose binding proteins (MBP), either DM43 (a SVMPi) or DM64 (a PLA2 inhibitor), and a tobacco etch virus (TEV) cleavage site were constructed through Gibson Assembly. Four constructs were used to produce either MBP-DM43 or MBP-DM64 in *E. coli*. The optimization of the enzymatic cleavage reaction between TEV and a model fusion protein with a TEV cleavage site, MBP-NusG, was accomplished using 2 experiments that optimized the duration, temperature, and amount of TEV used to conduct a cleavage reaction. For our purposes, the optimal conditions include the shortest duration and lowest temperature in which the reaction proceeds to completion. Reactions conducted at 4°C with 5.5 µg TEV for 1 hr gave optimal cleavage of MBP-NusG providing useful conditions for future reactions.

HENRY HALL ATRIUM 030

Structural and Functional Characterization of Novel ADC Variants Contributing to Antibiotic Resistance

Participants attending 9:00 AM - 10:00 AM

Presenter: Olivia Maurer

Mentor: Bradley Wallar

Antibiotic resistance in *Acinetobacter baumannii* is a global crisis that threatens current antibiotic use, as variants produce β -lactamase enzymes called *Acinetobacter*-derived cephalosporinases (ADCs). Two ADC variants in antibiotic-resistant *A. baumannii* are ADC-33 and ADC-219. Both contain a specific proline to arginine mutation and an alanine duplication in the Ω -loop. The last remaining difference is a glycine (ADC-33) vs. an aspartate (ADC-219), also in the Ω -loop; an area of the enzyme that is believed to be involved in substrate entry to the active site. The structures of ADC-33 and ADC-219 were determined by X-ray crystallography to study the substrate binding region and active site residues. Also, steady-state kinetics demonstrated that ADC-33 could bind and turn over larger cephalosporins, but ADC-219 had a significantly reduced ability to do so. Using structure/function analyses, we hope to develop a relationship between Ω -loop variants and substrate binding and turnover.

HENRY HALL ATRIUM 031

Developing the Art Educator's Scholarly Resource Guide

Participants attending 9:00 AM - 10:00 AM

Presenter: Xavier Golden

Mentor: Amber Dierking

Art educators have many responsibilities. Designing and teaching lessons; professional development; classroom management; self-advocacy, and fostering creativity, for the learners and themselves. As a future art educator, I wanted to design a guide that would help me prepare for designing integrative lesson plans. The goal of this project was to create an accessible resource guide that would support art teachers in all these roles. To garner an idea of the current goals and needs of art educators in 2021, interviews were conducted with five in-service art teachers. In conjunction with library science learning tools and frameworks, this qualitative research was used to design, format, and write an online database of six distinct categories of art education resources: Foundational Works, Explainers, Tutorials, Networks, Podiums, and Inspirations.

HENRY HALL ATRIUM 032

Modulation of Crayfish Aggression via a Neuropharmacological Agent

Participants attending 12:00 PM - 1:00 PM

Presenters: Skylar Brouwer, Alyson Furstenau, Grace Smith, Zachary Walker

Mentor: Daniel Bergman

In nature, crayfish aggressively compete for food, shelter and opportunities to mate. This competition results in a set of hierarchical relationships that govern which crayfish have access to available resources. The aggressive interactions and hierarchical relationships that develop between crayfish can lead to neurochemical alteration in their brains that can have long lasting effects on social behavior. Specifically, serotonin and dopamine neural circuitry can be impacted. We will analyze aggressive interactions between crayfish that have received either a placebo, dopamine, serotonin, or quetiapine injection. Quetiapine is an antipsychotic drug used to treat schizophrenia and functions as a serotonin agonist and dopamine antagonist. Quetiapine stimulates serotonin receptors while blocking dopamine receptors. Elevated serotonin is correlated with increased aggression in crayfish, therefore quetiapine treatment should increase their aggression and social status within a hierarchy.

HENRY HALL ATRIUM 033

What Causes Crime?

Participants attending 10:00 AM - 11:00 AM

Presenter: Shireen Salam

Mentor: John Constantelos

The presentation will summarize findings from the International Relations capstone project examining the causes of crime, with a specific emphasis on the role refugees might play in contributing to crime rates. The project seeks to analyze the relationship between crime rates (dependent variable) and the proportion of refugees, host countries labor market integration policies, family structure, population age, population density, the proportion of males in the population and income inequality (independent variables). The presentation will share results from bivariate and multivariate statistical analyses scrutinizing the relationship between the independent variables and the dependent variable, to discuss the causes of crime.

HENRY HALL ATRIUM 034

The Effects Of Nonylphenol on Male Crayfish Aggression in Acute and Chronic Exposures

Participants attending 11:00 AM - 12:00 PM

Presenters: Adam Gizowski, Jonathan McCabe, Ian Pope

Mentor: Daniel Bergman

Nonylphenol is a compound used in a variety of industrial, domestic, and agricultural products. The compound is classified as an inactive ingredient, therefore has little to no monitoring in the U.S. with a high possibility of exposure occurring via its disposal into the water supply. It acts as an endocrine disruptor by mimicking estrogen, influencing the behavior of organisms like crayfish. Crayfish utilize aggressive behaviors to find food, mates, and establish social hierarchies. Here we examine the effects nonylphenol has on aggression after acute and chronic exposures. Crayfish aggression was analyzed by observing encounters of nonylphenol exposed crayfish with non-treated crayfish. We further assessed the endocrine disruption both of the serotonin and androgen systems by collecting hemolymph and using an ELISA. We hypothesize that crayfish alter their aggression after both acute and chronic nonylphenol exposure and will impact the serotonin and androgen signaling systems.

HENRY HALL ATRIUM 035

Effects of miRNAs on alpha-Synuclein Gene Expression in PD-like Neuronal Cells

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: Lia Cook, Jyoti KC, Zane Walters

Mentor: Sok Kean Khoo

Parkinson's disease (PD) is a neurodegenerative disorder affecting over 10 million people worldwide. PD 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 prevent protein translation. Here, we will use PD-like neuronal cells to study the effects of miRNA mimics that can bind to alpha synuclein mRNA in hope to reduce its gene expression. We will treat the SH-SY5Y cell line originated from neuroblastoma with retinoic acid, brain-derived neurotrophic factor, and rotenone to function as a PD-like model. This study will provide the proof-of-concept of using miRNAs as an intervention to treat PD.

HENRY HALL ATRIUM 036

2021 Grand River Water Quality Sampling

Participants attending 11:00 AM - 12:00 PM

Presenters: Madeleine Lang, Allison Romanski

Mentor: Peter Wampler

Research goals include sampling at different locations and flow conditions, collaboration with wastewater treatment plants, and development of a refined Water Quality Index. In the summer of 2021, seven different reaches were sampled and over 120 samples were collected. Samples were analyzed for nitrate, total phosphate, ammonium, chloride, dissolved oxygen, biological oxygen demand, total suspended solids, *E. coli*, and total coliform. Field parameters included: temperature, specific conductivity, pH, turbidity, oxidation reduction potential, resistivity, salinity, and total dissolved salts. Water samples were collected from bridges and kayaks, and were analyzed at the Allendale Wastewater Treatment Plant or in the GVSU Lab. Lab methods included: 1) HACH spectrophotometer analysis; 2) Total Suspended Solids Filtration; 3) Biological Oxygen Demand; and 4) IDEXX Colilert 2000 quanti-tray method. Ongoing sample analysis will be compared to water quality data dating back to 1968.

HENRY HALL ATRIUM 037

The Influence of Socioeconomic Status and Nutrition on Pelvic Development

Participants attending 9:00 AM - 10:00 AM

Presenter: Michael Edozie

Mentor: Natalie Laudicina

Studies report that women of lower socioeconomic status undergo Cesarean delivery at higher rates, but none have identified a conclusive underlying reason to explain this disparity. However, some theorize that nutrition might play a role. Calcium and vitamin D deficiencies are commonly cited as factors that lead to abnormal pelvic development. Such deficiencies are thought to be associated with the morphological features characteristic of a flat pelvis, in which the anteroposterior diameter of the pelvis is notably decreased. Consequently, environmental factors, such as nutrition, during critical growth periods are implicated in causing these deficiencies. This project aims to investigate whether socioeconomic status and nutrition during childhood affect development of the pelvic inlet. This study has clinical significance, as the results could indicate that nutritional deficiencies, in connection to their impact on pelvic development, are associated with certain obstetric outcomes.

HENRY HALL ATRIUM 038

American Women Mental Health Post World War II

Participants attending 9:00 AM - 10:00 AM

Presenters: Madelyn Macionis, Autumn Majestic, Alyssa Washington

Mentor: Nora Salas

Since the end of World War II mental health around the world has been put under the microscope. In this presentation, the changes and continuities surrounding American Women mental health will be evaluated to determine how science and medicine have helped mental health, who was impacted the most by societal norms, and how the role of women in the household changed throughout a woman's life and how it affected their mental health. Extensive scholarly research has been done from behavioral science journals to multiple historical monographs to determine the most impactful changes that American women and their mental health have faced.

HENRY HALL ATRIUM 039

The Epiphytic Diatom Community of an Invasive Macroalga, Starry Stonewort (Charales: *Nitellopsis obtusa*) and its Native Relative (Charales: *Chara contraria*) from Two Drowned River Mouth Lakes

Participants attending 12:00 PM - 1:00 PM

Presenters: Davis Fray, Kelsey Inman-Carter

Mentor: Sarah Hamsher

Epiphytic diatoms are essential primary producers in aquatic environments, but the relationship between them and their hosts is not well understood. The purpose of this project is to understand the specificity of host-epiphyte relationships in Pentwater and Muskegon Lakes by comparing the epiphytic diatom communities of the invasive *Nitellopsis obtusa* to its native relative, *Chara contraria*, using metabarcoding approach. Host samples were collected in 2020-2021. DNA was extracted from each sample and the RUBISCO (*rbcL*) barcoding region was amplified using diatom-specific primers. Sequences were generated, using an Illumina MiSeq, primarily from the macroalgal hosts (*C. contraria* (23%) and *N. obtusa* (46%)), with the remaining sequences (32%) from other hosts, sediment samples, and plankton tows. Analyses of these sequences are ongoing. Ultimately, this study will improve our understanding of macroalgal host-epiphytic diatom relationships.

HENRY HALL ATRIUM 040

Characterizing the Effects of Melatonin on Striatal Dopamine Neurotransmission

Participants attending 2:00 PM - 3:00 PM

Presenter: Mason Kolanowski

Mentor: Eric Ramsson

Melatonin is a serotonin derived neurohormone known to be involved with the regulation of sleep and immune functions in the brain, as well as the modulation of other neurotransmitter systems such as acetylcholine, GABA, and glutamate. While we know some things about melatonin, much about melatonin is yet to be known. A growing body of research has begun to show that striatal brain dopamine levels fluctuate in accordance with circadian rhythms, and that this has to do with melatonin. Here we used various waveforms of Fast-Scan Cyclic Voltammetry, both *in vivo* and *ex vivo*, to record and characterize the effects of melatonin on dopamine transmission in the striatum. In both the *in vivo* and *ex vivo* models, our data suggest that melatonin suppresses the release of dopamine. This suggests that in addition to being a regulator of circadian rhythms and immune function, melatonin is also a modulator of dopamine release in the striatum.

HENRY HALL ATRIUM 041

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

Participants attending 1:00 PM - 2:00 PM, 3:00 PM - 4:00 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 a tandem Goldberg and Finkelstein reactions. This was utilized to synthesize the linezolid core in several steps. 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, 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.

HENRY HALL ATRIUM 042

Investigating the Environmental Parameters of Microbialite Formation Using Water Quality and Isotopic Analysis of Ore Lake, Michigan

Participants attending 9:00 AM - 10:00 AM

Presenter: Ryleigh Landstra

Mentor: Ian Winkelstern

Small (<3cm) oblong pisoliths have been observed on the shores of Ore Lake, located in southeastern Michigan. Seasonal water sampling of Ore Lake and other local water bodies has been conducted to better understand the unique environment that promotes carbonate precipitation within the lake. Alkalinity testing has shown an increase in CaCO_3 from the south shore to the north shore of Ore Lake and has reliably confirmed that S. Ore Creek is the source of this increased alkalinity. Decreased alkalinity in nearby lakes indicates that Ore Lake may be unique in the precipitation of carbonate locally. Isotopic analysis of Ore Lake water and pisolith samples were used for temperature analysis at the time of formation. Our data reflects that pisolith growth occurs in Ore Lake within the

summer months and shows some variability into fall temperatures, with multiple seasonal cycles seen within a single pisolith structure.

HENRY HALL ATRIUM 043

Nature of the Unconformity Between the Bisher Formation and Overlying Ohio Shale in Northern Kentucky

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Noah Carrick, Corbin Ebeling, Ryan Gentry, Eli VanDyke

Mentor: Peter Riemersma

Fluctuations in sea level can lead to changes in the depositional environment. These fluctuations can be represented in the rock record as changes in lithology or as unconformities. Evidence of a drastic change in sea level is preserved by the erosional contact between the Bisher Formation and overlying Ohio Shale, representing a gap of 60 million years. The top of the Bisher contains oil staining, shells, and pyrite, features not present in the underlying Bisher. The Bisher represents a shallow marine environment, while the overlying black Ohio Shale indicates a deep water anoxic environment. To constrain the nature of missing time and change in depositional environment, we will combine a literature review with our own observations of texture and lithology using hand sample(s) and thin sections from the uppermost Bisher. From this we hope to conclude if the unconformity is a result of sea level regression or transgression coupled with decreased deposition.

HENRY HALL ATRIUM 044

Investigating the Cyclical Lithologies of the Upper Ordovician Fairview Formation in Northern Kentucky

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenters: Caroline Cox, Rachel Kurima, Evan Sutherland, Lydia Tuttle

Mentor: Peter Riemersma

Nearly 460 Ma old, the Upper Ordovician Fairview Formation consists of distinct alternating layers of limestone and shale which point to a fascinating cyclical depositional history. Our objective is to assess the possible processes that deposited either shell-rich layers or mud over time. A focus question that we will address is: What role might sea-level cycles have had on the lithology of the formation? One proposed model for the limestone beds involves winnowing of fine-grained material during storms and sea-level changes, which together produced shell-rich beds. Alternatively, a sediment starvation model proposes that the shell-rich beds are a result of low sediment input over longer periods of time without the influence of storm winnowing. We will examine hand samples and thin sections to assess factors such as shell condition, packing, and mud content to differentiate between these two models and determine which represents the more likely explanation.

HENRY HALL ATRIUM 045

Cyclical Facies of Shale and Fossiliferous Limestone of the Upper Ordovician Kope Formation of Northern Kentucky

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Janelle Cook, Emily Siriano, Michael Stefanou, Hanna Szydlowski

Mentor: Peter Riemersma

The origin of highly fossiliferous limestones in the Kope Formation has been a source of wonder and controversy.

Consisting of alternating layers of shale and fossiliferous limestone, the shell rich beds are hypothesized to result from storm winnowing or sediment starvation. The storm winnowing model proposes that storms removed fine-grained mud particles from material, leaving behind dense shell beds. Storm impact may have been driven by changes in sea level. The sediment starvation model proposes that periods of low sedimentation were the primary driver in the accumulation of shell beds. Our research used hand samples and thin sections of the limestone to aid in constructing past depositional environments by assessing the distribution, condition, and type of fossils. Evidence in the form of skeletal fragment shape and the amount of micrite matrix within packstones and carbonate concretions was compared to provide support for either the storm winnowing or sediment starvation models.

HENRY HALL ATRIUM 046

Women in Theatre Arts

Participants attending 2:00 PM - 3:00 PM

Presenter: Madeline McDowell

Mentor: Nora Salas

During the 19th and early 20th century, women were overlooked and judged for their participation in theatre arts. Over the course of history many roles, such as director and playwright, have been masculinized and women were disregarded in terms of these roles. Many women portrayed stereotypical gender roles, like the submissive southern housewife, and were stifled when it came to other roles in performances. During the early to mid-20th century, women playwrights and directors became more prominent in the world of theatre, along with women's acting roles being updated to fit a more feminist lens.

HENRY HALL ATRIUM 047

Students to Surgeons: Using Mentorship to Promote Diversity in a Field of Limited Representation

Participants attending 12:00 PM - 1:00 PM

Presenter: Jessica Montgomery

Mentor: Jamie Langlois

Physicians of color are significantly underrepresented in cardiothoracic surgery compared to other specialties. In 2020, Black and Hispanic surgical residents comprised just 4 and 5 percent of cardiothoracic programs, respectively. Minoritized students face many structural barriers to pursuing a career in medicine, let alone competitive specialties like cardiothoracic surgery. Students to Surgeons is a pilot mentorship program that aims to both expose students to cardiothoracic surgery as a career and provide support in navigating educational systems and career planning as minoritized students. Limited representation in medicine leaves marginalized communities without adequate access to physicians who directly understand their needs and experiences. Students to Surgeons attempts to promote diversity in cardiothoracic surgery through direct, early engagement with minoritized students in the community. Programs must actively facilitate diversity, or else they effectively hinder it.

HENRY HALL ATRIUM 048

Stable and Clumped Isotope Temperature Reconstructions of Last Interglacial Mollusks

Participants attending 12:00 PM - 1:00 PM

Presenter: Lillian Minnebo

Mentor: Ian Winkelstern

The Bermuda Islands preserve carbonates from the Last Interglacial (~125,000 years ago), a warm time perhaps analogous to 21st century climate. We applied geochemical methods to *D. frons* (oyster) fossils from this time, found on Verrill Island, Bermuda, to reconstruct Interglacial conditions. This includes the use of the new clumped isotope technique (Δ_{47}), which directly measures paleotemperature. Mollusks were sampled along their growth axes for temperature reconstructions. The oysters report a mean $\delta^{18}\text{O}$ value of $-0.51 \pm 0.17\text{‰}$, consistent with two *G. americana* mollusk records. The Δ_{47} values report a mean temperature of $23.6 \pm 4.2^\circ\text{C}$ and $\delta^{18}\text{O}_{\text{water}}$ values report a mean of $+1.5 \pm 0.9\text{‰}$, both consistent with modern Bermuda conditions (16 to 31°C). These data enable interspecies comparisons and contribute to a broader understanding of climate and North Atlantic circulation during the Last Interglacial.

HENRY HALL ATRIUM 049

Trace-amine Associated Receptor 1 and Vulnerability to Methamphetamine Use Disorders

Participants attending 11:00 AM - 12:00 PM

Presenter: Derek Tonello

Mentor: Shkelzen Shabani

Vulnerability to methamphetamine (MA) use is related to the genetics that mediate the aversive and rewarding effects of MA. According to the most recent research, a gene known as the trace-amine-associated receptor 1 (TAAR1) seems to play protective role, meaning animals that have a functional version of the gene have very low voluntary MA intake. Our research worked with mice that have a non-functional version of the TAAR1 gene and mice that have the functional version of the gene TAAR1 $^{+/-}$ knocked in via the CRISPR-Cas9 method. We pharmacologically manipulated the gene and were able to show that TAAR1 receptor is necessary for the aversive effects of MA and other hypothermic effects.

HENRY HALL ATRIUM 050

Structural and Functional Investigation of BshC: The Final Enzyme of the Bacillithiol Biosynthesis Pathway

Participants attending 10:00 AM - 11:00 AM

Presenter: Connor Daly

Mentor: Paul Cook

Fosfomycin resistance has become an issue in recent years with previously treatable bacteria. Gram-positive species utilize FosB-type fosfomycin resistance which uses the low molecular weight thiol bacillithiol (BSH). The complete biosynthesis pathway of BSH is not yet known with the function of the enzyme BshC remaining unknown. This lab has explored several pathways to further the understanding of BshC. A structure of BshC from a different bacterial species, *Staphylococcus aureus*, was investigated via protein crystallization and x-ray crystallography. BshC activity assays were completed based on the mechanism of MshC. Further BshC assays were completed based on computational simulations indicating that a tRNA charged with cysteine could be the source of activated cysteine in the BshC mechanism. A method of thiol identification and quantification was developed using monobromobimane thiol complexes and ion-pairing HPLC. This was used in the analysis of BshC activity with cys-tRNA.

