
24TH ANNUAL
STUDENT SCHOLARS DAY
GRAND VALLEY STATE UNIVERSITY
APRIL 8, 2020
COMMUNITY
INCLUSIVENESS
SUSTAINABILITY
EXCELLENCE
INTEGRITY
INNOVATION
Kristin Donnelly '19

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SSD Committee

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Leifa Mayers	Women, Gender, and Sexuality Studies
Susan Mendoza	Office of Undergraduate Research and Scholarship
Debbie Morrow	Library
Ross Reynolds	Physics
Michael Scantlebury	Hospitality and Tourism Management
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Richard Vallery	Physics
Todd Williams	Psychology

Welcome to Student Scholars Day 2020!

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 24th year, Student Scholars Day adapted to a virtual world, where COVID-19 posed a challenge for our large, in-person event. Prior to the March shutdown, SSD registration had just closed and we had over 380 presentations scheduled. The OURS Team adjusted the event by asking our presenters to choose an online presentation method, be that through BlackBoard Collaborate, YouTube, Zoom, etc. Because of the challenges in finishing research projects in an online environment, some presenters cancelled or postponed disseminating their work until 2021. Some presenters chose synchronous presentations or sharing their work via asynchronous presentations on ScholarWorks, a service of the Grand Valley State University Libraries. Those presentations can be found at https://scholarworks.gvsu.edu/studentscholarsday. Any presentation that is shared on ScholarWorks has a direct link provided with the abstract within this book.

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 virtually on the day. 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, Danielle Uribe, Emily Morrison, Keaton Ruppert, and LaMaiya Wright who made this process manageable and enjoyable. We thank the members of the 2020 SSD committee, Feryal Alayont, Alice Chapman, Elizabeth Flandreau, Lauren Keough, Andrew Lantz, Vinicius Lima, 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.

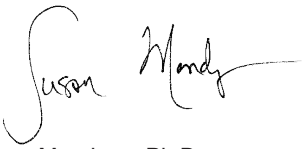
Once again, our deepest gratitude goes to Dan Slaughter for all of his work in the web registration for SSD, and especially for his help this year in transitioning our event to be virtual.

Thank you to Kristin Donnelly 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. Kristin'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, Office of Undergraduate Research & Scholarship
Center for Undergraduate Scholar Engagement

Schedule of Events

Poster Presentations
9:00 a.m. – 5:00 p.m.
See page 12 for detailed schedule.

Oral Presentations
9:00 a.m. - 5:00 p.m.
See page 45 for detailed schedule.

Sessions
9:00 a.m. – 5:00 p.m.
See page 55 for detailed schedule.

Exhibition of Art
9:00 a.m. – 5:00 p.m.
See page 57 for detailed schedule.

Statement from the Cover Artist

Kristin Donnelly

I chose to illustrate the famous Clock Tower because I feel that it is a Grand Valley staple structure. I then incorporated Grand Valley's core values into the leaves that I drew because Student Scholar Day is meant to capture the Scholarship, Research, and Creativity Grand Valley puts forward in it's students. I decided to do this design because I feel like it really incorporates Grand Valley's mission to educate students for school as well as life after our education.

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

Beckman Scholars Program at GVSU

Funded by the Arnold and Mabel Beckman Foundation

The summer of 2019 saw GVSU's third cohort of Beckman Scholars. GVSU is one of eleven institutions nationwide selected to receive the 2017 Beckman Scholars Program award.

The purpose of the Beckman Scholars Program (BSP) is to provide an in-depth, sustained undergraduate research experience for exceptionally talented, full-time undergraduate students at US colleges and universities. The BSP provides funding and support for a student and mentor to conduct sustained research over two consecutive summers and one academic year of research.

The Beckman Scholars Program (BSP) at Grand Valley State University (GVSU) is designed to support and develop exceptional undergraduate research students in either chemistry, biology, biochemistry, cell and molecular biology, or biomedical sciences. Success in the sciences requires a honed research skill-set, exceptional academic performance, and the mindset of a research scientist. BSP at GVSU prepares undergraduate students for graduate study and research through each aspect of the program from application to completion. The program offers three components to develop and support Beckman Scholars: 1) a rigorous research apprenticeship, 2) an interdisciplinary mentoring team, and 3) exposure to diverse narratives of success.

The 2019 Beckman Scholar presenting at this year's SSD is Isabel Thompson. *More information about the program can be found at www.gvsu.edu/ours/ssp*

TRiO Ronald E. McNair Scholars

Post-Baccalaureate Achievement Program

The McNair Scholars Program is designed to prepare highly talented undergraduates to pursue doctoral degrees and to increase the number of individuals (from target groups) on college and university faculties.

The McNair Scholars are highly talented undergraduate students whose parents have no 4-year college degree and are low-income, or groups underrepresented at the graduate level for doctoral studies. The program accepts students from all disciplines.

The McNair Scholars receive academic counseling, advising, and GRE preparation. In addition, they are matched with a Ph.D. faculty mentor to conduct research and attend a McNair research conference to present their findings. In the first semester of their senior year, the scholars receive assistance with the graduate school application process.

McNair Scholars is a TRiO program funded through the United States Department of Education and Grand Valley State University.

The 2019 McNair Scholars, many of whom are presenting at this year's SSD, include:

Jessica Avalos, Helen Bahlbi, Kyezie Bwanangela, Gabriella Davis, Trevor Ditmar, Nicholas Layman, Alexander Perez, Hannah Pierson, Violet Ruiz, Austin VanDenTop, and Jazmine Vasquez.

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

Highlights of OURS Programs (cont.)

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 is geared toward lower division students and first year transfer students. It provides 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 2019 Student Summer Scholars presenting at this year's SSD include:

Piper Burghduf, Nicholas Busby, Evangalene Dreyer, Micah Fernando, Alex Florian, Brady Fritz, Lauren Gapp, Lauren Gerritsen, Joel Hill, Julia Jesko, Grayson Kosak, Curtis Mack, Karissa McFarlane, Lauren Miling, Tanner Napierala, Maxwell Okros, Erin Reasoner, Jack Tietema, Maia Wichman, and Brynn Wilfong.

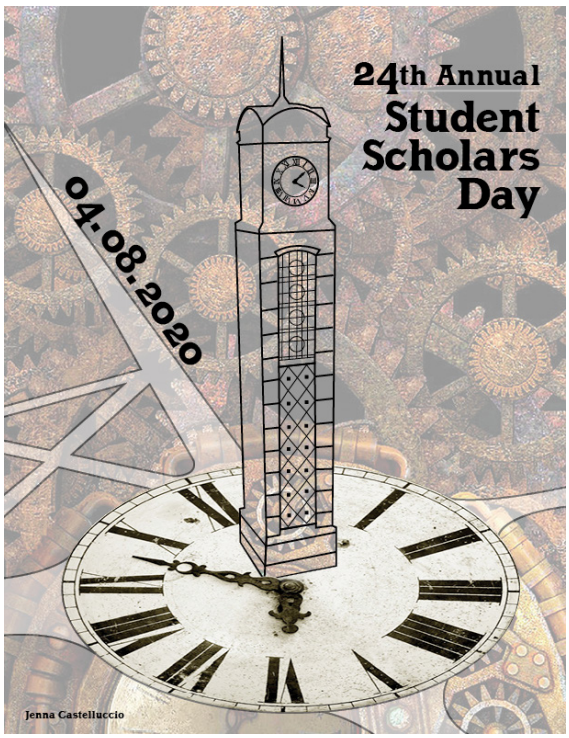
More information about the program can be found at www.gvsu.edu/ours/ssp