HENRY HALL ATRIUM 051

Dr. Lee S. Huizenga (1880-1945): A Medical Missionary in Jukao, China (1920-1945)

Participants attending 12:00 PM - 1:00 PM
Presenters: Haley Krebs, Erin Spencer
Mentor: Meghan Cai

Dr. Lee S. Huizenga (1880-1945) was a Dutch medical missionary who was sent to Rugao, China in 1920 with the first wave of missionaries sent by the Grand Rapids Christian Reformed Church. In Rugao, he treated patients for leprosy both in hospitals and homes and learned to conduct sermons in Chinese. This research was conducted to see the impact Chinese culture had on Dr. Huizenga's life, and to further understand how he impacted the health and religious beliefs of the people of Rugao. This study includes preliminary findings from artifacts from the Grand Rapids Public Museum and the Calvin University Archives, from where Dr. Huizenga received his undergraduate degree. These artifacts include handwritten scrolls from warlord Feng Yuxiang, monthly letters written by Dr. Huizenga, paintings representing the bodhisattva Guanyin, and books of sermons in Chinese with handwritten notes by Dr. Huizenga.

HENRY HALL ATRIUM 052

Using GIS to Analyze Erosion and Erosion Risk Mapping of Lake Michigan Shoreline

Participants attending 9:00 AM - 10:00 AM
Presenters: Michael Stefanou, Hanna Szydlowski, Levi Thaler
Mentor: Peter Wampler

Water levels in Lake Michigan have undergone variation resulting in dramatic changes along the shoreline. High lake levels in the mid-1980's reached 177.50 m above Low Water Datum (LWD) causing shoreline erosion and landowner efforts to protect the shoreline using engineered structures. Concern over erosion prompted the creation of shoreline erosion risk maps by GVSU's Dr. William Neal and other contributors. The original map set contained 49 erosion risk maps spanning the entire Lake Michigan coast. Renewed high lake levels in August 2020 at 177.45 m above LWD have caused renewed interest in shoreline erosion and risk mapping. For this study, map panels from the 1980's maps were randomly selected to explore the extent of erosion at the various sites and evaluate the accuracy of this risk mapping and shoreline erosion rate predictions.

HENRY HALL ATRIUM 053

What Influences Perceptions of Physical Threat?

Participants attending 9:00 AM - 10:00 AM
Presenters: Phuc Dang, Samantha Poliak
Mentor: Kristy Dean

What affects perceptions of and reactions to physical danger? Research shows that insecure attachment can aid in detection of and response to physical threats. But how does this personality trait compare to others, like belief in a dangerous world? Research also shows that social exclusion can sensitize us to physical threats. But do different types of social exclusion affect our perceptions/reactions to threats differently? In this study, 191 participants experienced social acceptance, rejection, or ignoring, and reported threat to basic needs. They visualized walking on campus at night and hearing strange noises, then reported perceptions of danger, emotions, and behavioral reactions to an ambiguous threat. Results show that attachment affects perceptions of danger beyond the effect of belief in a dangerous world. Also, experiencing rejection (vs. ignoring) exacerbates physical vulnerability, which then increases negative mood and perceptions of danger.

HENRY HALL ATRIUM 054

Assessing the Genetic Relationship of Wild Rice Populations in Michigan

Participants attending 9:00 AM - 10:00 AM

Presenter: Carlin Moore

Mentor: Charlyn Partridge

Wild rice native to Michigan is both culturally important to the Anishinabe people of the Great Lakes region and ecologically beneficial to aquatic habitats. However, populations are declining as a result of poor water quality, pollution, and habitat loss. The two main species of wild rice in Michigan include northern wild rice (*Zizania palustris*) and southern wild rice (*Z. aquatica*). These species have different characteristics and different management strategies since *Z. aquatica* is a threatened species. Observational work has indicated that some populations may be the result of hybridization by the two species, and this could have implications in terms of population health and management. We are using nuclear and chloroplast genetic markers to evaluate the genetic relationships among *Z. aquatica* and *Z. palustris* populations around Michigan and to identify potential hybrid populations. These data will be used to improve current management practices for this important species.

HENRY HALL ATRIUM 055

Analysis of a Hyperadherent *Salmonella* Mutant in Biofilm Formations

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM

Presenters: Carter Filchak, Brandon Tower

Mentor: Aaron Baxter

Salmonella enterica serovar Typhimurium accounts for ~1.35 million foodborne illnesses and 420 deaths/year in the US. Poultry is the main reservoir for *Salmonella* and easily spreads primarily through the consumption of undercooked poultry products. Previous work created a hyperadherent nonvirulent strain (BJ3562) that forms robust biofilms in host animals and on inanimate surfaces. We are undertaking a study to determine if BJ3562 can outcompete wild-type *Salmonella* colonization and potentially reduce the incidence of illness. Growth rate of BJ3562 was examined and shown to have similar rates to wild-type *Salmonella*. Fluorescent plasmids have been placed in the genome of BJ3562 to identify their presence in later examinations. These plasmids have been shown to have no effect on morphology or function. Currently, we are characterizing a biofilm assay for both static and competitive models. Future work will include additional competitive biofilm assays in flow-through chambers.

HENRY HALL ATRIUM 056

Anthropology in 3D: The Use of Photogrammetry in the Preservation and Dissemination of Ethnographic Art

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenter: Alexander Spindler

Mentor: Mark Schwartz

Photogrammetry is an effective tool used by archaeologists in museums and organizations by creating a 3D model from overlapping photos. This project involves a collection of ethnographic artifacts from Papua New Guinea that are currently housed in the GVSU Anthropology Department collection. This presentation reviews the results of this project. Artifacts were photographed and 3D models were created using the Agisoft Metashape program. Models are disseminated via the Sketchfab website with proper cultural information. Artifacts originate from Sepik River tribes and were designed originally for the tourist industry. This project shows utility of photogrammetry in

archaeology and cultural heritage preservation.

HENRY HALL ATRIUM 057

Computational Analysis of BshC, an Enzyme Responsible for Antibiotic Resistance in Firmicute Bacteria

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM

Presenter: Matthew Martin

Mentor: Mary Karpen

Bacillithiol is a compound synthesized by certain gram-positive bacteria called firmicutes, such as *B. Subtilis*. This compound is used to protect the bacterium from oxidative stress and establish antibiotic resistance. There are three enzymes in the synthesis pathway of bacillithiol: BshA, BshB, and BshC. Understanding the mechanism of BshC could lead to creating methods of combatting infections by these pathogens. This enzyme is a putative cysteine ligase, however the ligand that donates the cysteine is unknown. The structure of BshC has been previously solved and exists in the crystal structure as a homodimer. By performing structural homology searches, we were able to find ligands that may bind the BshC active site. These potential ligands were docked into the active site of BshC and molecular dynamics simulations were carried out to deduce possible binding modes. Results of this project will be used to formulate hypotheses about ligand interactions and possible enzyme mechanisms.

HENRY HALL ATRIUM 058

The Impact of a Global Scholarship Team: Fostering Scholarship and Student Mentorship.

Participants attending 10:00 AM - 11:00 AM

Presenter: Madison Niederer

Mentor: Katherine Moran

A diverse, scholarship team is an innovative approach for not only faculty to attain requirements of promotion, tenure and scholarship but also a method to increase scholarship output by students. An international, multisite team with individuals that are DNP or PhD prepared whom have expertise in multiple practice areas provides a collaborative approach with the diversity and different skill set for a highly productive approach to scholarship. A diverse, faculty and student global scholarship team is an effective strategy to 1) improve faculty output to address university requirements for productivity and 2) give DNP or PhD students the opportunity to initiate practice scholarship during their academic journey. The global scholarship team fosters mentorship for not only faculty members, but also for students to promote practice scholarship to ultimately advance improvements in health care, higher education, and the nursing profession.

HENRY HALL ATRIUM 059

Conspiracy Mindsets and The Big Five Personality Traits

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 2:00 PM - 3:00 PM

Presenters: Sadie Doctor, Emily Hill, Jessica Malinowski, Erin Mangan, Kendra Pollick, Kathrine Sawertailo, Kianna Sterlini

Mentor: Mario Fific

To explain how conspiracies are adopted, researchers have explored relationships between psychological foundations and propensities towards conspiracies. Current research explores the relationship between personality

traits and tendencies towards conspiracy thinking. Personality was evaluated with the Big Five test, measuring five dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism. The conspiracy propensity was measured by the Generic Conspiracist Beliefs scale. We hypothesized that these mindsets are associated with low agreeableness and conscientiousness, and high openness and neuroticism scores. We collected data on a sample of GVSU undergrad students, finding that conspiracy beliefs were normally spread over our subjects. However, the results failed to support our hypothesis, suggesting that personality doesn't play a role in conspiracy thinking. Future research will focus on understanding the cognitive aspects of forming conspiracy beliefs.

HENRY HALL ATRIUM 060

Pathophysiological Mechanisms That Contribute to Diabetic Cardiomyopathy and its Role on the Heart

Participants attending 11:00 AM - 12:00 PM

Presenter: Jefferson Cano

Mentor: Ruijie Liu

Diabetic cardiomyopathy (DCM) is a condition caused by diabetes mellitus (DM) that causes significant structural and functional changes in the myocardium. This condition is separate from the traditional coronary artery disease (CAD) that leads to heart failure. Even while CAD and hypertension are adjusted clinically, the risk of cardiovascular heart failure is still high within the DM patient population. Diabetes increases the risk of heart failure and heart failure has a worse outcome in the presence of diabetes. The pathogenesis of DC is still under heavy research as multiple mechanisms may play a role in there modeling of the myocardium. Some of these potential mechanisms are hyperglycemia, beta-oxidation of free fatty acids, advanced glycated end products (AGEs), reactive oxygen species, interstitial fibrosis, and inflammation. This study will review the pathophysiological mechanisms of AGEs deposition and hyperglycemia in the heart.

HENRY HALL ATRIUM 061

Phospho-Mimicking Nato3

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 4:00 PM - 5:00 PM

Presenter: Grace Okros

Mentor: Merritt Delano Taylor

The floor plate basic helix loop helix (bHLH) protein Nato3 has been determined to drive genes important in dopaminergic (DA) neurogenesis. Preliminary phosphomimetics studies indicate that T101, T132, and S140 sites may regulate Nato3's biological function, with in-silico analyses indicating that these sites could be phosphorylated by PKA, PKG and PKC. It is not yet known if these sites are phosphorylated by PKA, PKG or PKC. Our hypothesis is that Nato3 is a substrate for these kinases at these predicted phosphorylation sites. To test this, we will design and express a vector that contains the gene for a histamine tagged version of Nato3 in bacteria. The tagged protein will be purified using a nickel affinity column and phosphorylated using kinase assays. We will test for successful phosphorylation of Nato3 residues using mass spectrometry. These data will inform studies to create the phospho-mimicked version of Nato3 that can upregulate genes involved in DA neurogenesis.

HENRY HALL ATRIUM 062

Predicting Potential Archeological Dig Sites Using LiDAR Data and Relative Locations to Large Water Bodies

Participants attending 10:00 AM - 11:00 AM
Presenters: Nathan Byrne, Nathan Shelnick
Mentor: Peter Wampler

Native Americans had a strong presence in West Michigan and the Grand River Valley for the past 2,000 years. Natives left behind evidence through artifacts and changes to the landscape with mounds. Light Detection and Ranging (LiDAR) has allowed us to perform 3D analysis and produce slope derivative maps to identify potential mounds and mound complexes in Ottawa County. Known occupation sites are used to develop criteria which can predict the location of previously unmapped sites. Geographic information systems (GIS) can identify places where these people lived in relation to navigable water bodies and floodplains. This combination of criteria gives insight to where Native American populations were more likely and where potential archeological dig sites may be located. Specifically, we predict mounds that Native Americans created will be visible using derivative LiDAR maps and we can use the location of these mounds in relation to other land features in order to identify dig sites.

HENRY HALL ATRIUM 063

Improving Breastfeeding Outcomes through the Frenectomy Procedure

Participants attending 9:00 AM - 10:00 AM
Presenter: Shelby Thomas
Mentor: Kelli Damstra

Ankyloglossia, or “tongue-tie”, is a common congenital anomaly that is characterized by an abnormally short lingual frenulum. This condition can restrict tongue mobility, making it difficult for infants with ankyloglossia to breastfeed. A frenectomy is a simple procedure that is used to correct tongue-tie by using a laser or a scalpel to cut the frenulum, making tongue less restricted to allow more effective breastfeeding. The purpose of this study is to evaluate the effect of the frenectomy procedure on a mother’s breastfeeding outcomes and self-efficacy. Tools that may be used for the purpose of this study include the BSES-SF screening tool and other breastfeeding assessment questionnaires. The research conducted in this project will also be used for a current research study on the effect of frenectomy procedures on maternal self-efficacy. This current study is being conducted at a local pediatric dental office, Mitten Kids, where the frenectomy procedure is commonly done.

HENRY HALL ATRIUM 064

Cell Sorting and Quantitation of Microorganisms via Capillary Isotachophoresis

Participants attending 9:00 AM - 10:00 AM
Presenter: Olivia Gordon
Mentor: Andrew Lantz

Currently, there is a need for a rapid, inexpensive, and versatile method for the quantitation of bacterial contamination in many science-related fields. Here, we report the development of a method for the sorting and quantitation of microorganisms using capillary isotachophoresis (cITP). Unlike traditional capillary electrophoresis, cITP utilizes a nonuniform electric field through the capillary, taking advantage of charged cells’ electrophoretic mobilities and concentrations to focus and separate them from one another. In this study, we demonstrate a method to focus and sort various microbial species (such as *Streptococcus mutans*, *Bacillus subtilis*, and *Escherichia coli*). This cITP method was optimized for factors such as buffer concentration, leading, tailing, and spacer ion compositions, capillary length, and sample injection volume. In addition, initial data is presented on the capability of this method to simultaneously quantify these species in mixed samples.

HENRY HALL ATRIUM 065

Structural and Functional Characterization of BstA in *Staphylococcus aureus*

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

Presenter: Michael Pellizzari

Mentor: Paul Cook

Bacillithiol, a low-molecular-weight thiol, is central to the resistance of Fosfomycin, an antibiotic commonly used to treat MRSA infections. These thiols play a crucial role in cellular redox chemistry and is carried out by BstA, a thiol transferase. A structure of BstA has been determined previously but the active site is empty. This study highlights BstA and various mutants in attempts to obtain kinetic parameters and a crystallographic structure with substrate(s) bound in the active site. The BstA gene and mutants were transformed into BL 21 *E. coli*, expressed, and purified using Ni-NTA column chromatography. BstA exhibits kinetic activity with increasing concentration of concentrations of L-cysteine.

HENRY HALL ATRIUM 066

Synthesis of CMPO Ligands and Anion Recognition Elements for Use in the Extraction of F-block Elements

Participants attending 1:00 PM - 2:00 PM

Presenter: Gabriel Heselschwerdt

Mentor: Shannon Biros

"Rare earth" metals – metals that reside in the f block of the periodic table – are found in nuclear waste and electronic components and are difficult to recycle. Organic molecules ("ligands") can be used in the extraction of these metals from their source. We synthesized two ligands, TREN-CMPO-OEt and TRPN-CMPO-Ph, for the respective selective extraction of terbium and thorium. These compounds were characterized by IR, ¹H NMR, ¹³C NMR, ³¹P NMR, and mass spectrometry. In order to characterize the resultant metal complexes, the TRPN ligand was complexed with lanthanum and thorium. An anion recognition element (ARE), 5 (2-pyrrolo)tetrazole, was also synthesized as an attempt to increase the extraction efficiency of the ligands. Extractions were carried out with an acidic, aqueous solution of lanthanum or thorium, the ligand in DCM, and the ARE. The extraction efficiency was measured by ICP-OES. Extraction data for various ligand-metal-ARE combinations will be presented.

HENRY HALL ATRIUM 067

Does Social Media Affect College Students Mental Health?

Participants attending 11:00 AM - 12:00 PM

Presenter: Laynie Braman

Mentor: Hsiao-ping Chen

The purpose of this research study was to find out how social media is affecting college students' mental health. To find this, 28 Grand Valley State University students were sampled. Their viewpoints on social media and how it affects issues like academics, and mental health were analyzed. Mental health issues are continuously rising in present society, and is becoming much more apparent in younger generations. Social media is growing just as quickly. This research is aimed at studying the connection between the two.

HENRY HALL ATRIUM 068

Toxicological Evaluation of Microcystin-LR (MC-LR) using *Galleria melonella*

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenter: Micaela Manschula

Mentor: Babasola Fateye

Background: *Galleria* has increasingly been used as a surrogate invertebrate model. This project seeks to (i) investigate its suitability for assessing the effect of MC-LR; (ii) compare indices with reported values from vertebrates. Method: We assessed acute effects, development, histopathology in *Galleria* larvaedoses (25 to 500ng in 5ul) by injecting into the haemocoel or via oral gavage. Results: Preliminary results (n =2) shows that the acute TD50 is between 125 to 250ng. Conclusion: *Galleria* has been easy to work with.

HENRY HALL ATRIUM 069

Using GIS to Track of Harmful Cyanobacteria Blooms in Western Lake Erie

Participants attending 12:00 PM - 1:00 PM

Presenter: Mariah Gotz

Mentor: Peter Wampler

Lake Erie is the shallowest and warmest of the Great Lakes, making ideal conditions for algal growth. Cyanobacteria are harmful algae that are threatening the water quality of Lake Erie. Nutrient loading from excess Phosphorus and Nitrogen are a main contributor to algal blooms. Phosphorus is a nutrient used for agriculture and often ends up in the water, especially after major storm events. ArcMap GIS was used to analyze data for the western portion of Lake Erie, where the majority of these harmful blooms are located. Satellite imagery and supervised classification were used to quantify the extent of algal blooms for several time periods. Water chemistry data from six monitoring stations were used to quantify phosphorus levels and their geographic distribution in the western portion of the lake. Analyzing the extent of blooms and phosphorus levels may provide a means of predicting future algal blooms and their extent.

HENRY HALL ATRIUM 070

Investigation of Atypical Nutrient Acquisition Due to Esophageal Cancer

Participants attending 9:00 AM - 10:00 AM

Presenter: Zachary Seim

Mentors: Chris Reed, Dawn Richiert, Melissa Tallman

Most individuals break down food through mechanical digestion within the oral cavity which continues as chemical digestion in the stomach allowing nutrients to be absorbed. However, there are medical conditions that affect swallowing such as cancer. These individuals will need external sources, such as Percutaneous Endoscopic Gastronomy (PEG) tubes. A PEG tube is placed by cutting through the abdominal wall in order to access the stomach. The tube is then fed into the stomach to send nutrients through. The dissection of an 88-year-old female cadaver who was diagnosed with Esophageal Cancer revealed that a PEG tube was in place. The tube was confirmed based on the location into the stomach seen with PEG tube placement. Due to the esophageal damage, a PEG tube will ensure that nutrients are absorbed. Decreased nutrition can be detrimental to cancer patients recovering from chemotherapy. The use of a PEG tube may be the best option to provide nutrients without further risk.

HENRY HALL ATRIUM 071

Ut Pictura Cetus: On Herman Melville's Adaptation of Epic Ekphrasis in *Moby-Dick*

Participants attending 11:00 AM - 12:00 PM

Presenter: Jacob Petrosky

Mentor: Charles Ham

While Herman Melville refers frequently to ancient Greek and Roman literature in his works, relatively little work has been done on Melville's reception of classical antiquity (although see Garrison 1971 and Sweeney 1975). In this project, however, I argue that prominent ekphrases - descriptions of visual art - in *Moby-Dick* should be situated in the tradition of ekphrasis in ancient epic, particularly the shields of Achilles and Aeneas in the *Iliad* and *Aeneid*. Following Homer, ekphrasis becomes an important generic feature of classical epic, with the ekphrases often functioning as icons of the cosmos (*imagines mundi*), as demonstrated by Hardie (1986). My project focuses on the painting in the Spouter-Inn (Chapter 3) and the doubloon (Chapter 99), arguing that Melville casts both as *imagines mundi*, in which the four elements of ancient natural philosophy and the planetary bodies, particularly the sun, figure prominently.