Highlights of Student Work
Student Scholars Day Abstract Book Cover

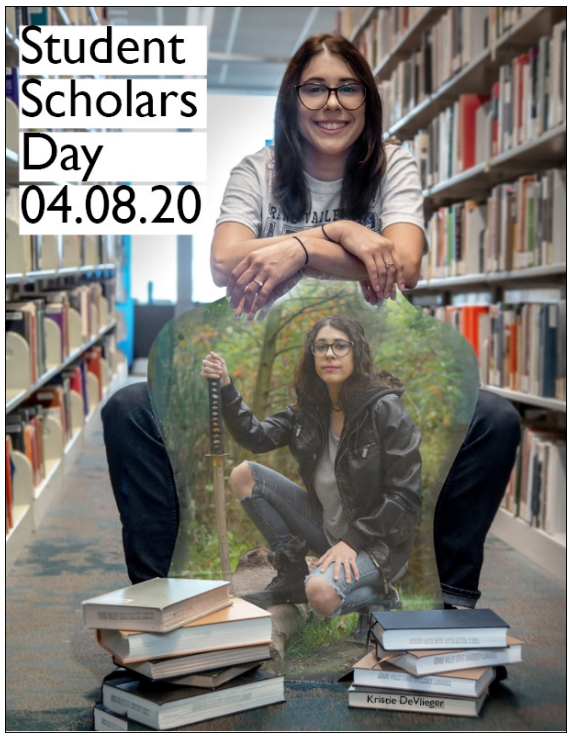
Each year, the Office of Undergraduate Research and Scholarship hosts a competition for artwork to be featured on the Student Scholars Day abstract book cover. All GVSU students are eligible to participate in the competition.

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.

Jenna Castelluccio
Cover Design



Kristie DeVlieger
Journey



Madeline Gingerich
Cover Design

Lauren Weimer
Cover Design

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
Beckman Scholars Program at Grand Valley State University (BSP at GVSU)
GVSU Library Scholars Summer Program
GVSU McNair Scholars Program
P. Douglas Kindschi Undergraduate Research Fellowship in the Sciences
Student Summer Scholars (S3)/Modified Student Smmer Scholars (MS3)

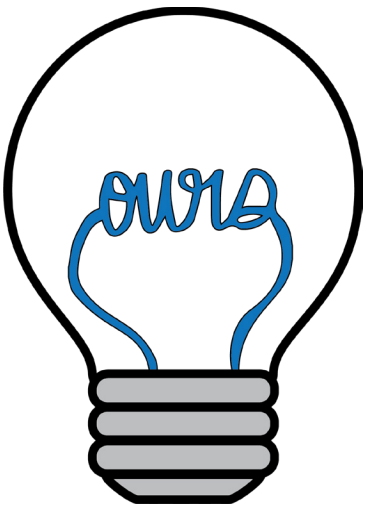
Research Support & Recognition

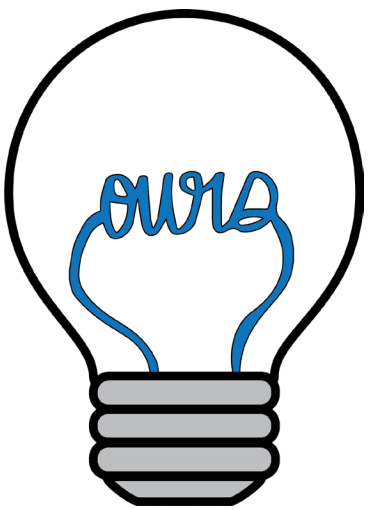
Academic Conference Fund (ACF)
Academic and Professional Enrichment Fund (APEF)
OURS Project Supplies Grant
Supplementary Research Support for Faculty
GVSU Undergraduate Research/Creative Scholar Transcript Designation
Undergraduate Research Assistants Program (URA)

Outreach Programs & Events

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

GET YOUR
GEEK ON





GET YOUR
GEEK ON

Poster Presentations, Abstracts & Schedule

HENRY HALL ATRIUM 001: https://scholarworks.gvsu.edu/ssd_posters/10

Love it or List it: Enclosure Alterations Affect Behavior of Canada Lynx at John Ball Zoo

Participants attending 3:00 PM - 4:00 PM
Presenters: Hailee Cederquist, Chelsea Clark
Mentor: Jodee Hunt