HENRY HALL ATRIUM 072

Vaccine Confidence of West Michigan Project

Participants attending 4:00 PM - 5:00 PM

Presenter: Maggie Willson

Mentor: Kristin Hedges

The ongoing COVID-19 pandemic has affected communities and families worldwide since March 2020 when lockdowns and mask mandates first went into place. A year of confusion and uncertainty followed waiting for the vaccine. Misinformation and disinformation was spread widely on social media sites which increased fear and concerns for the safety of the COVID-19 vaccines. The goal of this project is to help groups like Vaccinate West Michigan determine what kind of positive and truthful information of the vaccines needs to be shared on social media. In order to gauge what people thought about the vaccine, we conducted ethnographic interviews, participant observation, and social media research. We were striving to understand perceptions about vaccines, confidence in vaccines, and how this spreads across social media platforms. We created ethnographically informed social media graphics in order to answer questions and increase vaccine confidence.

HENRY HALL ATRIUM 074

Neural Tube Defects: Spina Bifida, Chiari Malformation, and Frontal Encephalocele

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, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenter: Sid Osborn

Mentor: John Capodilupo

Spina bifida, or myelomeningocele, is an open neural tube defect in which the spinal cord does not develop properly due to incomplete closure of the neural tube. This report looks to enlighten on the clinical significance of spina bifida by giving a detailed account of what it is, how it is diagnosed, and how it is treated, as done through the analysis of varying studies, trials, and reviews. In addition, this paper presents what advances in the field are currently being explored to improve the treatment of those affected by spina bifida.

As an extension of this report, the student will present a 3-part poster at Student Scholar's Day that not only gives a visual enhancement of spina bifida, but explores the related neural tube defects of Chiari malformation and frontal encephalocele. Similar to the report, the poster will work to provide its audience with information on what both Chiari malformation and frontal encephalocele are, how they are diagnosed, and how they are treated.

KIRKHOF CENTER GRR 001

Finding Malicious Malware using Twitter Scanner

Participants attending 10:00 AM - 11:00 AM

Presenter: Morgan Hamlin

Mentor: Erik Fredericks

Zoom has become an increasingly popular application. This has led to an increase in cyber criminal activity. Cybercriminals have been utilizing social engineering tactics to persuade users to download compromising software. Their agenda is to gain access to sensitive information and exploit your system. I will be utilizing a Python bot to find malicious malware posted on Twitter under the domain name of Zoom. This bot can scan and identify potential threats, with the idea being to bring awareness to phishing scams and help mitigate dangerous Zoom downloads on Twitter.

KIRKHOF CENTER GRR 002

Detecting Face Mask Usage Trends in Social Media with Machine Learning

Participants attending 2:00 PM - 3:00 PM

Presenter: Seth Ockerman

Mentor: Erin Carrier

The use of face masks to prevent disease spread among the general population has become widespread due to the COVID-19 pandemic. The ability to accurately detect and monitor the trends in face mask usage is crucial to understanding and predicting hotspot areas for both current and future pandemics. This work investigates the detection of face masks in social media images using deep learning. This project creates a social-media-based face mask image dataset that reflects the scale needed for deep learning and the diversity (mask types, positions of people, and ethnicity) of real life. We have gathered approximately 120k images containing people from different cities. Mechanical Turk is used to label the images based on the presence of a face mask. Using this dataset, we train a CNN model to detect the presence of face masks in social media images and compare the results to existing datasets. We then deploy our model to detect trends in face mask usage in Los Angeles over time.

KIRKHOF CENTER GRR 003

ACE2 Receptors and SARS-S-2: Developing a Treatment for COVID-19

Participants attending 9:00 AM - 10:00 AM

Presenter: Rachel Meriweather

Mentor: Amy Manderscheid

SARS-S-2, the virus behind Covid-19 infections, has caused devastating effects worldwide in the last two years. This literature review explores the relationship between the SARS-S-2 virus and ACE2 (angiotensin converting enzyme 2) receptors, as well as therapeutic treatments that could target this cellular interaction. PubMed and CINAHL databases were searched for articles using the phrases "covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19" and "ACE2 or angiotensin converting enzyme 2". The findings of the nine articles that met set

criteria indicated that ACE2 receptors are a likely entry mechanism for the virus and insulin resistance and heart failure increases the expression of this enzyme in the body. Various treatments such as ascorbic acid, Chinese Medicinal treatments, camostat mesylate, and other SARS virus antibodies may be effective in lessening the severity of the disease, especially in patients with increased risk factors for complications.

KIRKHOF CENTER GRR 004

Expressing Hyphal Proteins in *C. albicans* Yeast Cells

Participants attending 12:00 PM - 1:00 PM

Presenters: Kassandra Baker, Nicholas Schena

Mentors: Ian Cleary, Derek Thomas

There are many changes in cell wall architecture associated with the transition from yeast to hyphae in the fungal pathogen *Candida albicans*. We have constructed strains where hyphal proteins are expressed in yeast cells to examine the effects of these individual changes on the properties of the yeast cells. In particular, we are examining changes in important virulence factors of adhesion and biofilm formation.

KIRKHOF CENTER GRR 005

Identifying Tradeoffs in Benefits of Interaction and Visualization Techniques for Analytic Tasks

Participants attending 1:00 PM - 2:00 PM

Presenters: Calob Horton, Shweta Dnyaneshwar Terkar

Mentor: Michelle Dowling

In visual analytics research, new visualization or interaction techniques are typically developed to support specific analytic tasks, such as clustering observations of high-dimensional data. User studies on these new techniques seek to demonstrate their effectiveness on specific tasks. Developers of visual analytics systems then seek to combine these techniques to support more tasks, such as characterizing distributions and clustering observations. In this example, the effectiveness of a clustering technique on characterizing distribution tasks was not evaluated and may be detrimental to this task. Therefore, a different technique for this task may be preferred. As such, we promote a broader perspective when evaluating the effectiveness of a new technique so that the tradeoffs in the benefits of using such techniques across a wide range of analytic tasks can be understood. This presentation demonstrates how to complete such an evaluation on the techniques employed by SIRIUS.

KIRKHOF CENTER GRR 006

Japanese American Women in the Internment Camps - WWII

Participants attending 11:00 AM - 12:00 PM

Presenter: Tess Dornan

Mentor: Nora Salas

Executive order 9066 led to the relocation and internment of thousands of Japanese Americans. This had a great impact on the mental and physical well beings of those incarcerated both in the camps and afterwards. However, I wish to look at the experiences of women within these camps. My research will address women's familial roles within the camps and how they might have changed. It will also look at the generations of Japanese American women, and how they handled the camp experience. The relevance of silence will also be explored in this research. And finally, I will address the changes these women faced once they left the camps. This research relies on

secondary and primary sources such as books, memoirs, interviews, and photographs. I look forward to sharing my research on Student Scholars Day.

KIRKHOF CENTER GRR 007

An Investigation of F-Kassinin, a Model Functional Amyloid

Participants attending 9:00 AM - 10:00 AM

Presenter: Lindsay Milton

Mentor: Laura Hawk

Amyloids are a class of proteins that aggregate *in vivo* and *in vitro*. These peptides are of interest as they are associated with degenerative neurological conditions like Alzheimer's and Parkinson's diseases. Amyloids also serve functional purposes in a wide variety of natural pathways and cycles. Therefore, understanding the similarities and differences between disease-associated amyloids and function amyloids is of interest. To investigate these proteins, the peptide Kassinin, a model functional amyloid, was synthesized using solid-phase peptide synthesis and the peptide's sole phenylalanine residue was replaced with 4- fluorophenylalanine. The peptide was purified utilizing HPLC and the correct mass was confirmed by mass spectrometry. The fluorinated Kassinin was found to precipitate instead of forming fibrils, while non-fluorinated Kassinin formed fibrils. Future experiments will explore conditions under which both fluorinated and non-fluorinated Kassinin form fibrils, followed by a detailed investigation into the fibrillization mechanism of Kassinin.

KIRKHOF CENTER GRR 008

Spin Dependence of the Nuclear Level Density

Participants attending 4:00 PM - 5:00 PM

Presenter: Luke Newman

Mentor: Sofia Karampagia

Experimental level densities are available only for a limited number of nuclei, mainly nuclei whose half-lives are long enough to take measurements of a series of energy levels. Therefore, a theoretical method is needed to predict these unknown level densities. In this study, we will calculate the nuclear level densities of a group of nuclei with valences that occupy the p and f shells. From these calculated densities, we will also study a quantity that is related to the dependence of the nuclear level densities on spin, the spin distribution. We use a code based on a technique called the moments method to predict the level density as a function of energy and spin. We will compare the predicted level densities with available experimental level densities. We will use the calculated nuclear level densities as an input in another code that calculates nuclear reaction rates. We then compare these reaction rates with the reaction rates predicted when using other theoretical level densities.

KIRKHOF CENTER GRR 009

Caregiver Feedback on Use of a Toolkit to Provide CAPABLE to Older Adults with Alzheimer's Disease: A Thematic Analysis

Participants attending 4:00 PM - 5:00 PM

Presenter: Callie Dzurisin

Mentor: Sandra Spoelstra

There are 16.3 million caregivers in the US who care for someone with Alzheimer's Disease (AD) or dementia. As part of a National Institute of Aging trial (ClinicalTrials.gov NCT03634033), we conducted a pilot study, engaging

50 caregivers to assist in providing Community Aging in Place, Advancing Better Living for Elders (CAPABLE), a person-centered intervention that improves function and factors that impact function, to 52 low-income, disabled older adults with AD or dementia living at home in a Michigan Medicaid program. Data were collected monthly for 5-months (phone survey) on use of an enhanced aging-in-place toolkit; and how the content and format aided in providing care. Analysis is underway using descriptive statistics to examine demographic characteristics; and a thematic analysis to examine qualitative data. Results will be presented. Findings are expected to provide insight into how caregivers can assist with providing CAPABLE to those with AD or dementia.

KIRKHOF CENTER GRR 011

Improving Engineering Design Education by Fostering a Better Understanding of Electromechanical Elements

Participants attending 2:00 PM - 3:00 PM

Presenter: Kevin Lott

Mentors: John Farris, Christopher Pung

This project will create boards that explain common electromechanical elements used in common products and machinery. The boards will be two feet by four feet and hang on the walls of the Innovation and Design Center. Mounted on the board will be a physical example of the electromechanical element. When possible, the electromechanical element will be displayed disassembled or with covers cut away to reveal the inner workings. All parts will be labeled with their name and function. A technical description of how the electromechanical element works will be provided.

KIRKHOF CENTER GRR 012

Effects of Male Histamine Deficiency on Female Receptivity & Secondary Cell Differentiation in the Accessory Glands of Male *Drosophila*

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Ryan Blackmer, Justin Lilley, Cazmir Sarnacki

Mentor: Martin Burg

Histamine, a neurotransmitter, has recently been located outside the nervous system in secondary cells of the accessory gland in male *Drosophila*. Secondary cells have been implicated in the induction of female post-mating responses (PMRs), including post-copulatory receptivity to male courtship advances. Lack of histamine in accessory cells affects the PMR of female receptivity 1-day after copulation. To better understand how histamine affects this PMR, the number of secondary cells was determined in normal and *Hdc* mutant flies lacking histamine. This was accomplished by labeling secondary cells in normal and mutant flies with green fluorescent protein (GFP) in live preparations examined using laser-scanning confocal microscopy. Findings indicate that a lack of histamine causes a decrease in the number of secondary cells. This result suggests that histamine deficiency may affect female PMRs simply by reducing the number of secondary cells in male accessory glands.

KIRKHOF CENTER GRR 013

Exploring Fast Emulators for Long-running Mars Simulation Code.

Participants attending 4:00 PM - 5:00 PM

Presenter: Marc Tunnell

Mentors: Nathan Bowman, Erin Carrier

The NASA Ames Global Climate Model (GCM) software has been in steady use at NASA for decades and was recently released to the public. This model simulates the complex interactions of different weather cycles that exist on Mars, namely the Dust Cycle, the CO₂ Cycle, and the Water cycle. It is used by NASA to help understand their empirically observed data through the use of sensitivity studies. However, these sensitivity studies are computationally taxing, requiring weeks to run. To address this issue, we have developed a surrogate model using Gaussian processes that can emulate the output of this model with relatively small amounts of data in a reduced amount of time (on the order of minutes). We demonstrate the effectiveness of our emulator using backward error analysis.

KIRKHOF CENTER GRR 014

Addition of Silyl Anions to Alkenes

Participants attending 11:00 AM - 12:00 PM

Presenter: Camryn Hokenstad

Mentor: Randy Winchester

Silyl anions with lithium and potassium counterions were reacted with alkenes. Nine reactions were studied to learn more about the addition of silyl anions to alkenes. In previous research, the silyl anions did not add to the alkenes as expected, forming an unusual dimer and a separate goal of this research was to study why and collect some evidence of possible mechanisms. There were some interesting results with the lithium silyl anions that suggest the silyl anions added to the alkene along with producing the dimer from previous research.

KIRKHOF CENTER GRR 015

Characteristics of Simulations That Facilitate Student Confidence Working With Future Clients Who Stutter

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenter: Katherine Day

Mentor: Cara Singer

Two simulations utilizing standardized patients (i.e., actors) were embedded in a graduate-level stuttering course to provide students an opportunity to practice evaluation and treatment skills. Students evaluated and provided a treatment session to the same patient virtually and completed questionnaires following each simulation. This study explored student perceptions of these two simulated experiences to identify simulation and student characteristics that heighten the realism of the experience and facilitate student confidence working with this population in the future. Characteristics include stuttering severity and age of the patient, the student's previous clinical experience, and the experience (i.e., evaluation or treatment). The results of this study will help guide instructors to develop more effective simulated clinical experiences. Findings will be based on two cohorts of students.

KIRKHOF CENTER GRR 016

What Happens When Molecules Collide?: Pressure Broadening of Carbon Monoxide Infrared Absorption Lines by Neon and Nitrogen

Participants attending 1:00 PM - 2:00 PM

Presenter: Esabella Powers

Mentor: George McBane

Molecule-molecule or molecule-atom collisions are the first steps in most chemical reactions. Nevertheless, careful study of energy transfer during collisions on a molecular/atomic scale is a relatively recent endeavor. Here we describe laser-based spectroscopic studies that quantify a result of collisional energy transfer on the shapes of infrared absorption line shapes for CO. Specifically, the degree to which increased collision frequency (higher pressure) affects the width of an absorption line is reported. High precision spectroscopic measurements for infrared overtone absorption lines of CO are used to evaluate collision broadening effects in collisions of CO with nitrogen or neon. Recent results, especially at higher pressures, are presented.

KIRKHOF CENTER GRR 017

Lumbosacral Angle Changes Due to Gut Volume

Participants attending 11:00 AM - 12:00 PM

Presenter: Carly Stoops

Mentor: Natalie Laudicina

This project investigates the impact of increased gut volume on the lumbosacral angle (LSA). The LSA is an essential human adaptation to walk upright. The magnitude of the LSA can change due to age, pregnancy, sex, and, as we hypothesize, gut volume. LSA changes can result in lower back pain and decreased mobility. The consequences of being overweight or obese rarely include the anatomical changes that result due to excess gut volume. This project examines this skeletal adjustment by comparing LSA measurements from a sample of 100 adult CT pelvic scans (50 males, 50 females). Three-dimensional imaging software will be used to measure the pelvic landmarks, which will then be compared to gut volumetry. The individuals are divided into categories based on their BMIs, ranging from "normal" to obese. Statistical analysis will follow to determine if there are any changes in the LSA due to gut volume changes. We seek to understand how a larger gut size can impact anatomical function.

KIRKHOF CENTER GRR 018

Expression, Purification, and X-Ray Crystallographic Analysis of Methylglyoxalase A and B from *Bacillus subtilis* and *Bacillus licheniformis*

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenter: Hunter Krzysik

Mentor: Paul Cook

Methylglyoxalases A and B are two enzymes that play a critical role in detoxification in Firmicutes. These bacillithiol utilizing enzymes are involved in a chemical pathway that converts methylglyoxal, a toxic byproduct of glycolysis, to lactate. Previously characterized X-ray crystallographic structures of Glx A and B exist but lack crucial information regarding their active sites. Without this information, it is difficult to predict the manner in which these enzymes bind their substrates and catalyze their reactions. Presented here are the techniques used for the expression, purification, and analysis of Glx A and B. Also shown here is the progress towards growing crystals and acquiring well-resolved structures with active site information. A thorough structural analysis of these methylglyoxalase enzymes will provide a better understanding of bacillithiol metabolism in *B. subtilis* and other gram-positive bacteria.

KIRKHOF CENTER GRR 019

Why Has Misinformation Bloomed in our Modern Political System?

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Joshua Trierweiler

Mentor: Coeli Fitzpatrick

There has been an incredible surge of misinformation surrounding the American Political System in recent years. This project will attempt to display why this surge has occurred by discussing changes that have resulted from information-sharing technologies such as social media, the effects of media polarity, and the effects of increased political polarization. Connections between misinformation and free speech, deep state conspiracies, and distrust in government will also be discussed. These changes and connections will be discussed through the lens of misinformation surrounding the 2020 election, vaccine information, and climate change. In addition, this project will attempt to explain the effect that misinformation has on our country and our political system, as well as to explain how to reconcile this issue.

KIRKHOF CENTER GRR 020

American Women in the Great War

Participants attending 12:00 PM - 1:00 PM

Presenter: Zane Tikkanen

Mentor: Nora Salas

American women, and women as a whole, were an incredibly important part of the Great War. Without their great sacrifices and bravery, America would not have been able to wage war. Their work in the factories and the farms of the United States provided material for the homefront, while their work on the frontlines saved the lives of soldiers through medicine and espionage. Without the work of women, veterans likely would never have received their due benefits. The Great War also raised the respect that men had towards women, especially in the signal corps of the American Expeditionary Forces, where women earned their respect as proper members, and then some. It is for these reasons that I believe a poster presentation on the sacrifices and strength of women of this time is important. They fought for the United States, despite lacking respect and rights. These are stories that should, and must, be told.

KIRKHOF CENTER GRR 021

Identifying the Isotopic Signature of Lake-Effect Precipitation in Shallow Groundwater

Participants attending 12:00 PM - 1:00 PM

Presenter: Andrew Brown

Mentor: Tara Kneeshaw

Three different stable isotopes of water occur in nature, with the majority of water on Earth containing the oxygen isotope ^{16}O . These isotopes have slightly differing physical and chemical properties. H_2O with heavier oxygen isotopes should theoretically precipitate earlier than lighter isotope H_2O , meaning this natural process should allow us to more closely observe the magnitude of effects of lake-effect precipitation on the basis of water isotope differences. Furthermore, it may allow us to understand the significance lake-effect precipitation plays in recharging shallow aquifers. In this study, patterns of lake-effect precipitation from Lake Michigan are observed in a collection of water samples from shallow-depth (<80 ft) aquifers. The extent of the difference in isotope concentrations between samples that differ longitudinally will also provide insight into the magnitude of effects of lake-effect precipitation, as well as on overall groundwater chemical composition.

KIRKHOF CENTER GRR 022

Biological Assessment of Ecosystem Integrity in the Grand River, MI

Participants attending 3:00 PM - 4:00 PM

Presenter: Colin Assenmacher

Mentor: Eric Snyder

The Grand River is the longest river in Michigan and has been greatly impacted by human activities, leading historically to poor river quality. Despite this, actions throughout the past 50 years have resulted in increased river health and broader water quality monitoring. During the summer of 2021, rapid bioassessments targeting benthic macroinvertebrates were conducted along the Grand River, with the goal of following up on prior state-led efforts. Using Michigan P22 and P51 methodologies, surveys at 7 previously sampled locations were carried out along with chlorophyll-a analysis. Our results indicate a decline in water quality as one travels downstream, likely due to riparian impacts and cumulative pollution. Macroinvertebrate ratings remained similar to prior efforts in all sites, except Jackson and Grandville which showed increased quality. Chlorophyll-a concentration was highest in the Grand Rapids reach and lowest in the Jackson site, generally increasing further downstream.

KIRKHOF CENTER GRR 023

Medical Controversies in the Emergency Department

Participants attending 9:00 AM - 10:00 AM

Presenter: Paige Berman

Mentor: Coeli Fitzpatrick

Clinical literature and guidance regarding controversial practices in the Emergency Department can be unclear and confusing to emergency health providers needing to make quick decisions regarding patient care. This project utilizes CMS meaningful measures to examine the effect on quality of care for each selected controversy. A literature review was conducted of peer reviewed journal articles, books, and other sources from databases including CINAHL Complete, ScienceDirect, and UpToDate. Each source was categorized as either conducive to quality improvement or detrimental. Controversial psychiatric care, pain management, and imaging practices as well as the use of artificial blood were found to be detrimental to quality care. Family presence in emergencies and evidence-based staffing were found to increase quality of care. Recommendations to improve controversial practices based on the evidence are made and should be considered to promote safe, quality care for all patients.

KIRKHOF CENTER GRR 024

Investigating the Role of PTPR in Planarian Regeneration

Participants attending 11:00 AM - 12:00 PM

Presenter: Jane Moore

Mentor: Matthew Christians

Planaria have the unique ability to regenerate any part of their body via stem cells at a much higher rate than other organisms. They are a model organism for studying regeneration and discovering the genes that play a role in this process. This experiment investigated the role of a protein tyrosine phosphatase receptor (PTPR) gene, which a preliminary analysis concluded that it may be involved in neuron regeneration. We produced double stranded RNA of the PTPR gene and used this to suppress the endogenous PTPR gene in planaria through RNAi. After which, we amputated the heads from the planaria and assessed regeneration after 1 week. Our results suggest that the PTPR gene does not affect planarian head regeneration. We only investigated head regeneration in this experiment; therefore more research could be conducted on whether PTPR affects behavior or other types of regeneration in this species.

KIRKHOF CENTER GRR 025

Marmoset Monkeys (*Callithrix jacchus*) Only Scent Mark After Behaviors that Evaluate Food Quality

Participants attending 9:00 AM - 10:00 AM

Presenter: Ashley Brown

Mentor: Cynthia Thompson

Common marmoset monkeys (*Callithrix jacchus*) gouge tree holes to feed on the exudate produced, and frequently scent mark these holes. If scent marks function to communicate information about food quality, primates are expected to first feed or gouge a hole for evaluation, then decide whether to scent mark. To test this hypothesis, data were collected on wild marmoset foraging and scent marking sequences at Tapacurá Field Station, Pernambuco, Brazil. Of recorded sequences, 25.1% (N=139/553) displayed scent marking, and animals fed or gouged prior to scent marking in 100% of sequences. The most common sequence was to feed then scent mark (38.1%, N=53/139); compared to feed, gouge, scent mark (32.3%, N=45/139); and gouge then scent mark (20.1%, N=29/139). Scent marking never preceded an initial feeding or gouging event. Although alternate explanations are possible, these behavioral sequences are consistent with the hypothesis that scent marking could function to communicate food quality.

KIRKHOF CENTER GRR 026

Ball-and-Pillow Genesis in the Ordovician Fairview Formation of Northern Kentucky: Evidence of Seismic Activity?

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM

Presenters: Elisia Fritz, Jared Galka, Zachary Kippe, Logan Mocherman

Mentor: Peter Riemersma

Structures preserved in coarser rock layers can provide evidence of ancient seismic activities. Ball-and-pillow structures are deformation sediments caused by density instability between layers of unlithified sediments, with beds sinking into underlying mud. They can form during rapid introduction and deposition of sediments as turbidites or during storms. Seismic activity has been proposed as initiating their genesis in some cases. Sediment liquefaction occurs when seismic shaking causes deposited mud to behave more like a liquid, allowing overhead sediments to infiltrate the mud below. At our outcrop we observe that ball-and-pillow structures are not present in all layers, and if present they tend to occur in thicker parts of the bed. Utilizing this distinction, as well as both deformed and undeformed hand samples and thin sections, we will look for evidence of seismically-induced liquefaction.

KIRKHOF CENTER GRR 027

Improving Memory Performance in Older Adults Through Training

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenter: Laura Schultz

Mentor: Jing Chen

Over the years, there has been a number of memory training programs developed to mitigate age-related changes in memory. Research has also been conducted to examine the effectiveness of these programs in improving older adults' memory functions. In this presentation, I plan to review some empirical studies that have investigated the effects memory training programs have on both objective and subjective memory. I will also review research that

has specifically looked into whether the aging brain can reorganize and alter its function in response to memory training programs and what characteristics can predict an individual's gains from such training. In the end, I will discuss my experience working with residents at a retirement community using the Higher Memory Program which involves a baseline cognitive assessment, followed by weekly math tests, writing prompts, and reading.

KIRKHOF CENTER GRR 028

Examining Prospective Methods for Self-Heating Ultrasound Transmission Gel for Possible Improved Health Outcomes in NICU Patients

Participants attending 3:00 PM - 4:00 PM

Presenter: Erica Wiencek

Mentor: Miriam Teft

Previous research outlines the impact of neonatal intensive care unit environment on patient health outcomes. Findings include physiologic, neurobehavioral, and neuromotor sequelae related to excessive light, sound and touch in the NICU. Sonographic evaluation of NICU patients introduces sensory burdens of handling, transducer use, and cold sterile gel which may contribute to high sensory NICU environments. This study demonstrates a novel technique for the production of self-heating, sterile, single use gel packets for use with neonates in a portable setting. Single use gel packets contain internal heating components activated by inducing an exothermic chemical reaction to warm the gel. Temperatures reached a value intermediate to room, and body temperature, which would lessen the sensory load of sonographic exams. Using sterile self-heating gel packets will allow sonographers to reduce the sensory stress contributed in the NICU environment, possibly improving neonate health outcomes.

KIRKHOF CENTER GRR 029

A Guide to Performing Historical Contextualization

Participants attending 1:00 PM - 2:00 PM

Presenter: Ryan Iacovone

Mentor: Sheila Garcia Mazari

Some students think history classes are simply about memorizing facts that have to do with dates and dead people. On the contrary, learning about history involves crafting narratives about the past rooted in evidence; then analyzing that narrative to evaluate how human societies have changed over time. That's the story of historical contextualization. Lacking this skill results in students falling into the trap of presentism and consequently missing vital historical information. Therefore, this presentation is designed to acquaint students with the concept of historical contextualization and explain how it can help improve their authority while conducting research.

KIRKHOF CENTER GRR 030

Origin of Chert Lenses in Dolomite and Relative Timing With Respect to Dolomitization in Lower Silurian Brassfield Formation at Tollesboro Kentucky

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Ryan Benjamin, Ethan Gardner, Jared Jesko, Jagger Wicker

Mentor: Peter Riemersma

The origin of chert lenses in dolomite and relative timing with respect to dolomitization in the Lower Silurian Brassfield Formation (~440 Ma) is poorly understood. The light-colored chert of the Brassfield is present as lenses within the dolomite. As the process of dolomitization tends to destroy fossil fabrics, the relative timing between

chertification and dolomitization can be assessed by the presence or absence of fossils in the chert. This project seeks to investigate what local conditions led to the development of chert lenses and the timing of dolomitization. This will be achieved by examining hand samples and petrographic analyses of samples in thin-section. We'll discuss possible sources of silica and synthesize the literature on how these chert lenses are formed and what controls their distribution within the dolomite.

KIRKHOF CENTER GRR 031

American Women's Experiences in World War II

Participants attending 2:00 PM - 3:00 PM

Presenter: Kristen Lach

Mentor: Nora Salas

World War II had far-reaching impacts on society through changes in the daily lives of individuals, societal structures, and ways of thinking. This research project studies the experiences of American women during World War II and how the war impacted their daily lives. Through analysis of primary and scholarly secondary sources, this project will examine how women of different races experienced and participated in World War II. The project will then discuss how these experiences changed America's perception of women and gender. It analyzes the impact of World War II on the development of gender roles and views in American society. The project argues that race impacted the experiences American women had during World War II, that women made significant contributions to the war effort, and that America's views on gender and women changed because of the participation of women in World War II.

KIRKHOF CENTER GRR 032

Unwed mothers in the 60s and 70s

Participants attending 2:00 PM - 3:00 PM

Presenter: Hannah McBride

Mentor: Nora Salas

The Homes for Unwed Mothers housed many women in the 1960s and 1970s. This presentation will look at the impact of these homes on the mothers and their babies. This presentation will be focusing on the sector of hospitals called the Booth Hospitals for Unwed Mothers, which had locations all over the country. Special attention will be paid to the location in Grand Rapids, which was located where the current Salvation Army building is on Fulton and Fuller. This presentation will address how staying in the homes impacted the mother's mental health, and the shame that surrounded the mother since she became pregnant before getting married. This often resulted in her family sending her away. My project will include interviews with people who lived during that time, including women who became pregnant and were sent away. I will also be using secondary scholarly research on this topic.

KIRKHOF CENTER GRR 033

Going Big with *Ginkgo*: Another Look at the Odd Geometry of an Ancient Tree

Participants attending 9:00 AM - 10:00 AM

Presenters: Victoria Lutz, Steven Polaski

Mentor: Gary Greer

The Greer lab has been investigating the evolution and ecology of branch geometry of trees, which reflects optimizations and tradeoffs between structural support and hydraulic efficiency. This has included a study of *Ginkgo*

biloba, a gymnosperm with a presence in the fossil record dating back 170 mya and a very unusual, essentially unique, branch geometry. At the heart of these studies is how branch attributes (e.g., width, length, and angle) change with size; a.k.a., allometry. Studies of allometry require a robust survey across a wide range of sizes. We added to the pre-existing data set by collecting data on larger-sized *Ginkgo* to improve the allometric analysis of its branch geometry. We have also begun a study to further elucidate the causation of some odd anomalies in branching that the original team observed.

KIRKHOF CENTER GRR 034

Effects of Caffeine on Reaction Time During Oculus Gaming

Participants attending 12:00 PM - 1:00 PM

Presenters: Marta Cholewa, Anna Williams

Mentor: Nicholas Lerma

Caffeine is a known physical and cognitive performance enhancer. Active virtual reality gaming (AVR) incorporates physical and mental abilities and is increasingly available to consumers participating in competitive gaming. The purpose of this study was to determine the effects of caffeine on AVR performance while playing Fruit Ninja on Oculus Quest 2 gaming headset. Seventeen Grand Valley State University students voluntarily participated in a randomized double-blind controlled crossover trial. All subjects were given a beverage with or without 100mg caffeine powder to be ingested one hour prior to testing. Participants completed two reaction time performance tests before two rounds of Fruit Ninja on Zen mode. The results showed the caffeinated group performed better in Fruit Ninja by 25.3 +/- 23.4 points ($p=.062$). The other two reaction time tests are to be analyzed.

KIRKHOF CENTER GRR 035

Community Gardens as Contexts for Teaching Art Across Disciplines

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Angela Corey, Andrea Johncheck, Lisa Sonke

Mentor: Hsiao-ping Chen

This project is designed for 6th-8th grade students, focusing on individual contributions to the communities by exploring the contemporary art and practice of Mel Chin. Mel Chin's *Revival Field* uses a garden to detoxify the soil, using art to cultivate environmental awareness and empower social change. The big idea of community is explored by transforming a recycled container into a planter that will later be collected into a garden representing the students' class community. The transformation and integration of science using art-making skills will explore how we make up and contribute to our community. The lesson is scaffolded for students to use the 21st-century skills of transformation, collaboration, problem-solving, and creative strategies (e.g., metaphor) to create meaningful contributions to their school community and encourage them to be conscious and accountable members of society.

KIRKHOF CENTER GRR 036

Saving Lives with Lanthanides: Lighting up Tumors

Participants attending 1:00 PM - 2:00 PM

Presenter: Lizzy Sielaff

Mentor: Shannon Biros

According to the American Cancer Society, "In 2022, there will be an estimated 1.9 million new cancer cases diagnosed." The CDC also reported that cancer was the second leading cause of death in the United States in

2021. Cancer's widespread impact puts it at the forefront of biomedical research. My project aims to push at the boundaries of cancer detection research by illuminating the boundaries of cancerous tissues. Lanthanides luminesce in the visible IR and near-IR regions of the electromagnetic spectrum with narrow emission bands. By chelating a lanthanide metal to a carbazole ligand, we can create a lanthanide-ligand complex primed for the addition of a polypeptide chain capable of targeting cancer cell-surface receptors. Hitting this lanthanide complex with UV light will cause the metal to luminesce, lighting up the tumor.

KIRKHOF CENTER GRR 037

Canadian Raising of *BUY* and *BOW* vowels in UP English: "Let's go out and about in town tonight!"

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Molly Baxter, Lucille Near

Mentor: Wil Rankinen

This sociophonetic study examines a linguistic feature known as "Canadian Raising" (CR) in U.P. English spoken in Michigan's Upper Peninsula. This feature involves vowels in words like "buy" (purchase) and "bow" (bend at waist) – referred to as BUY and BOW. In American English, these vowels are produced similarly in "bite" and "bide" (BUY) and in "bout" and "bowed" (BOW). However, CR (i.e., found in Canada, New York, Washington) affects beginning of BYE and BOW in "bite" and "bout" (i.e., tongue raises to produce "but" vowel); "bite" is pronounced similar to "buh-ayt", while "bout" is similar to "buh-awt" (rather than "bah-ayt" and "bah-awt"). Raising does not occur for "bide" and "bowed". Therefore, CR is conditioned by following "t" sounds but not "d" sounds. The study examines reading passage data from a 94-speaker corpus stratified by county, age and gender. The study seeks to uncover if and to what extent U.P. English, across the peninsula, exhibits Canadian Raising.

KIRKHOF CENTER GRR 038

Investigating Students' Knowledge of the Nature of Science

Participants attending 2:00 PM - 3:00 PM

Presenters: Kayla Decker, Kara McKinley

Mentor: Thomas Pentecost

The goal of this project is to determine students' knowledge and application of the nature of science. We will explore the relationship between proximal and distal knowledge as well as the role they play in the development of the nature of science. Through the use of strategies such as surveys and interviews, we can better grasp how and when students apply these different types of knowledge. From our experimental findings we would like to develop a tool that can accurately predict students' understanding of the nature of science. This poster will present our progress in the analysis of existing instruments that measure students' knowledge of the nature of science.

KIRKHOF CENTER GRR 039

Does Grand Valley Prepare Students for Adult Problems?

Participants attending 4:00 PM - 5:00 PM

Presenters: Madelyn Diegel, Shareef El-Kildani, Nicole Nunez

Mentor: Hsiao-ping Chen

An online survey developed in Google Forms was sent to 66 GVSU students in January 2022 to find out if GVSU has prepared students for adulting problems. Our findings represent the possibility for Grand Valley State University

to improve and provide more opportunities for students to become educated in. This could include providing the appropriate classes, having more resources around campus, or educational programs. The numbers and visualizations will express the needs of fellow students at this university.

KIRKHOF CENTER GRR 040

Does Ability to Double or Triple Tongue Impact Speed of Articulation in Persons who Play Wind Instruments?

Participants attending 12:00 PM - 1:00 PM

Presenter: Natalie Crossen

Mentor: Beth Macauley

Diadochokinetic tests consist of saying “Pa,” “ta,” and “ka” to test proper articulation. Double-tonguing in music allows wind players to separate their notes while playing quickly by placing the tongue in different positions, usually that of “ta” and “ka.” This study intended to see if there is a significant difference in the rates of those who can double-tongue and those who do not play wind instruments.

The data involved a diadochokinetic exam and a segment of double-tonguing in musicians. For the diadochokinetic test, participants produced the “pa” sound in isolation ten times as fast as they could three separate times, and then the average time was determined. The same process was used with the “ta” and “ka” sounds in isolation, finishing with “pa-ta-ka.” For musicians, their playing was recorded and then analyzed to find the rate of double-tonguing. The data was then analyzed to look for a relationship between the ability to double-tongue and faster diadochokinetic rates.

KIRKHOF CENTER GRR 041

Variation of the Lateral Cord of the Brachial Plexus in a Male Cadaver

Participants attending 9:00 AM - 10:00 AM

Presenter: Bryce Reynolds

Mentors: Chris Reed, Dawn Richiert, Melissa Tallman

A variation of the lateral cord of the brachial plexus was uncovered while dissecting a male cadaver. Typically, the lateral cord contributes to both the median and musculocutaneous nerves. However, on this cadaver the lateral cord contributes solely to the median nerve and the musculocutaneous nerve is absent. The median nerve innervates the biceps brachii and brachialis and forms the lateral antebrachialcutaneous nerve, and the radial nerve innervates the coracobrachialis. This variation and other similar variations of the lateral cord have been noted previously in as many as 8% of dissected upper limbs. The variations are likely due to atypical axonal migration during development, possibly as a result of abnormal communication between mesenchymal cells and neuronal growth factors during nerve branching. This anomaly has clinical implications for patients presenting with brachial plexus injuries, as well as for procedures on or in the vicinity of brachial plexus nerves.

KIRKHOF CENTER GRR 042

Claudia Jones, Angela Davis, and the Involvement of Black Women in the Communist Party

Participants attending 11:00 AM - 12:00 PM

Presenters: Noelle Charbonneau, Grace Hayes, Caitlin Hays

Mentor: Nora Salas

In its early days in the United States, the Communist Party hoped to draw greater African American membership by committing to fighting for racial equality. This also drew the attention of activists who sought to improve conditions across the civil rights, feminist, and socialist movements. We argue that triple oppression—the struggle between race, gender, and class—was the root of Communist motivations in Black women during the 20th century. This research seeks to place key figures, including Claudia Jones and Angela Davis, at the heart of the intersection between Communism, feminism, and civil rights in the United States during the 20th century. Our project aims to contextualize the motivations of Black women for joining the Communist Party within the sociopolitical and economic spheres across the 20th century. The project also endeavors to determine how women like Jones and Davis shaped and were shaped by the broader context of American women's history.

KIRKHOF CENTER GRR 043

Does Exercise Change Brain-Derived Neurotrophic Factor Levels in Parkinson's Patients? -a Pilot Study

Participants attending 9:00 AM - 10:00 AM

Presenter: Cameron Coates

Mentor: Sok Kean Khoo

Parkinson's disease (PD) is the second most common neurodegenerative disorder in adults with no cure. In PD patients, the level of brain-derived neurotrophic factor (BDNF) – a protein that regulates brain plasticity – is lower compared to healthy people. Studies have shown that serum BDNF levels increase with exercise. Here, we collected serum samples from twelve PD patients that underwent a Nordic walking regimen over 4.5 months. Serum BDNF concentrations were analyzed using enzyme-linked immunosorbent assays in hopes to show exercise as an intervention to slow PD progression.

KIRKHOF CENTER GRR 044

Adaptive Immune Response to Cancer

Participants attending 12:00 PM - 1:00 PM

Presenter: Maci Rozich

Mentor: Kristin Renkema

In this study, we used a mice model which is known as the "dirty mice model." This compares two types of mice. SPF mice are essentially pure of pathogens (other than natural microbes such as in the gut) and they have had no exposure to outside infections. We call them the "clean" mice. Compared to a human, the clean mice are representative of a newborn baby (Beura et al.). Therefore, the clean mice, like the newborn, have very little immune system experience. On the other hand, we obtained mice from the petstore which had diverse microbial experiences and a host of immune memory (meaning their T cells were well adapted and ready to take on pathogens that come their way). We call these the dirty mice since they have such an enveloped immune system, full of memory T cells. We tested whether dirty mice have increased immune responses to cancer and found that dirty mice have reduced tumor size and changes in their innate and adaptive immune cells.

KIRKHOF CENTER GRR 045

Community Composition of Middle Eocene Fauna in Uinta Basin, Utah

Participants attending 10:00 AM - 11:00 AM

Presenter: Emma Miller

Mentor: Laura Stroik

The Uinta Basin in Uinta County, Utah has produced hundreds of productive localities since 1994. These localities span the mid-Eocene, specifically the Uintan and Duchesnean North American Land Mammal Ages (~46-38 Ma). In order to analyze the palaeoecological community that lived in the area so long ago, an understanding of the faunal composition and structure is crucial. I analyzed species richness and diversity using the Simpson's and Shannon's indices for all localities at the site. Analysis was restricted to jaws and teeth, as these specimens have high identification fidelity. Results indicate that there is high abundance and diversity of artiodactyls and rodents across the section. Previous assessments of Uintan fauna support these findings. Low diversity among other groups, such as carnivores and primates, could be due to taphonomic and collecting biases. A future analysis of the abiotic factors affecting these communities could reveal insights into the patterns presented here.