Environmental variables influence animal behavior, and routines of captive animals often alter when individuals are moved between zoos, their social group changed, or enclosure altered. In 2018, two Canada lynx were introduced to John Ball Zoo, then their exhibit subsequently modified in 2019. We used scan sampling with ZooMonitor to quantify behaviors and enclosure use of individuals every 30 sec in 30 minute bouts of sampling, comparing patterns in 2018 and 2019. Both cats used inconspicuous resting sites extensively, but the specific sites changed from 2018 to 2019. The male's daily activities changed little, incorporating the same locomotion paths both years. The female was more active in 2019 than 2018, but sought resting sites above visitors both years. Overall, both cats sought sites hidden by vegetation in 2018, but adjusted to its removal in 2019.

HENRY HALL ATRIUM 002: https://scholarworks.gvsu.edu/ssd_posters/6

White Saviorism and American Imperialism: An Analysis of the Peace Corps

Participants attending 9:00 AM - 10:00 AM
Presenter: Madison Svoboda
Mentor: Leifa Mayers

My research is focused on the Peace Corps, specifically looking at the experiences of volunteers in order to see how they are reinforcing and/or resisting white saviorism and American imperialism. I used an intersectional approach in order to understand how the experiences of volunteers are shaped by racial and national relations of power. I have used discourse analysis to analyze blogs made by Peace Corps volunteers in order to see if narratives of the US needing to save the world and spreading American values were present. My preliminary findings suggest that many PCVs are critically examining their work as volunteers, while others are continuing to perpetuate attitudes of Americans needing to help poor people in Africa and American superiority over other countries. This research is significant in understanding how volunteers may be unwittingly reproducing ideas that American volunteers are needed in other countries.

HENRY HALL ATRIUM 004

Using Protein Knockdown to Observe Loss of Function Phenotype of p53 in *Drosophila melanogaster*

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Mikaela Berg
Mentor: Georgette Sass

Loss of function mutations in the p53 gene are frequently associated with a wide variety of cancers and the critical role p53 protein plays in cell cycle progression has led to its description as the Guardian of the Genome. The role of p53 in cell cycle regulation occurring during developmental processes in *Drosophila melanogaster* will be examined using genetic techniques to knockdown either the p53 RNAi or the p53 protein. Currently, we know

some functional properties that p53 plays on imaginal disks in normal and in overexpressed circumstances on the imaginal disks. Imaginal discs are structures found in larval stages of insects that undergo rapid metamorphosis. The goal is to find and create novel phenotypes associated with loss of function of this protein in imaginal discs. In order to visualize this, experiment the use of Epi-Fluorescent Microscopy and Confocal Microscopy will be vital to our characterization.

HENRY HALL ATRIUM 013

A Global Team Approach to Advancing the Practice Doctorate in Nursing

Participants attending 1:00 PM - 2:00 PM
Presenter: Elizabeth Pohl
Mentor: Dianne Conrad

Given the complexities of healthcare today, advanced nursing practice leaders are needed to address person-centered and system issues in care delivery. The purpose of this presentation is to describe a global team's efforts to engage international partners in identification of specific geographic healthcare needs, with the potential for development of practice-focused doctorate nursing leaders. An innovative project approach was used with U.S., Irish, and Saudi Arabian nursing faculty scholars to address advanced nursing practice that included assessment of current national trends in policy, education, practice, and development of recommendations for advance nursing practice while respecting cultural diversity. The presentation will describe the team's efforts to foster global networking, collaboration, and sharing of expertise with international partnerships.