KIRKHOF CENTER GRR 046

The Archaeologist's Toolbox: Theoretical Perspectives

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

Presenters: Drew Bochenek, Natalie Dobleske, Carolyn Morgan, Drew Rausch, Alexander Spindler, Madeline Weinberger

Mentor: Melissa Morison

Our team is presenting our methods and progress in regard to the creation of a graphic novel covering archaeological theory. Aimed at students newly introduced to theoretical approaches, novice archaeologists, or anyone interested in archaeology, it will cover the theoretical models that make up the primary frameworks of culture-history, processualism, and post-processualism. The purpose is to present these concepts in an approachable, accessible, and understandable way, using comprehensible imagery and conversational language. Our goal for this project is to create a valuable resource that will promote public understanding of archaeological ideas. We recognize that archaeologists have an obligation to communicate the means by which they construct knowledge, and the role of theory in that process. The finished product will be available in accessible formats, online and to print.

KIRKHOF CENTER GRR 047

Examining the Effect of Over-expressing a Cell Surface Protein on *C. albicans* Growth and Adhesion.

Participants attending 2:00 PM - 3:00 PM

Presenter: Mark Sobetski

Mentors: Ian Cleary, Derek Thomas

The opportunistic fungal pathogen *Candida albicans* is part of normal human microbiota. That means that when humans travel to space they will bring this organism with them, and should someone become immune compromised during space flight they will be vulnerable to developing an infection. A study was conducted comparing *C. albicans* growth in orbit to ground conditions and it was observed that cells grown in space were more adhesive and that a number of genes were differentially expressed. Since adhesion is a key component of the virulence trait of biofilm formation, we are constructing strains that over-express individual genes whose expression was changed during space flight to better understand the cause of the observed phenotypic changes. The gene studied in this work is upregulated in space flight and is predicted to encode a cell surface protein that could be involved in adhesion.

KIRKHOF CENTER GRR 048

Exploring Private Servers In Online Games

Participants attending 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

Presenter: Korey Stamper

Mentor: Alisha Karabinus

This article is an examination of the history of private servers in online games in the field of digital game studies. Although there is a growing list of literature on the history of mods, there is little to no academic writing about the modification of an MMO game's server. Massive Multiplayer Online Games (MMOs) are games that host large numbers of game players using online servers in order to keep the online world running perpetually. Video game modders have the ability to emulate these online servers in order to create their own "copy" of the desired MMO. World of Warcraft and Ultima online are two MMOs that both have a history of having private or emulated servers. Tags: online games, private server, world ofwarcraft, ultima online, mod

KIRKHOF CENTER GRR 049

Glucose Effects on Dopamine Release in the Caudate Putame

Participants attending 2:00 PM - 3:00 PM

Presenter: Carson Kasche

Mentor: Eric Ramsson

Glucose is the brain's primary energy source, yet it's effects on specific neurotransmitter release hasn't been explored in detail. The Caudate Putamen resides within the Nigrostriatal Dopamine pathway which is responsible for motor movement, and motivation and rewards systems. Using Fast-Scan Cyclic Voltammetry (FSCV) in mice brain slices, dopamine release can be measured. By administering three different glucose concentrations, this study found a positive relationship between glucose concentration and dopamine release. However, there were occurrences of sex related differences in dopamine release, as well as little significant difference between a doubled concentration of glucose and a quadrupled concentration indicating a possible limit to glucose's effects on dopamine release. Overall findings of this study show a positive correlation between glucose concentration and dopamine release within the Nucleus Accumbens.

KIRKHOF CENTER GRR 050

Collage and the Art of Identity: Expressing Self through Artmaking

Participants attending 2:00 PM - 3:00 PM

Presenters: Thomas DeBoer, Hannah Mshar

Mentor: Hsiao-ping Chen

The focus of this project is to create a lesson plan for middle school students that helps them gain the ability to create art that instinctually expresses their sense of self. This gives them the opportunity to confront outward perceptions of their identity by exploring the internal and external expression of identity through the creative process. We provide students with the tools and vocabulary to express their sense of identity within art and in interdisciplinary contexts. In this project, we use collage as an art form to engage students, instinctually choosing what speaks to them in relation to their identity. We then have the students create art that meaningfully explores the concepts of self they've chosen. This mode of expression and creative inquiry allows students to expand and conceptualize their identities in a meaningful and exploratory way. The goal of this project is to instill a sense of

reflection of how they see and present themselves and express that in a collage.

KIRKHOF CENTER GRR 051

The Effect of Instructor Feedback on Student Motivation in Undergraduate Chemistry Courses

Participants attending 3:00 PM - 4:00 PM

Presenter: Lindsey Schmidt

Mentors: Thomas Pentecost, Jessica VandenPlas

Research indicates that student motivation tends to decrease upon receiving disrespectful or vague feedback from their instructors. There is also evidence that female STEM students drop their majors at rates higher than male STEM students. The purpose of this project was to develop a comprehensive understanding of the current literature on instructor feedback and its effects on student motivation and to look into how student gender plays a role in this interaction. The goal of this project was to develop an experiment to investigate this relationship. We developed four feedback groups: respectful and specific, respectful and vague, disrespectful and specific, and disrespectful and vague. Each group will receive feedback on assignments we developed for CHM 115, 116, 241, and 242 classes. This poster will present the findings of the current literature and the process of developing the feedback groups and measurement tools.

KIRKHOF CENTER GRR 052

Genome Expansion in *Drosophila*: What's the Buzz in CMB 440?

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, 4:00 PM - 5:00 PM

Presenters: Jared Bengston, Zachary Dertien, Lillian Duce, Adam Gruppen, Emily Kedziorek, KatrenaKorenek, Chad Miller, Madison Miller, Natalie Price, Kari Shadab, Madelline Waite

Mentor: Martin Burg

Similarities and differences between various *Drosophila* species enable the investigation of the relationship between genome structure and function. The F element in *D. melanogaster* is the smallest chromosome of four, containing about 5.2 Mbps. Comparison of the genome structure of various *Drosophila* species has revealed that the F element size can vary, with the F element in *D. ananassae* being more than 18.7 Mbps in size. The Muller F Element Expansion Project, as part of the Genomics Education Partnership, is to determine how this expansion trends across multiple *Drosophila* species with regards to specific gene characteristics such as intron size, coding exon size, and gene synteny. We will detail the gene annotation process carried out for genes from either the F element of *D. kikkawai* or the Delement (chromosome 3L) of *D. bipectinata*, which will be compared to the same F and D element genes from *D. melanogaster*.

KIRKHOF CENTER GRR 053

Roles Prominent Women Played in Organized Crime

Participants attending 2:00 PM - 3:00 PM

Presenters: Rebbekka Dingus, George Hart-Waara

Mentor: Nora Salas

During the Prohibition Era and the Great Depression many people turned to crime and illegal activity in order to make money.

This presentation will show the roles that women played in organized crime that have often been overshadowed by men. Many female gangsters were only known for their male partner instead of focusing on their own actions. Media has only focused on the men. This presentation will also show how the societal problems that can cause conflict within people and make them feel like crime is the only way to survive impacted women.

KIRKHOF CENTER GRR 054

An Adventure into Diatom Biology in Two Projects: Building a Local Flora and Exploring *Nitzschia* Evolution

Participants attending 3:00 PM - 4:00 PM

Presenter: Tyler Garcia

Mentor: Sarah Hamsher

Diatoms are photosynthetic protists responsible for 20% of the world's oxygen production and often used as ecological indicators. Difficulty in species identification and their unresolved evolution are barriers to understanding their ecology. To these ends, we are working on two projects. 1- We are compiling a species-level flora of the Grand River to use as a baseline for water quality monitoring. Preliminary data reveal *Navicula cryptotenella*, *Cocconeis placentula*, and *Staurosira construens* as dominant species. 2- To study diversity and evolution, we are studying members of the diverse genus *Nitzschia* (known to be indicators of poor water quality) because their evolution is not well understood. These data will contribute to a larger dataset to eventually produce a robust phylogeny of the genus. Both projects have increased our understanding of the local diatom flora and further resolved the phylogeny of *Nitzschia*, assisting in future studies that use diatoms for biomonitoring.

KIRKHOF CENTER GRR 055

A New Space-Filling Curve

Participants attending 11:00 AM - 12:00 PM

Presenter: Elise Dettling

Mentor: Christian Trefftz

Space-filling curves have many applications in scientific computing. Most space-filling curves are displayed using cartesian grids and they work in conjunction with traditional quadrees. We have proposed a new kind of curve, the LTD curve. We have written a grammar that can generate different levels of recursion of the curve. We have chosen to use barycentric coordinates instead of traditional cartesian coordinates, and we have devised a new flavor of quadtree designed for triangular grids. Previous work on this subject has been surveyed by Michael Bader in his book *Space-Filling Curves: An Introduction with Applications in Scientific Computing*.

KIRKHOF CENTER GRR 056

The Portrayal of the Victim on Netflix

Participants attending 10:00 AM - 11:00 AM

Presenter: Shaylynne Kotch

Mentor: Leifa Mayers

Every minute, around 20 individuals are being abused by a partner (NCADV). Domestic violence has been a problem and continues to affect many. It is important to analyze how the media represents violence, as the portrayal can affect how the public perceives the victim. Within Netflix's limited Series "Maid", a young mother is a domestic violence victim. The series navigates the relationships of the victim and how she attempts to find safety

for herself and her daughter. The purpose of my research is to examine how a current popular streaming service is depicting the victim within a domestic violence situation. Within my study I use discourse analysis to go through the series and analyze the characteristics of the victim. I anticipate finding caregiver, empathetic, and vulnerable characteristics of the victim. These findings could help show how the media reinforces stereotypes of DV victims. Such implications could change the way we, collectively, discuss domestic violence and the victims.

KIRKHOF CENTER GRR 057

Studying the Potential Role of ERK1/2 in Diabetes-induced Heart Disease

Participants attending 12:00 PM - 1:00 PM

Presenter: Madilynn Olenick

Mentor: Ruijie Liu

Diabetic cardiomyopathy, a disease of the heart muscle induced by diabetes, makes it more difficult for the heart to deliver blood to the body and can lead to heart failure. This study examines if extracellular signal-regulated kinases 1 and 2 (ERK1/2) play a role in diabetic cardiomyopathy development. Diabetes was induced chemically in mice through a drug, streptozocin (STZ), which drug attacks pancreatic beta cells. Biochemically, the STZ treatment led to significant increase in ERK1/2 phosphorylation and reduction of Glut4 proteins in mice. A mouse model with enhanced ERK1/2 phosphorylation, called DKO mice due to their genetic composition, was used to study the physiological role of ERK1/2 in this process. 2 weeks after STZ administration, both control and DKO mice had high plasma glucose, but there was no difference in heart tissue fibrosis in mice 12 weeks after STZ injection. Our preliminary study suggests a potential role of ERK1/2 phosphorylation in diabetic cardiomyopathy.

KIRKHOF CENTER GRR 058

Child Developmental Change in the Description of People

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 12:00 PM - 1:00 PM

Presenters: Hanna Elwell, Kathryn Karmanos, Kelsey Lansky

Mentor: Josita Maouene-Cavin

A lack of developmental data on how children describe people prompted us to examine changes in descriptors of people by 12 children of ages 3.1-6.3 and 11 of age 7.2-10.9. 23 participants were recruited and asked 3 questions about 21 words (15 people and 6 objects over 2 lists). Each question prompted answers about appearance, function, and location. The older children provided 14.3% more perceptual features than younger children, with an increase of 10.5%. To investigate the overlap in their responses of each group of children, we created networks where the nodes corresponded to people and objects, and the links corresponded to their responses. All three networks of the older children about appearance, function and location showed more connectivity than the networks of the younger children. The functional network was the most disconnected in the young ones. Altogether these results suggest that shared perceptual features are more connecting than functional features.

KIRKHOF CENTER GRR 059

Effects of Transcription Start Site (TSS) Deletions on Spatial Expression Patterns of the *Hdc* Gene in *Drosophila melanogaster*

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenter: Collin Louis

Mentor: Martin Burg

This study sought to determine whether the 3 transcription start sites (TSS) identified for the histidine decarboxylase (*Hdc*) gene, where *Hdc* gene expression initiates, can induce *Hdc* expression in different tissues. The entire *Hdc* gene had been identified to be within a 9.4 kb DNA fragment, determined through immunodetection of histamine in *Hdc*^{JK910} mutant flies bearing this 9.4 kb *Hdc* DNA fragment. Several deletions were made to this *Hdc* gene fragment that removed regions known to contain separate TSSs for expression of *Hdc*. These deletion-bearing transgenes were transformed into *Hdc*^{JK910} mutant flies and histamine immuno-localization was carried out. The histamine distribution in these flies indicated that removal of the 2 distal-most TSSs eliminated CNS expression while peripheral expression of histamine remained. These results suggest that the 2 TSSs that were eliminated are responsible for inducing expression in the CNS, but not the peripheral sensory structures, in *Drosophila*.

KIRKHOF CENTER GRR 060

Subcutaneous Infusion Ports

Participants attending 12:00 PM - 1:00 PM

Presenter: Caleb Basney

Mentors: Chris Reed, Dawn Richiert, Melissa Tallman

During the superficial dissection of an elderly male cadaver's pectoral region, a subcutaneous infusion port was discovered stitched to the superior border of the right pectoralis major muscle. The individual had passed from esophageal cancer and the port was likely used for the infusion of chemotherapeutic drugs. An infusion port is a device often installed in patients that require multiple and/or frequent infusions of medication. A catheter that is connecting the port to the subclavian vein and extends into the vessel would have allowed any medications to be delivered directly into the patient's bloodstream. A healthcare individual would be able to palpate the device beneath the patient's skin and insert a needle into the port. In this study, I will be exploring the design, function, installation, and use of subcutaneous infusion ports in the administration of intravenous medications.

KIRKHOF CENTER GRR 061

Body Parts in English Verb-Object Network Associations

Participants attending 9:00 AM - 10:00 AM, 4:00 PM - 5:00 PM

Presenters: Kalob Bellows, Ammy Huynh

Mentor: Josita Maouene-Cavin

Previous studies have shown that adults associate body parts with early learned verbs, systematically and coherently. We wondered if body parts would be nested in object associations with verbs. We asked adults to link objects with the early learned verbs. We used an available corpus where 286 undergraduate students had provided responses to 102 concrete verbs. The results showed that only 7 verbs were not linked to any body part. To examine the underlying organization of the shared responses in categories, we created networks. The nodes were the verbs and the links were the responses. The full network had 102 nodes and 1838 links with 13 categories of verbs. These categories show a link to specific regions of the body in correlation to certain verb contexts, for example, feed, cook, and eat were linked to objects such as sandwich, dinner, and stomach. This suggested that in English, a systemic connection exists between objects and body parts related to verbs.

KIRKHOF CENTER GRR 062

Branch Geometry of White Oak Compared to Red Oak and Two Maples: Patterns in Self Support and Water Transport

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenters: Victoria Lutz, Steven Polaski
Mentor: Gary Greer

A tree needs to be able to efficiently conduct water and structurally support itself. In order for a tree to optimize these functions in different environments the woody components of a tree species need to evolve and this may impose functional tradeoffs. A tree species expresses these tradeoffs in the form of its branch geometry, a product of its inherited anatomy and its ecological circumstance. We investigated the branch geometry of white oak (*Quercus alba*) to assess its optimization of water transport and self-support. We compared the geometry of white oak to that of red oak (*Q. rubra*), sugar maple (*Acer saccharum*), and red maple (*A. rubrum*) which were studied by our lab last year, to further elucidate species-specific (inherited) patterns.

KIRKHOF CENTER GRR 063

Investigating the Rise of Authoritarianism Around the World in the 21st Century

Participants attending 1:00 PM - 2:00 PM

Presenter: Ryan Iacovone

Mentor: John Constantelos

When the Soviet Union dissolved in 1991, President George H.W. Bush prophesied a 'new world order' where the nations of the world could prosper and live in harmony. A world where nations recognize the shared responsibility for freedom and justice. For a time, this new order appeared to be taking shape as the number of democracies around the world rose dramatically while autocratic regimes fell. In 2002, for the first time in history, the number of democratic regimes outnumbered autocratic regimes. However, the honeymoon period for this new world order would not last. According to Freedom House, since 2006 global freedom scores have declined every single year for 15 consecutive years. Over this time, democratic backsliding has been evident in countries such as the Philippines, Venezuela, Hungary, and Poland. So, what's caused this recent surge of authoritarianism around the world? A combination of economic and cultural factors will be examined to understand this rise of authoritarians.

KIRKHOF CENTER GRR 064

An Investigation Into Fatal Craniocerebral Trauma

Participants attending 10:00 AM - 11:00 AM

Presenter: Paige Zielinski

Mentors: Chris Reed, Dawn Richiert, Melissa Tallman

Skull fractures commonly disrupt the middle meningeal artery which runs in the meningeal groove, between the periosteal dura and the meningeal dura. Injury to this vessel may cause development of a significant epidural hematoma. Post-mortem dissection of a 75 year-old man revealed a linear fracture of the lateral aspect of the right parietal bone with edema of the overlying soft tissue and evident intracranial hematoma. With the location of the fracture and the appearance of a significant hematoma on the contralateral portion of the skull, the individual may have sustained a coup-contrecoup injury. Because some of the most common causes of craniocerebral trauma include falls and motor vehicle accidents, it is possible that a similar type of incident led the individual in question to sustain such injuries. This presentation will further investigate the injuries sustained and potential mechanisms of injury in this case of craniocerebral trauma.

KIRKHOF CENTER GRR 065

Using GIS & Repeat LIDAR to Quantify Land Surface Changes due to Permafrost Melting

in Alaska

Participants attending 9:00 AM - 10:00 AM

Presenter: Davis Eyth

Mentor: Peter Wampler

The degradation of permafrost in arctic regions can cause land subsidence, increased runoff, and flooding. Climate change is altering permafrost geographic distribution and rates of change. Light detection and ranging (LIDAR) elevation data from multiple dates at the same geographic location can be used to quantify these changes. ArcMap GIS and 3D Analysis tools are used to quantify land surface changes across multiple years. Study sites at different latitudes in Alaska provide insights into the rate of permafrost changes as a function of latitude and geographic location. Identifying areas of permafrost degradation can allow the creation of environmental risk maps, highlighting areas most at risk of subsidence, increased runoff, and flooding. Future studies may also look to utilize repeat LIDAR data to monitor climate change issues in the arctic.

KIRKHOF CENTER GRR 066

***Salmonella enterica* serovar Typhimurium: Characterization of Potential Virulence Genes and their Impact on Virulence, Motility, Invasion, and Survival**

Participants attending 9:00 AM - 10:00 AM

Presenter: Stephanie Grahm

Mentor: Aaron Baxter

Salmonella pathogenesis involves the environmentally controlled expression of genes located in pathogenicity islands. *Salmonella* Pathogenicity Island 1 (SPI-1) is responsible for the initial invasion of host intestinal epithelium, whereas SPI-2 allows for macrophage survival after invasion. The purpose of this research is to characterize genes located in a potential pathogenicity island. Experiments are being conducted to ascribe functions to the genes found in this region, and to identify their impact on *Salmonella* virulence. Currently, we have created a series of polar mutations in potential operons in this region and are investigating their impact on key virulence indicators. Our studies have analyzed some of these mutations' effects on motility, invasion, and the key SPI-1 activator *hilA*. In the future, we intend to further our studies by determining their impacts on other virulence regulators, adherence, macrophage survival, biofilm formation, and fimbrial directed motility.

KIRKHOF CENTER GRR 067

Sustainable Alternatives to Petroleum: Chemicals from Wood

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Beckett Vigh

Mentor: Dalila Kovacs

Lignin is a naturally occurring polymer that makes up approximately 30% of cell walls in plants. It is rich with aromatic structures, which make it a valuable resource for chemical manufacturing, and a more sustainable alternative to petroleum. Currently, lignin is treated as a waste product in the paper industry, and it is mostly burned for fuel. The challenge faced by chemists lies in the process of depolymerization; it is difficult to break apart the large polymer into usable molecules in a way that leaves the aromatic rings intact, is selective for the desired products, and is both environmentally and economically sustainable. A variety of methods of depolymerization that are currently being studied will be presented here. More work needs to be done to optimize processes like this, but selective catalytic depolymerization has the potential to allow lignin to become a sustainable alternative to

petroleum as a chemical feedstock.

KIRKHOF CENTER GRR 068

Can Information Technology Improve Grantmaking?

Participants attending 10:00 AM - 11:00 AM

Presenter: Christina Vann

Mentors: Huafang Li, Kin Ma

“Can Information Technology Improve Grantmaking?” tests the effects of an hour-long Geographic Information Systems (GIS) workshop on a set of students’ learning outcomes, including awareness of community needs, grantmaking familiarity, intention to use GIS in future grantmaking, and mental health. GIS combines the power of mapping and data to contextualize geography and display community stories in a visual way. The participants are from Youth Advisory Councils (YAC), committees of students across Michigan who fund youth-oriented programs in their communities. We are surveying students before and after the GIS workshop to see whether students report higher scores in a set of outcome survey questions. In addition, we are surveying students who do not participate in a workshop to establish a baseline result. This presentation will explore the implementation of GIS on YACs and consider whether this form of information technology can be used in a student grantmaking setting.

KIRKHOF CENTER GRR 069

Using GIS to Analyze Changes in Depth and Morphology of the Intracoastal Waterway

Participants attending 9:00 AM - 10:00 AM

Presenters: Gretchen Anderson, Lillian Minnebo

Mentor: Peter Wampler

The Intracoastal Waterway is approximately 3,000 miles long and runs from Boston, Massachusetts to the coast of Florida. The waterway, first proposed in 1802, was used for transportation to avoid ocean travel and construction was completed in the 1940s. We use ArcMap GIS and 3D analyst, volumetric analysis, georeferencing of historic maps to quantify erosion, deposition, and bankline changes. Modern bathymetric data and historic depth soundings are used to evaluate and quantify elevation changes. LIDAR elevation data adjacent to the waterway is used to quantify erosion and morphological changes along the channel. Three study areas were selected near Charleston, South Carolina. These localities represent urban, rural, and areas near the ocean to evaluate how land-use settings impact the waterway. Metrics of erosion and channel change are used to compare the study areas and evaluate the influence of land-use on waterway changes.

KIRKHOF CENTER GRR 070

Women's Mental Health and the Connection to Hysteria in 1800s to 1920s

Participants attending 12:00 PM - 1:00 PM

Presenters: Erin Duff, Emma Jenkins, Hannah Schafer

Mentor: Nora Salas

This presentation will show how many women in the 1800s to the 1920s were misdiagnosed with hysteria. Many of those misdiagnosed had hysterectomies performed as a treatment option, taking away their right to bear children. The presentation hopes to bring to light how women's mental health has been delegitimized for most of history.

KIRKHOF CENTER GRR 071

Using GIS to Inventory, Quantify, and Predict Impacts from Constructed Lakes in Ottawa County Michigan

Participants attending 9:00 AM - 10:00 AM

Presenters: Noah Carrick, Corbin Ebeling, Lauren Phelps

Mentor: Peter Wampler

A new data layer of constructed inland lakes in Ottawa County was created using ArcMap GIS and aerial imagery. This geodatabase includes lakes regulated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and unregulated lakes. Unregulated lakes are defined by EGLE as any lake that is under five acres in an area not connected to any of the Great Lakes. ArcMap GIS was used to map lake features on a 2018 aerial photo. Lakes larger than 0.1 acres in Ottawa County were mapped and compiled. Eighteen students from GEO425 digitized lakes within Ottawa County which we quality checked and compiled for our study. We then used this data to calculate and quantify evapotranspiration, potential groundwater contamination, and impacts from lake management practices for both regulated and unregulated lakes. The new data layer was used to estimate lake density and aerial extent to estimate potential impacts on water quality and quantity.

KIRKHOF CENTER GRR 072

Stressful Job? Studying the Link Between Trait Affect and Job Stress

Participants attending 3:00 PM - 4:00 PM

Presenters: Rylee Cregg, MacKenzie Payton

Mentor: Benjamin Walsh

Trait affect reflects stable emotional states and research shows evidence of two dimensions: positive affect (PA) and negative affect (NA). PA is a tendency to experience high energy and pleasure. NA is a tendency to experience negative emotions. Previous research suggests that PA and NA are associated with stress levels at work. A person's level of trait affect can influence perceptions of stressors, specifically in the workplace. The goal of this study was to replicate prior research on the link between PA, NA, and job stress. Hypotheses were tested using survey data from 213 employees of childcare programs in a Midwestern state. Regression analysis was used to test our hypotheses. Results showed that people with high NA are more likely to perceive their job as stressful, whereas people with high PA are less likely to perceive stress in the workplace. These findings suggest that employers with stressful jobs may benefit by considering trait affect when hiring employees.

KIRKHOF CENTER GRR 073

Using GIS to Analyze Changes in Stream Terraces Due to Tectonic Activity, Landscape Evolution, and Climate Change in Arkansas' Ouachita Mountains

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Emily Siriano

Mentor: Peter Wampler

Stream terraces are former floodplain remnants disconnected from the current stream by vertical erosion and can be the result of tectonic activity, climate change, and/or bedrock composition. ArcMap GIS was used to compile and analyze geology, fault, and elevation data to better understand terrace formation and geographic distribution. Several study areas were randomly selected to characterize landform changes throughout the Ouachita Mountains of Arkansas. For each of the study areas data regarding stream terraces, channel gradients, and other landscape

metrics were used to understand vertical stream incision. Landscape metrics from the study areas were compared to determine if the changes in stream terraces are due to tectonic uplift, climate change, bedrock composition, or a combination of these variables.

KIRKHOF CENTER GRR 074

GIS Evaluation of Land Use Impacts on Water Quality at Wall Lake, MI

Participants attending 9:00 AM - 10:00 AM

Presenter: Elisia Fritz

Mentor: Peter Wampler

Wall Lake is an inland lake of 540 acres (219 hectares) with a 5 mile shoreline in Barry County, Michigan. There are 319 mapped parcels around the lake that have lakefront property, ranging in area from 0.4 acres (0.16 hectares) to 73 acres (29.5 hectares). This study will combine several attributes of these parcels to determine the potential for each parcel to impact water quality of the lake. Aerial photos will be classified using ArcMAP GIS to quantify the extent of different land use types for each parcel. A range of aerial photo dates was selected to coincide with available water chemistry data. Light Detection and Ranging (LIDAR) elevation data was used to quantify the slope, aspect, and other landscape metrics for each parcel. Water chemistry data, collected as part of the MiCORP program, was used to determine if land use and land surface metrics correlate with observed water quality changes.

KIRKHOF CENTER GRR 075

Case Study of a Patient Diagnosed with a Brain Meningioma Requiring Immediate Hospitalization and Urgent Craniotomy

Participants attending 4:00 PM - 5:00 PM

Presenter: Brent Spiteri

Mentor: John Capodilupo

The aim of this project is to show how a comprehensive evaluation of a post-partum patient presenting to an outpatient medical office with complaints of low back pain and weakness involving her left lower extremity led to a serious diagnosis which could have resulted in death if left undiagnosed. Utilization of a thorough history and physical examination formulating a differential diagnosis led to the correct diagnosis of a brain meningioma causing intracranial pressure which required immediate hospitalization and urgent craniotomy to relieve brain pressure avoiding cerebral herniation and possible death. This case study further emphasizes the importance of a thorough understanding of human anatomy and pathophysiology to arrive at the correct diagnosis and exclude other diseases that could theoretically have presented in a similar fashion.

Recorded Presentation Abstracts

VIRTUAL SYMPOSIUM 001

Photography as an Intervention for Substance Use Disorder

Presenters: Erin Calkins, Lauren Grendysa

Mentor: Dawn De Vries

This presentation will review the results of a scoping review on the use of photography as a coping intervention for people with substance use disorders. Implications for recreational therapy practice will be included.

VIRTUAL SYMPOSIUM 002

Therapeutic Use of Play on Children with Autism

Presenters: Selena Aleman, Kristen Bueche, Nicole Strode

Mentor: Dawn De Vries

This presentation examines the outcomes of the therapeutic use of play for children with autism. We will be discussing how recreational therapists can utilize play-based interventions to improve social and cognitive functioning for these children.

VIRTUAL SYMPOSIUM 003

Camp for People with Autism

Presenters: Hallie Greiner, McKenna Hewitt

Mentor: Dawn De Vries

This literature review focuses on the benefits of the use of summer camp to target treatment goals for people with autism.

VIRTUAL SYMPOSIUM 004

The Benefits of Creative Arts in Children Who Are Victims of Domestic Violence

Presenter: Yazmine Schultz

Mentor: Dawn De Vries

This literature review examined the use of creative arts, such as music, drawing, writing, and drama in children who are victims of sexual abuse. The study was conducted in an attempt to determine what the benefits are of using art as a coping mechanism following trauma in this form.

VIRTUAL SYMPOSIUM 005

The Effects of Social Skills Training on Individuals with Intellectual and Developmental Disabilities

Presenters: Maria Goosen, Katrina Kurowski

Mentor: Dawn De Vries

This presentation looks at the systematic literature review of intellectual and developmental disabilities and how the effects of social training impact those individuals. Social skills training is used in order to build and maintain healthy

interpersonal relationships. This literature review looks at the effectiveness of social skill training programs and how they influence relationships for individuals with intellectual and developmental disability.

VIRTUAL SYMPOSIUM 006

How Do Meditation and Mindfulness Interventions Increase the Quality of Life of Inmates in Detention Centers?

Presenter: Ema Brace

Mentor: Dawn De Vries

This literature review looks at how mindfulness training and meditation increases the quality of life of inmates in detention centers. This review will explore the physical, cognitive, emotional and social benefits of mindfulness and meditation interventions on inmates during their incarceration.

VIRTUAL SYMPOSIUM 007

Mindfulness Techniques in Public Schools for Children Diagnosed with ADHD.

Presenter: Cortney Caverly

Mentor: Dawn De Vries

This presentation will explore the outcomes of a systematic review of literature on mindfulness techniques used in public schools for children diagnosed with ADHD.

VIRTUAL SYMPOSIUM 008

Bio-Surveillance of COVID-19 Data using Statistical Process Control

Presenter: Payton Miloser

Mentor: Paul Stephenson

The ability to predict virus outbreaks is important for assessing the spread of the virus and handling the impact of the spread on the population. The COVID-19 pandemic has provided data that can be studied at the county level that contributes to the knowledge and research surrounding the eradication of the virus; at the county level, the ability to track the spatial dependence of COVID-19 spread between counties across the United States can be done using the geospatial autocorrelation statistic, Moran's I. Using Moran's I this has been able to track the spatial dependence of the COVID-19 cases throughout the pandemic and visualize spikes in Coronavirus case rates to predict outbreaks. This study will present methods for tracking incident type data using Moran's I and Statistical Process Control to predict outbreaks.

VIRTUAL SYMPOSIUM 009

Microscale Biogeochemical Dance with Earth-scale Implications: Modern Mat Microbes Synchronize Migration to a Daily Tempo

Presenter: Janelle Cook

Mentor: Bopaiah Biddanda

Colorful modern-day benthic microbial mats that resemble life on early Earth inhabit Lake Huron's cold, low-oxygen, high-sulfur submerged sinkholes. Mats are dominated by purple-pigmented cyanobacteria capable of oxygenic and anoxygenic photosynthesis, and pigment-free chemosynthetic sulfur-oxidizing bacteria. We captured time-lapse images of daily overturn between cyanobacteria and sulfur-oxidizing bacteria – turning the mat surface

nearly entirely purple after dawn and white after dusk. Alternating layers of vertically migrating photosynthetic and chemosynthetic filaments climbed across μm gradients –exhibiting their fastest motility following dawn and dusk. Observations were corroborated with time-lapse imaging and microprofiling of intact mats under simulated day-night conditions. Such daily migrations of mat-dwelling microbes in the benthic biosphere of the Precambrian may have played a critical role in optimizing photosynthesis, chemosynthesis, carbon burial, and oxygenation.

VIRTUAL SYMPOSIUM 010

Self-Care and Happiness Among Social Work Students

Presenters: Nicole Drabek, Nichole Wallace, Hailey Westerbeek

Mentor: Joshua Bishop

The importance of social workers' use of self-care is directly correlated to their competence as care providers for their clients and as professionals. Based on an understanding of the reviewed literature, it was hypothesized that there would be a positive correlation between self-care and perceived levels of happiness among college students studying social work, during the COVID-19 pandemic. In order to obtain the data, one self-administered survey was sent to all 697 social work students enrolled at a midwestern public university. The sampling frame of this study was BSW and MSW students at Grand Valley State University. This study's findings were consistent with the findings of the reviewed literature that coincided with this study's hypothesis. Self-care and happiness have a positive correlation which was determined statistically significant.

VIRTUAL SYMPOSIUM 012

Women's Abolitionist Movement

Presenter: Caeley Smith

Mentor: Nora Salas

The abolitionist movement had a major impact in the United States from the 1830s to the 1860s. Its purpose was to end slavery. American women abolitionists greatly influenced and participated in the movement by forming antislavery societies, delivering speeches, and much more. My presentation will present research on important figures and organizations for women abolitionists such as Sojourner Truth, Frances Ellen Harper Watkins, and the Boston Female Anti-slavery Society. The presentation will also look at the religious influence on American abolitionism.

VIRTUAL SYMPOSIUM 013

Suicide in Autism

Presenter: Brooke Binkley

Mentor: Dawn De Vries

This presentation will discuss findings of a systematic literature review on Suicide in Autism, as well as implications for practice in Recreational Therapy.

VIRTUAL SYMPOSIUM 014

The Benefits of the Therapeutic Use of the Arts for People Dealing with Adverse Symptoms of Trauma Disorders

Presenter: Lex Russ

Mentor: Dawn De Vries

This literature review is looking at the effects of the therapeutic use of the arts as an intervention for those who have been diagnosed with some sort of trauma disorder. We are looking to see if art interventions would be beneficial in reducing the severity of adverse symptoms caused by these trauma disorders.

VIRTUAL SYMPOSIUM 015

Benefits of Bibliotherapy with Older Adults in Residential Care Facilities

Presenter: Erin O'Leary

Mentor: Dawn De Vries

This presentation presents the findings of a systematic literature review investigating the benefits of bibliotherapy for older adults in residential care facilities. Social, emotional, and cognitive domains are overviewed. Implications of these findings for Recreational Therapy practitioners working in residential care facilities is discussed.

VIRTUAL SYMPOSIUM 016

AAT & Incarceration

Presenters: Claudia Ligas, Ally Lupu, Jenna Prohaska

Mentor: Dawn De Vries

This presentation will utilize a systematic literature review to discuss animal assisted therapy with youth and adults who have been or are incarcerated. We will discuss the implications and findings of this intervention along with analyzing the effects of it to those participating in the program.

VIRTUAL SYMPOSIUM 018

Women Against Suffrage in the United States

Presenter: Brendan Webster

Mentor: Nora Salas

This recorded presentation will shed light on a topic that is not discussed all that often: women who were against gaining the right to vote. The road to gaining suffrage is studied and discussed in many history classes and rightfully so. When this topic is being taught, from my experience, we learn of the Seneca Falls convention and how many brave women stood up for their rights over the following decades culminating in the 19th amendment being ratified in 1920. Many people may be under the impression that most (if not all) women were fighting for their suffrage but it wasn't until this semester that I learned more about how many women were opposed to suffrage and thought it would lower women's status in society. This presentation will explore some of these women and their efforts to fight the suffrage movement from the end of the 19th century up until the passage of the 19th amendment in 1920.

VIRTUAL SYMPOSIUM 019

Protest Music of the 2010s

Presenter: Tumaini Sango

Mentor: Helen Marlais

Throughout U.S. history, music has served as a soundtrack to transformative social and cultural movements. Songs like "Swing Low, Sweet Chariot," "Lift every Voice and Sing," and "We Shall Overcome" are linked to key events that inspired hope and change. Collectively, these songs are known as protest music. Protest music can act as a type of social commentary, expressing a wide range of emotions, and have a uniting element, calling leaders and groups

to action for tangible results. At its core, protest music is a musician's creative response to events happening in the world around them. The 2010s saw the rise of several social movements that initiated national conversations about perpetuated inequalities and injustice. This project will examine the music associated with these movements, the artist(s) who wrote the music, and the reception this music received. The goal of this project is to achieve a greater understanding of how American protest music has evolved in the 21st century.

VIRTUAL SYMPOSIUM 020

South Africa and COVID-19: Institutional Quandaries and the Pandemic Response

Presenter: Christopher Marco

Mentor: Heather Tafel

This research project examines the South African COVID-19 response. Under direction from Pres. Cyril Ramaphosa and the African National Congress (ANC), South Africa (SA) engaged in strict lockdowns, forcible relocation of citizens, attempted unemployment aid, and established the National Coronavirus Command Council (NCCC). This paper considers scholarly analyses of the regime (an electoral democracy) and its role in the response. Research addresses the issue of corruption and factional conflict within the ANC, human rights concerns, and history of Apartheid, and applies it to the COVID-19 response. The current measures are compared to that of HIV/AIDS, as is the Ramaphosa-led ANC and Mbeki's ANC during the crisis. Finally, human rights implications are highlighted before revisiting the nation over a year later into the pandemic response and vaccine rollout.

VIRTUAL SYMPOSIUM 021

Relationships and Schizophrenia

Presenter: Amanda Woods

Mentor: Dawn De Vries

A scoping literature review to discuss the impact of recreational therapy interventions on negative symptoms of schizophrenia. Specifically, how interventions of recreational therapy can be utilized to overcome social withdrawal to build relationships.

VIRTUAL SYMPOSIUM 023

New Music Community Initiative

Presenter: Stephanie Bueche

Mentor: William Ryan

An installment of the New Music Community Initiative, this project involves the commission of a new composition by living composer Becky Turro and its premiere performance by Grand Valley State University undergraduate student Stephanie Bueche. This project seeks to support the existence and live performance of new music. The commissioning of new works is crucial to the advancement of classical music, and it is even more important that historically and contemporarily marginalized communities are at the forefront of this progress. The new work for unaccompanied soprano clarinet solo, entitled Layers of Loss, was a collaborative project between composer and performer inspired by the concept of grief. Layers of Loss was premiered by Stephanie Bueche on April 3rd, 2022 at GVSU's Sherman Van Solkema Hall. This project was made possible through funding from the GVSU Office of Undergraduate Research Project Supplies Grant.

VIRTUAL SYMPOSIUM 025

Efficacy of Documentary Intervention in Changing Attitudes of University Students, Staff, and Faculty Toward Stuttering

Presenters: Autumn Cannon, Allison Shattuck

Mentor: Cara Singer

Different educational tools, including documentaries, have been studied in an attempt to improve public attitudes toward stuttering with inconclusive results. This study explored whether *When I Stutter* is an effective documentary to improve attitudes compared to a non-stuttering documentary. Participants were GVSU staff/faculty members and students who completed the Public Opinion Survey of Human Attributes-Stuttering twice. Once before watching their assigned documentary, and once after watching their assigned documentary. Half of participants watched *When I Stutter* and half of participants watched 2e:Twice Exceptional. Results indicate that *When I Stutter* may be an effective tool in improving attitudes toward stuttering. However, further research and continued collection of data are required in order to draw more definitive conclusions.

VIRTUAL SYMPOSIUM 026

Prevalence of Sexually Transmitted Infections Among Pregnant Women Living in the United States and Associated Adverse Birth Outcomes, 2016-2019

Presenter: Shealyn Mandle

Mentor: Sarah Nechuta

Sexually Transmitted Infections (STIs) are a global burden that are known to cause various adverse health outcomes, and can be especially harmful to pregnant women and their infants. Infection during pregnancy has been associated with issues like miscarriage, stillbirth, low birth weight, preterm birth, etc. The purpose of this study is three-fold and focused in the area of maternal and child health in association with STIs. First, this study evaluates the association between preventable STIs and adverse infant birth outcomes. Additionally, the association of pregnancy intention and prevalence of STIs, and the association between receiving information and proper prenatal care and the prevalence of STI prevalence were analyzed. Secondary, de-identified data from the Pregnancy Risk Assessment Monitoring System's (PRAMS) survey was used for this study. To my knowledge, there are only a handful of studies exploring STIs among pregnant women in the U.S. My hope is to add to the current knowledge and literature.

VIRTUAL SYMPOSIUM 027

Reading Into Sleepovers?: A Historical Queer Analysis of the Sleepover Environment Through Parenting Magazines

Presenter: Tate Johanek

Mentor: Krista Benson

The sleepover environment is an adolescent space that isolates itself from direct societal pressures yet is influenced by external factors that maintain expectations of heteronormativity. Parents are a primary influence in shaping their child's self-perception of identity and necessary skills for socialization, modeling ideal performances of gender and sexual identity and guiding their child's development in compliance with social expectations. Such influences damage the capacity for queer children to embrace their sexuality, causing feelings of isolation or identity repression through forced compliance with heterosexual norms. To assess the impact of heteronormative language and social pressures by parents regarding sleepovers, I analyzed articles from parenting magazines between 1950

and 2020. I will map the transition towards modernized expectations of identity and analyze patterns to understand how queer identities have maneuvered themselves to navigate sleepovers across time.

VIRTUAL SYMPOSIUM 029

Cooking Up Trouble

Presenter: Brennan Carroll

Mentor: Dawn De Vries

This scoping literature review is to highlight the need for an established protocol for using cooking, gardening, and nutrition education as treatment for people with mental illness as it relates to Recreational Therapy.

VIRTUAL SYMPOSIUM 030

The Effects of Big Pharma on the Use of Medicinal Plants

Presenters: Mackenzie Johnson, Abigail Main, Zoe Schultz

Mentor: Karen Amisi

This presentation examines the negative relationship between Big Pharma medications and medicinal plant use to raise awareness for the option of medicinal plants within a community that traditionally leans toward Westernized medicine. The factors analyzed in this report include the extent of research conducted on the development of each medicine type, the safety and efficacy when using them, the quality of the active compounds including regulation standards, the possibility of curing specific diseases more effectively using plants, and how we may integrate both modern and traditional medicine. Data used for support has been collected from textbooks, reputable articles, and peer-reviewed published reports. This presentation challenges the typical way of medicating within our country. However, with a higher emphasis and more research dedicated to medicinal plant use, there could be a medical breakthrough in new treatments.

VIRTUAL SYMPOSIUM 031

The Assimilation of Asian American Identities

Presenter: Dana Toren

Mentor: Leifa Mayers

Racism and the dismissal of racial identities is prominent in much of society. The influence that the media has on how people view one another is large and can be representative of the image Asian Americans receive. It is common in the media for characters to be racialized based on how society expects them to behave, which is not an accurate depiction of the unique experiences and racial identities that take place. This problem has been exemplified by the assimilation of Asian Americans in the television show *Fresh Off the Boat*, by Eddie Huang. My research project will take on an intersectional approach to analyze the textual and visual information that displays the absorption of the Asian American identity. I predict that there will be a dismissal of the Asian identity, while the American identities these characters have will be more positively represented. This research has implications for understanding how the media depicts the assimilation of Asian American identities.

VIRTUAL SYMPOSIUM 032

Estimates of Local Stress Conditions and Variations in the Chunky Gal Mountain Fault, Western North Carolina Using Recrystallized Quartz Grain Size and Paleopiezometry

Presenter: Lydia Tuttle

Mentor: Ginny Peterson

Measurements of recrystallized grain size in fault rocks are directly correlated to differential stress during deformation and tectonic regimes. A common tool used to estimate these deformation stresses is piezometry. Located in the Blue Ridge Province in Southwestern North Carolina, the Chunky Gal Mountain Fault (CGMF) separates two tectonic terranes. This fault zone displays evidence of variable deformation intensity in the form of mylonites and protomylonites. I focus on samples from several CGMF shear zones in which quartz-rich domains in thin section were scanned using the electron backscatter diffraction (EBSD) method. I use this EBSD data and MATLAB code to determine recrystallized grain size and then evaluate differential stress conditions and variations (paleopiezometry) in the shear zones. Average stress values range from 36.8 MPa to 85.6 MPa across shear zones, with narrow variations within shear zones.

VIRTUAL SYMPOSIUM 033

Retrotransposon deletion in *Physcomitrium patens* using Gateway Cloning

Presenter: Elizabeth Cazallis

Mentor: Margaret Dietrich

Polar growth is ubiquitous across kingdoms; tip growth is a subset of polar growth in which a filament tip cell elongates. In plants, a similar process is responsible for root hair and pollen tube growth via polarized exocytosis of vesicles. *P. patens* is being used as a model to study tip growth due to its critical role in moss filament development. In a previous study, random insertional mutagenesis produced an insertion/deletion in the middle of a retrotransposon (RT) island yielding a variety of phenotypes in the filamentous stage due to abnormal tip growth. Here, we investigate how deletion of this entire RT island in the wild type will affect the phenotype compared to that of the original mutant. Three-fragment recombination Gateway Cloning, which is based on lambda phage recombination, is being used to create the deletion allele to elucidate the role of RTs in *P. patens* tip growth.

VIRTUAL SYMPOSIUM 034

Law Enforcement Mental Health Training, Procedures, and Perceptions in a Campus Context

Presenter: Collin Petz

Mentor: Kristy Dean

Much research has been done in the past on mental health training and procedures in city and rural law enforcement agencies, but (to date) little research exists on higher education campus law enforcement training and procedures related to mental health (Schrivier, 2021). In the current study, we will explore mental health training, philosophies, procedures, and perceptions among campus law enforcement officials. This study aims to provide a rich, qualitative understanding of an understudied law enforcement population in regard to mental health-related areas. In exploring these themes, we will conduct semistructured interviews with the Chief of Police, training experts, and officers at a Midwestern university which will be recorded, transcribed, and analyzed with MAXQDA for thematic descriptions of training procedures, dealing with mental health situations, and general perception towards dealing with mental health concerns.

VIRTUAL SYMPOSIUM 035

Combined Pathway Analysis of a Mutant Strain of *P. patens* to Understand Tip Growth

Presenter: Collin Kozar

Mentor: Margaret Dietrich

Polar growth, in which cells elongate in one direction, is important across all kingdoms. Tip growth, a type of polar growth, is important in the seed plant life cycle due to a role in pollen tube and root hair development. In *Physcomitrium patens*, a moss, tip growth is critical in the filamentous stage, making it an ideal model for the study of tip growth. We are studying a random insertional mutant displaying abnormal growth patterns due to tip cell defects involving growth and differentiation. A transcriptome project was initiated to understand what processes were altered in the mutant which might underlie the observed phenotype. We are using the Combined Pathway Analysis in Omicsbox, in which the KEGG and Reactome pathway/function databases, differential gene expression, and gene set enrichment data are inputs. To date, several pathways involving select ribosomal proteins have been shown to be underrepresented in the mutant as are several photosynthetic and stress functions.

VIRTUAL SYMPOSIUM 036

Influences of Family Leisure as a Coping Mechanism for Parents of Children with Disabilities

Presenter: Lauren McCumber

Mentor: Dawn De Vries

This presentation is about the importance of family leisure in reference to families of children with disabilities and strengthening the family unit as a whole. Family leisure is often overlooked as an intervention to increase the quality of family life due to differing needs and skills by all members who participate.

VIRTUAL SYMPOSIUM 037

More Than a Pet: The Value of Pets During the Covid-19 Pandemic

Presenter: Judith Essemiah

Mentor: Babasola Fateye

This study wants to highlight the changes between the coping mechanisms used by students during and after the pandemic by using their photos. Participants: Students at a large 4-year college in Midwestern USA. Methods: We used a word cloud analysis to find which words were often used to describe the pictures that were submitted in the survey. Currently we are analyzing the images based on demographic information and phenomenological interpretation of participants' text. Results: Preliminary findings suggest that there was an increase in coping mechanisms especially concerning pets in spring 2021 compared with the year before.

VIRTUAL SYMPOSIUM 038

The Unobtainable Standard: Social Media Impacts on Body Image in College Aged Women

Presenter: Sydney Ford

Mentor: Babasola Fateye

Body image issues are rampant across the world, especially in college-aged women. The purpose of this study is to determine the effect of body portrayal on social media for college aged women's self-satisfaction of body image. Participants viewed 12 pictures (4 'thin' models, 4 'overweight' models, and 4 'average' models) for 15 seconds a piece, then asked to rate their own body satisfaction using The Body Image State Scale. In our preliminary survey, college aged women's body image became worse after viewing a 'thin' model and became better after viewing a

'plus size' model. Our findings suggest that using predominantly thin models throughout history in social media has a negative impact on college aged women.

VIRTUAL SYMPOSIUM 039

Seeing the Forest for the A's, T's, C's, and G's: Investigating Tree Architecture at Multiple Levels of Biological Organization.

Presenter: Noah Holkeboer

Mentor: Gary Greer

Over the past three years, I have worked with my research mentor on a nesting set of studies regarding native trees at forest, individual, tissue, and molecular levels. This research has centered around the branch architecture of trees and how it reflects species-specific optimizations for water transport and structural support. In short, I have mapped a forest stand in GVSU's ravines, measured branch architecture of numerous species, and collated existing tissue data. More recently, I have begun a project examining the role of two genes on species-specific differences in branch angle. In this talk, I will outline how these studies inform one another, highlighting key discoveries and remaining mysteries, and reflect on my undergraduate research journey to date.

VIRTUAL SYMPOSIUM 046

Truth in History

Presenter: Daisy Soos

Mentor: Leigh Rupinski

As a discipline, History is often questioned for its ability to objectively and accurately report historical information. This project discusses what steps historians take to study history objectively. Mainly, by acknowledging the bias involved in primary sources and comparing and contrasting information, historians are able to make rational inferences about what actually happened. Historians themselves also acknowledge their influence on how information is reported. By adhering to strict academic standards, historians, like any type of scholar, are able to reach objectivity. What truth means in history and how objectivity should manifest is also investigated. Generally, objectivity concerns obtaining more or less factual information from sources and making well-informed, accurate interpretations based on primary and secondary evidence. However, objectivity does not equal neutrality as making judgements and arguments about the past are what compel us to reflect on the present.

VIRTUAL SYMPOSIUM 269

Perceived Barriers that RT Students Have to Working with People with Limited English Proficiency

Presenter: Vincenza Alfano

Mentor: Dawn De Vries

Drawing upon previous research regarding cultural competence in recreational therapy, this paper will illuminate the need and importance for the profession to prioritize cross-cultural competence. By surveying students to identify perceived barriers of working with people with Limited English Proficiency, recommendations for further research and professional growth will be suggested.

VIRTUAL SYMPOSIUM 551

Loneliness During the COVID-19 Pandemic: Associations With Older Adults' Health and

Well-being

Presenter: Rebecca Clark

Mentor: Anna Hammersmith

The detrimental effects of loneliness and social isolation on older adults' health and well being are well documented. During the COVID-19 pandemic, public health and media messages have focused on the vulnerabilities of older populations to coronavirus-related morbidity and mortality. Advocates, however, have voiced concern over manifestations of ageism in containment efforts and resource allocation, compelling reassessment of unmet needs as a direct result of the pandemic. The presented study constitutes results from a listening survey into the practical and social needs of older adults in West Michigan, with particular focus on COVID-19-related loneliness and its impacts. The current study attempts to capture the views of a broad sample of older adults via mixed methods, including those who lack Internet access or are homebound. Study aims include identification of opportunities to alleviate loneliness and increase community involvement for older adults.

VIRTUAL SYMPOSIUM 552

Infection Isolation Precautions and Blood Culture Contamination Prevalence in a Hospital Acute Care Setting

Presenter: Luke Dalton

Mentor: Sarah Nechuta

Blood cultures are a significant part of patient acute care. For practitioners, blood culture contamination (BCC) poses a significant threat to the effective care of patients in the hospital setting. In the wake of the COVID-19 pandemic, many hospitals experienced surges in BCC prevalence, which may be in part due to an increase in infection prevention isolation precaution procedures seen in inpatient units. In this aggregate analysis of blood culture contamination prevalence (%) and isolation precaution burden (%) measures by month at a multi-hospital health system in Southwest Michigan, we looked to see if there was a correlation between the two measures. Through multiple statistical methods, we determined that there was no relationship between BCC and isolation precautions, which may suggest the presence of a different reason why there was an observed increase in BCC prevalence (e.g., such as employee turnover).

VIRTUAL SYMPOSIUM 553

Practicing Resilience Conference

Presenter: Stacie Fifelski

Mentors: Gwenden Dueker, Jamie Langlois

An estimated 62% of adults have experienced one adverse childhood experience (ACE) during childhood and nearly one-quarter reported experiencing three or more ACEs (CDC, 2019). These traumatic experiences during childhood physically change the structure of the brain and have long-lasting impacts. Practicing resilience can decrease the negative effects of trauma. Through a full-day conference, we aim to provide a trauma-informed framework and tools to promote resilience in our community. From research and collaboration with Family Futures, students and faculty of Grand Valley State University have determined the need for this training within our helping professions. To mitigate the impacts of trauma, we must understand the significance of personal experiences and support resilience practice. This conference will be the catalyst for future community programming surrounding the prevention and mitigation of trauma effects. Together, we can create a more resilient community.

VIRTUAL SYMPOSIUM 554

Support and Educational Groups for Caretakers of those with Eating Disorders

Presenter: Rheanna Graver

Mentor: Jamie Langlois

Thirty million Americans live with an eating disorder. Individuals who struggle with an eating disorder often comment that caregivers do not understand their illness or know how to assist through recovery. Caregivers often state that caring for an individual struggling with an eating disorder can be mentally and emotionally draining. Partnering with Forest View Hospital, we have created Support and Educational Groups for Caretakers of those with Eating Disorders. We aim to provide space for caregivers to learn from professionals how to best support their loved ones through recovery. This group will cover topics including how eating disorders work and how to be supportive and allow space for questions and processing. This free group offered to the community is expected to provide relief for supports and assist in the recovery of those battling their eating disorder. Our programming aims to serve 50% of families combating an eating disorder in the Grand Rapids area.

VIRTUAL SYMPOSIUM 555

Care Management Resources Redo: Discharge Database

Presenter: Brooke Jacobs

Mentor: Jamie Langlois

The last 3 years have been unlike any others. With a worldwide pandemic causing global chaos, the demands for quality care and hospital space have only grown, and healthcare workers continue to feel the pressure. With this project, Care Management Resources Redo: Discharge Database, I am partnering with Spectrum Health to create a more user-friendly location for current discharge resources and posthospital support for those with varying backgrounds and payer sources. Through research and collaboration, I am encouraging the care management team to examine outdated information and join me in changing the narrative. The new Discharge Database will allow care managers company-wide access to current information and community organizations to pair with patients of all backgrounds and payers in an effort to minimize rehospitalizations and promote quality care for all.

VIRTUAL SYMPOSIUM 556

Substance Abuse Licensure Application

Presenter: Robyn Lehner

Mentor: Jamie Langlois

Roughly 9.5 million adults over 18 use explicit drugs in the United States. Before COVID in 2019, approximately 615,000 individuals 12 and older needed substance abuse treatment in Michigan. Throughout the pandemic, the need for substance abuse treatment has risen, and this need has not escaped the West Michigan Community. Mercy Health is interested in expanding its substance abuse services to the community of Grand Rapids by applying for substance abuse licensure through the State of Michigan. My partner, Mercy Health, advises that the acquisition of state licensure would help decrease the number of individuals in need of services, increase the organization's ability to provide services to the community, and expand the organization's services.

VIRTUAL SYMPOSIUM 557

Impact of Unpaid Internships on Recreational Therapy Students

Presenters: Emilie Seibert, Madeline Taylor, Andrea Valdes Flores

Mentor: Dawn De Vries

The purpose of this study is to investigate the effect of unpaid vs. paid internships on Grand Valley State University Recreational Therapy students and alumni and utilizes existing literature on the benefits and drawbacks of internships. Internships, regardless of being paid or unpaid, are becoming a common ground for stepping onto the next career path among college students (Rothschild, 2020). Both unpaid and paid internships can benefit or hurt the student in various ways. The existing literature conflicts on which type of internship is more beneficial. However, there is currently no research on the impact of internships on Recreational Therapy in particular. This study intends to expand this research into the Therapeutic Recreation field.

VIRTUAL SYMPOSIUM 558

The Benefits of Therapeutic Use of Dance Movement on Individuals with Alzheimer's Disease

Presenter: Emily Wilson

Mentor: Dawn De Vries

The aim of this presentation is to explore the potential of dance interventions to improve the overall well-being of older adults with cognitive impairments. Several studies on the outcomes of therapeutic dance were reviewed. The outcomes of these studies revealed many positive benefits of different types of dance for older adults with cognitive impairments.

VIRTUAL SYMPOSIUM 559

Benefits of Adventure Therapy on Emotional/Social Skills with Youth at Risk

Presenter: Haylee Ray

Mentor: Dawn De Vries

This presentation will look at the benefits of Adventure Therapy and the outcomes for youth at risk specifically. Adventure Therapy is an emerging option for mental health treatment practices that can have benefits on social and emotional aspects of the lives of young adults within their community and family interactions.

VIRTUAL SYMPOSIUM 560

Therapeutic Use of Arts for the Treatment of Those with Eating Disorders

Presenters: Emma Andrus, Lexie Bays, Jennifer Hunt, Isabelle McConkey

Mentor: Dawn De Vries

We will be assessing the many effects of the therapeutic use of the arts for individuals with eating disorders. Through our research, we hope to find the most effective methods to help treat eating disorders.

VIRTUAL SYMPOSIUM 561

Girl Scout Voices Count (GSVC): 2020-2021 Girl and Parent Surveys

Presenters: Jonathan Korte, Sophie Mikonczyk, Sullivan Russ

Mentor: Sango Otieno

This project pertains to the Girl Scouts of Michigan Shore to Shore (GSMISTS). The goals of the project are to identify what areas of work within Girls Scouts are successful as well as identifying where the organization needs to improve. It is of importance to GSMISTS to know how to both better improve their internal efficiency and advertise

their success to others. This project includes analysis of data collected through surveys conducted by GSMISTS during 2020 and 2021. Each year girls and parents are invited to participate in a different survey. All reported findings are based on the responses to the four surveys. Of particular interest to GSMISTS were Kent, Ottawa, Muskegon and Oceana counties on which there will be a focus in research and analyses. This project is part of the STA 419 course designed to provide experience in statistical consulting, manipulating data, applying the appropriate statistical technique for a given situation and communicating the findings in clear terms.

VIRTUAL SYMPOSIUM 562

Medical Laboratory Sciences Student Performance and Satisfaction for Traditional Courses Versus Online/Hybrid Courses

Presenters: Adrian Deychakiwsky, Andrew Hodge, Nathan Roesler

Mentors: Lilianne Nelson, Sango Otieno

Student performance data measured by exams, lab practicals and quizzes is analyzed, as well as student satisfaction measured using a questionnaire for MLS 370. Using SAS/R, two course delivery methods (traditional vs online/hybrid) are compared. This analysis will help instructors determine how to improve the delivery of course material, as well as provide suggestions on how to increase their student's fulfillment and success relative based on the method of delivery. This analysis is part of STA 419, a course designed to give students experience with methods of consulting and increase their fluency in working through data and relaying their findings.

VIRTUAL SYMPOSIUM 563

Health and Medicine as Social Sciences

Presenter: Grace McMahon

Mentor: Anna White

This project was cultivated as a part of the GVSU Library Summer Scholars Program to create an interactive resource for students interested in medicine that evaluated the impact of relationships, training & education, lived experiences, and community on patient wellness. The final form is the LibGuide, Health & Medicine as Social Sciences. The majority of this project was conducted through analysis of journal articles and peer reviewed papers which were then translated to the LibGuide format through text, links, and summaries. It further grew to include videos, graphics, and book suggestions to incorporate broad inclusion for various learning formats. The result of this project is a complete LibGuide serving as a live resource to students that includes a home page and highlights the following topics: Patient Care, Interactions in Medicine, Creating Healthy Communities, Minorities and Medicine, and information for Patients and Providers.

VIRTUAL SYMPOSIUM 564

Post-Removal from the Great Lakes Area of Concern List: A Study of White Lake

Presenter: Rylie Dorman

Mentor: Amanda Buday

In 2014, White Lake was removed as a Great Lakes Area of Concern (AOC) as defined by the Environmental Protection Agency's U.S.-Canada Great Lakes Water Quality Agreement. Since being delisted, little research has been done on how the AOC process influences residents' relationship with a historically polluted lake. This study acquired data on White Lake via a survey sent to a random sample of 1200 residents within the White Lake/White River Watershed and sought to gauge how different belief systems influence people's relationship with their

environment. This analysis focuses on two different belief systems, environmental values and place attachment. Results of this study suggest that assessments of restored waterways may be driven by ideology.

VIRTUAL SYMPOSIUM 565

Women Spies During the Civil War

Presenter: Abigael Noffert

Mentor: Nora Salas

During the Civil War, the lives of women drastically changed just as much as they did for men. While men had to go fight the war, women had to not only take care of their households and families, but in some cases get a wage-earning job. Some women, however, did not have to take on those kinds of responsibilities and helped the war effort in a different manner. Many women fought the war as spies. Women spies were able to convey messages to generals like troop movements and numbers. The poster will highlight 3 influential women: Rose O'Neal Greenhow, Belle Boyd, and Harriet Tubman.

VIRTUAL SYMPOSIUM 566

Female Spies During the Civil War

Presenter: Audrey Medaugh

Mentor: Nora Salas

My presentation will be focused on female spies during the Civil War and their impact as women in history. I plan on first giving a generic insight into the different roles female spies would play as well as who the majority of these spies fought for. It will consist of then more specific events and occurrences in United States history that these women were a part of. Specifically, I will give brief introductions of who these women were and how their historical legacy is still relevant to our country today. By using images along with textual analysis of primary and scholarly sources. My presentation will explain the significance of female spies in the Civil War.

VIRTUAL SYMPOSIUM 567

Girl Scout Voices Count (GSVC) Through Troop Leader and Volunteer 2020-2021 Surveys

Presenters: Robert Bilyk, Nathan Jenks, Alexa Kraklau

Mentor: Sango Otieno

The purpose of this project is to provide an analysis of survey data for the Girl Scouts of Michigan Shore to Shore (GSMISTS). The goal overall is to find improvements for the organization using key performance indicators as well as assess the impact of COVID-19. The survey data was collected from two separate surveys distributed to troop leaders and volunteers during 2020 and 2021. 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, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 568

Michigan Department of Natural Resources 2020 and 2021 Visitor Survey Data Summary

and Analysis

Presenters: Kaj Hjelm, Jasmine Lassin, Clara Voetberg

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. In 2020, the survey was sent to 255,062 visitors, and 16,319 responded, while in 2021, the survey was sent to 341,388 visitors and 49,527 responded. Using the data we examined the voices of the visitors to identify areas that DNR needs to pay closer attention to and to amend current policy. This project is part of the STA419 course which is designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 570

Education Course Feedback from Fall 2017 to Fall 2021

Presenters: Jacob Garland, Micah McFarlane, Delaney Rutgers

Mentors: Sango Otieno, Suzanne Richards

Laker Impressions of Faculty Teaching (LIFT) evaluations are emailed to Grand Valley State students towards the end of their course. These evaluations are composed of student ratings of the course as well as open ended responses from fall 2017 until fall 2021. Using SAS, we analyze the response rates and scores over time by course type, and also examine the open response answers for trends in the instructor's performance over time. The findings will help inform the course instructor of potential areas that need improvement as well as inform on the impact of COVID-19. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 571

Intervention Approach for a Concomitant Stuttering and Articulation Disorder

Presenter: Ellianne Martin

Mentor: Cara Singer

Speech language pathologists have reported a need for additional research regarding intervention for children who stutter (Unicomb, 2013). Some children who stutter also exhibit a concomitant speech sound disorder, which further impacts the child's communication and often results in further uncertainties about the most beneficial treatment approach. Motivated by a preschool-aged child with concomitant articulation (i.e., lisp) and a stuttering disorder, a literature review was conducted to evaluate the present literature regarding treatment for children with concomitant lisps and stuttering disorders. Results are expected to yield treatment recommendations for working with this population.

VIRTUAL SYMPOSIUM 572

The Effect of Caffeine and Exercise on Cognitive Performance

Presenter: Carissa Mitchell

Mentor: Matthew Feedback

The majority of college-aged students are sleep deprived, and to combat sleepiness, 72% consume caffeine.

Previous studies show that habitual caffeine use is associated with numerous negative side effects. If exercise has comparable arousing effects as caffeine, and improves cognitive performance, exercise may be used in place of caffeine. The purpose of this study was to evaluate the effects of caffeine and exercise on cognitive performance. In this study, nine participants went through two days of testing. Participants were randomly assigned to one of three groups - control, caffeine, and exercise. Trail Making Tests were administered to evaluate cognitive function before and after intervention. Results indicated that individuals who exercised had a 17% improvement in cognitive performance compared to the caffeine group. Exercise serves as a healthy alternative to caffeine, and should be used in place of caffeine to enhance cognition.

VIRTUAL SYMPOSIUM 574

The Burden of Human Papilloma Virus-Related Cancers Among Native Americans and Alaska Natives

Presenter: Nora Walker

Mentor: Sarah Nechuta

HPV is one of the most common sexually transmitted infections. Untreated HPV is the cause of cervical cancer and several types of oropharyngeal cancer. Currently, the American Indian and Alaska Native (AI/AN) community is shown to have higher rates of cancer compared to the non-Hispanic white population. With little research being conducted among AI/ANs, we investigated trends among HPV-related cancer incidence and mortality, vaccination, and screening rates for the AI/AN community in Michigan (MI). We also examined HPV-related cancer incidence among the U.S. population in comparison to MI. Secondary data from multiple sources were used and SAS and SEER*Stat were utilized to analyze the trends and generate descriptive statistics. A decrease in cervical MI cancer mortality rates was found from 1990-2018, however no change was found in cervical cancer incidence rates. Further research is needed to measure the association between HPV-related cancer rates among the AI/AN community.

VIRTUAL SYMPOSIUM 575

What are the Eating Habits of GVSU Students Like?

Presenters: Virginia Berger, Abby Ditmar, Caeley Smith

Mentor: Hsiao-ping Chen

This is a group research project in which a survey was sent out to Grand Valley State University students asking them about their eating habits. The responses from the survey were then collected and analyzed. Then the data insights including patterns and trends were put into a cohesive presentation.

VIRTUAL SYMPOSIUM 576

Neonatal Abstinence Syndrome Surveillance Definitions in Indiana from 2017 to 2020: A Statewide Hospital Discharge Data Analysis

Presenter: Danielle Siwula

Mentor: Sarah Nechuta

Introduction: Neonatal abstinence syndrome (NAS) is a condition where a fetus is exposed to drugs in utero and undergoes withdrawal symptoms after birth. This project discusses NAS trends in Indiana by using ICD-10-CM codes and examine surveillance definitions of NAS.

Methods: This study utilized hospital discharge data from the state of Indiana from 2017 to 2020. Eligible infants were admitted to an Indiana hospital within 30 days of birth and had no missing data (n=236,139). A logistic regression analysis was performed.

Results: From 2017 to 2020, there were 2,307 infants with NAS born in Indiana. Infants diagnosed with NAS were mostly non-Hispanic white (92.20%) and used Medicaid as their primary payment source (78.33%).

Conclusion: If NAS is not diagnosed correctly, public health professionals cannot gauge the burden of NAS or provide adequate resources for mothers and infants. Considering existing health disparities will be important for future surveillance efforts.

VIRTUAL SYMPOSIUM 577

Prostitution in the American West, 1840-1900

Presenter: Loraellen Hilborn

Mentor: Nora Salas

Women who braved the American "Wild West" faced extraordinary difficulties in the pursuit of economic and societal betterment, and due to this, many turned to prostitution. As prostitutes, these women lived as outcasts in society, and as with many outcast groups, did not leave behind much in the way of credible sources. Through careful dissection of what sources are available, the origins and motivations of female prostitutes on the frontier became known, but there is still question as to the standard of living these women experienced, societal reactions to their presence, and the degree to which their profession helped to build the American West. Building on previous research, this project will attempt to answer the question, "What role did prostitution play in shaping the American West?"

VIRTUAL SYMPOSIUM 578

Title IX and Women's Sports

Presenter: Grace Buckley

Mentor: Nora Salas

Title IX is a policy that prohibits sex-based discrimination and outlines the acceptable treatment for any education program that receives federal funding. This project will summarize Title IX's policy and specifically focus on collegiate and professional women's sports adherence to the policy. Adequate compliance will be assessed through women's participation in sports, their access to adequate resources, and schools' response to sexual harassment. This project aims to view women's experience in sports both during the mid-twentieth century before Title IX and into the modern age after Title IX was implemented. This project will use court hearings, statistical evidence, media coverage, personal testimonies, and surveys to evaluate the topic.

VIRTUAL SYMPOSIUM 579

Issue Box: Building Empathy and Compassion Through Contemporary Art Practice of Pedro Reyes' Work

Presenters: Saidee Beahan, Lauren Hubbuch

Mentor: Hsiao-ping Chen

Artists have researched different issues to bring knowledge to the viewer of what's happening in our world. The art project was developed based on social topics and community issues, based on the work "Atlas for Civic

Innovation” by Pedro Reyes. Reyes is an installation and sculpture artist from Mexico City whose works are known for incorporating elements of play and compassion through interaction with the audience. Reyes’ Atlas for Civic Innovation project consists of several portable boxes containing a variety of colorful graphic posters depicting initiatives that have been used around the world to improve living conditions and society as a whole. By incorporating Reyes’ thematic, research-driven processes and artmaking strategies, the issue-box project aims to address social issues and build compassion through artistic practice that invites the audience to learn about the issues portrayed in the box designed to inspire changes in our world.

VIRTUAL SYMPOSIUM 580

The Association Between Dental Topographic Metrics and Diet Preferences Of A Mammalian Guild In The Mindanao Community

Presenter: Hyun Jin Lee

Mentor: Laura Stroik

Paleontologists use the diet-dentition relationship of living mammals to study the ecological adaptations of extinct mammals. Dietary reconstruction is possible due to molar form-function relationship, as the molar shape is highly correlated with the mechanical properties of food. This study builds on past studies on diet reconstruction of primates by increasing the range of species on which to test the homology-free nature of dental topographic analysis and its efficacy in determining diet-dentition relationships. In this study, the dental topographic measures of relief index (RFI), Dirichlet normal energy (DNE), and orientation patch count rotated (OPCR) were calculated from the second mandibular molars of the mammalian guild in the Mindanao, Philippines community. Results indicated higher RFI, DNE, and OPCR values in species whose diets include more mechanically demanding foods. In addition, RFI and DNE had the strongest relationship with diet regime, while OPCR had the weakest.

VIRTUAL SYMPOSIUM 581

Effects of Warming on Pollination in the High Tundra

Presenter: Nina Gropp

Mentor: Robert Hollister

As the world has warmed, the Arctic has warmed three times faster. Plant responses to climate change have included earlier phenological development and increased reproductive effort which may impact ecological relationships, including pollination. To better understand plant-pollinator interactions, 60 visitor watches were conducted during the summer of 2021 at Utqiagvik, Alaska. Observations were carried out on both control and experimentally warmed plots. During each observation, flowering plant species, insect landings, and insects present were recorded. Pollinator visits were on average greater in the warmed plots and generally occurred more frequently at higher air temperatures. These findings suggest that pollinators and their activity may change as the Arctic continues to warm. Continuing to collect pollinator observations will give a better understanding of how ecological relationships may change as the region warms.

VIRTUAL SYMPOSIUM 582

Analyzing Characteristics of Popular Songs

Presenters: Keana Ilagan, Alyssa Koza, Kelsey Tedford

Mentors: Feryal Alayont, Lora Bailey

What defines a popular pop song? Is it the chords in the bridge, the verse, or the chorus? Is it the lyrics? Or the

length of the song? We will analyze the most streamed and downloaded pop songs utilizing Billboard data to identify what characteristics are shared amongst them. In our work, we focus on the data from 2000 to the present to discover current trends. In this presentation, we will report on our results.

VIRTUAL SYMPOSIUM 583

The Relationship between Emotion and Transformation: Through Emotion Necklace

Presenters: Hanna Ford, Karly Thomas

Mentor: Hsiao-ping Chen

This presentation is about the artist Janine Antoni and how a K-12 teacher can incorporate her themes of personal, emotional, and physical connections into a Unit lesson Plan. The lesson touches on the Big Idea of emotion and the key concept of transformation through students' construction of "Emotion Necklaces." This is done through intertwining personal objects as well as found objects like bottle caps, key chains, buttons, and more onto the stringed necklace. By using symbols of emotion through color use, pattern, and design it will convey an emotional transformation within the necklace. This artmaking activity is inspired by Janine Antoni's artwork titled, Moor, a 78-meter rope of transformed personal and familial objects that have emotional value to her. When given this Unit lesson, students were able to convey emotions in their own creative ways in the same way Antoni does in her art piece, Moor with the Emotion Necklace.

VIRTUAL SYMPOSIUM 587

AAT and Childhood Behavioral Disorders

Presenter: Shannon Fitzgibbon

Mentor: Dawn De Vries

This will be a comprehensive literature review of the evidence supporting the implementation of Animal Assisted Interventions among children and adolescents with behavioral disorders such as conduct disorder, reactive attachment disorder, oppositional defiant disorder, and more.

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Medaugh, Audrey	Student
Meriweather, Rachel	Student
Meyer, Sydney	Student
Mikonczyk, Sophie	Student
Miller, Chad	Student
Miller, Emma	Student
Miller, Grace	Student
Miller, Madison	Student
Miloser, Payton	Student
Milton, Lindsay	Student
Minnebo, Lillian	Student
Mitchell, Carissa	Student
Mocherman, Logan	Student
Montgomery, Jessica	Student
Moore, Carlin	Student
Moore, Jane	Student
Moran, Katherine	Mentor
Morgan, Carolyn	Student
Morgan, Kelly	Student
Morison, Melissa	Mentor
Mshar, Hannah	Student

N

Nalam, Pranav	Student
Near, Lucille	Student
Nechuta, Sarah	Mentor
Nelson, Lilianne	Mentor
Nelson, Sophia	Student
Newman, Luke	Student
Nichols, Jacy	Student
Niederer, Madison	Student
Niessink, Abby	Student
Noffert, Abigael	Student
Noteboom, Jonathon	Student
Nunez, Nicole	Student

O

O'Leary, Erin	Student
O'Connor, Mikaela	Student
Ockerman, Seth	Student
Okros, Grace	Student
Olen, Tara	Student
Olenick, Madilynn	Student
Osborn, Sid	Student
Otieno, Sango	Mentor

P

Partridge, Charlyn	Mentor
Payton, MacKenzie	Student
Pellizzari, Michael	Student
Pentecost, Thomas	Mentor
Perris, Jennifer	Student
Perry, Kaitlyn	Student
Peterson, Alycia	Student
Peterson, Ginny	Mentor
Petrosky, Jacob	Student
Petz, Collin	Student
Phelps, Lauren	Student
Piasecki, Emma	Student
Polaski, Steven	Student
Poliak, Samantha	Student
Pollick, Kendra	Student
Pope, Ian	Student
Powers, Esabella	Student
Powers, Rachel	Mentor
Price, Natalie	Student
Prohaska, Jenna	Student
Pung, Christopher	Mentor

Q

R

Ramsson, Eric	Mentor
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Rankinen, Wil	Mentor
Rausch, Drew	Student
Ray, Haylee	Student
Reed, Chris	Mentor
Renkema, Kristin	Mentor
Reynolds, Bryce	Student
Richards, Suzanne	Mentor
Richiert, Dawn	Mentor
Richmond, Alexander	Student
Riemersma, Peter	Mentor
Rodriguez, Stella	Student
Roesler, Nathan	Student
Romanski, Allison	Student
Rozich, Maci	Student
Rupinski, Leigh	Mentor
Russ, Lex	Student
Russ, Sullivan	Student
Russell, Greg	Student
Rutgers, Delaney	Student
Ryan, William	Mentor

S

Salam, Shireen	Student
Salas, Nora	Mentor
Sands, Georgia	Student
Sango, Tumaini	Student
Sarnacki, Cazmir	Student
Sawertailo, Kathrine	Student
Schafer, Hannah	Student
Schena, Nicholas	Student
Schmidt, Lindsey	Student
Schultz, Laura	Student
Schultz, Yazmine	Student
Schultz, Zoe	Student
Schwartz, Mark	Mentor
Sciaky, Sarah	Student
Seibert, Emilie	Student
Seim, Zachary	Student

Shabani, Shkelzen	Mentor
Shadab, Kari	Student
Shattuck, Allison	Student
Shelnick, Nathan	Student
Siebert, Melanie	Student
Sieczka, Dallas	Student
Sielaff, Lizzy	Student
Singer, Cara	Mentor
Siriano, Emily	Student
Siwula, Danielle	Student
Smielewski, Lucas	Student
Smith, Caeley	Student
Smith, Grace	Student
Smith, Jillian	Student
Snyder, Eric	Mentor
Sobetski, Mark	Student
Sokolow, Natasha	Student
Sonke, Lisa	Student
Soos, Daisy	Student
Spencer, Erin	Student
Spindler, Alexander	Student
Spiteri, Brent	Student
Spoelstra, Sandra	Mentor
Stairs, Joanna	Student
Stamper, Korey	Student
Staves, Mark	Mentor
Stefanou, Michael	Student
Stephenson, Paul	Mentor
Sterling, Stella	Student
Sterlini, Kianna	Student
Stoops, Carly	Student
Strode, Nicole	Student
Stroik, Laura	Mentor
Stuhldreier, John	Student
Suehr, Matthew	Student
Sutherland, Evan	Student
Symons, BN	Student
Szydlowski, Hanna	Student

T

Tafel, Heather	Mentor
Tallman, Melissa	Mentor
Tallon, Darby	Student
Taylor, Madeline	Student
Tedford, Kelsey	Student
Teft, Miriam	Mentor
Terkar, Shweta Dnyaneshwar	Student
Thaler, Levi	Student
Thomas, Derek	Mentor
Thomas, Derek	Mentor
Thomas, Karly	Student
Thomas, Shelby	Student
Thompson, Anthony	Mentor
Thompson, Connor	Student
Thompson, Cynthia	Mentor
Tikkanen, Zane	Student
Tiongson, Emma	Student
Tonello, Derek	Student
Toren, Dana	Student
Tower, Brandon	Student
Trefftz, Christian	Mentor
Trierweiler, Joshua	Student
Tunnell, Marc	Student
Tuttle, Lydia	Student

U

V

Valdes Flores, Andrea	Student
Vales, Ethan	Student
VanDyke, Eli	Student
VandenPlas, Jessica	Mentor
Vann, Christina	Student
Vigh, Beckett	Student
Villanueva, Isabelle	Student
Voetberg, Clara	Student

W

Waite, Madelline	Student
Walker, Darcy	Student
Walker, Nora	Student
Walker, Zachary	Student
Wallace, Nichole	Student
Wallar, Bradley	Mentor
Walsh, Benjamin	Mentor
Walters, Zane	Student
Wampler, Peter	Mentor
Washington, Alyssa	Student
Webster, Brendan	Student
Weinberger, Madeline	Student
Werner, Robert	Mentor
Westerbeek, Hailey	Student
White, Anna	Mentor
Wicker, Jagger	Student
Wiencek, Erica	Student
Williams, Anna	Student
Williams, Todd	Mentor
Willson, Maggie	Student
Wilson, Emily	Student
Wilson, Griffin	Student
Winchester, Arly	Student
Winchester, Randy	Mentor
Winkelstern, Ian	Mentor
Wolfe, Michael	Mentor
Woods, Amanda	Student
Woodwyk, Seth	Student

X

Y

Z

Zettle-Sterling, Renee	Mentor
Ziebarth, Alexandra	Student

Zielinski, Paige
Zylman, Hannah

Student
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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