HENRY HALL ATRIUM 018: https://scholarworks.gvsu.edu/ssd_posters/40

Structural and Functional Characterization of New Clinically Relevant Enzymes Involved in Antibiotic Resistance

Participants attending 2:00 PM - 3:00 PM
Presenter: Micah Fernando
Mentor: Bradley Wallar

Resistance to β-lactam drugs such as penicillins and cephalosporins has become a worldwide health problem. The World Health Organization has listed multi-drug resistant *Acinetobacter baumannii* as requiring "top priority for new antibiotic development." Such antibiotic resistance derives primarily from β-lactamases, including *Acinetobacter*-derived cephalosporinase (ADC), which bind and destroy antibiotics. A recent study of clinical *A. baumannii* infections identified the most prevalent ADC β-lactamases conveying antibiotic resistance. This research study seeks to determine the structure and function of two clinical ADC variants: ADC-30 and ADC-162. Using X-ray crystallography and enzyme kinetics, we aim to relate the small changes in structure to their enhanced ability to turn over antibiotics. Characterizing the structure and function of clinical ADC variants will be critical to developing molecules that could inhibit ADCs, thereby restoring antibiotic effectiveness.

HENRY HALL ATRIUM 021

Determining the Mechanism of Histamine Action in the Post-mating Response of *Drosophila* Females

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenters: Georgie Blake, Lauren Gerritsen, Erika Spafford, Paige Zielinski
Mentor: Martin Burg

Histamine has been studied as a neurotransmitter in *Drosophila* and is required for a number of nervous system functions. Histamine has recently been localized outside of the nervous system, in the male accessory gland (fly prostate). Histamine was localized to secondary cells in these glands, shown to be required for a number of female post-mating responses (PMRs). Elimination of secondary cells disrupts several PMRs such as egg laying, sperm viability and female receptivity to male courtship advances. To determine whether histamine signaling drives female-specific PMRs, wild-type females were mated with normal, *Hdc* mutant males lacking histamine, or *ort* mutant males bearing a disrupted histamine receptor. Results indicate that disruption of histamine synthesis in males interferes with the PMR of female receptivity. This work demonstrates that histamine functions in tissues outside of the nervous system and appears to be necessary for normal post-copulatory behavior in female flies.

HENRY HALL ATRIUM 022: https://scholarworks.gvsu.edu/ssd_posters/29

Recruitment Strategies for Cognitively Impaired Older Adults in Assisted Living Communities

Participants attending 9:00 AM - 10:00 AM
Presenters: Paige Greer, Elizabeth Hill, Katelyn Ware
Mentor: Rebecca Davis

It is well documented that recruiting persons with dementia for research in long term care settings is challenging (Lam, et. al. 2018). The purpose of this study is to explore recruitment techniques suggested by the National Institute on Aging (2018), including the use of brochures, community contact introductions (CCI), presentations, event tables, 1:1 interactions and activity events. We examined the success of each method of recruitment in two recruitment waves based on the number recruited in relation to the number of hours spent on that recruitment method. Of the 119 people that were screened, 47% were enrolled in the study. The top three recruitment methods found to be successful included activities [4 hours per person (HPP)], CCI (5.6 HPP), and 1:1 interaction (7.5 HPP). Additionally, there was a decrease in the hours per person for 1:1 interaction which we propose was related to relationships forming between the facility and recruiters.

HENRY HALL ATRIUM 025: https://scholarworks.gvsu.edu/ssd_posters/25

Automated Conjecture Making: Domination on Planar Graphs

Participants attending 12:00 PM - 1:00 PM
Presenter: Jose Garcia
Mentor: Taylor Short

A planar graph $G = (V,E)$ is a graph that can be embedded in the plane, i.e. it can be drawn in the plane so that no edges intersect except at the vertices. A subset S of vertices in a graph G is called a dominating set if every vertex $v \in V$ is either an element of S or is adjacent to an element of S. The domination number of a graph G is the smallest cardinality of a dominating set; we denote the domination number as $\gamma(G)$. Automated conjecture making is the process of having a computer generate conjectures. We investigate and find a bound for the domination number of planar graphs with the use of automated conjecture making.

HENRY HALL ATRIUM 029: https://scholarworks.gvsu.edu/ssd_posters/20

Safe Sleep

Participants attending 9:00 AM - 10:00 AM
Presenter: Jenna Czart

Mentor: Kelli Damstra

Many parents and healthcare providers are either unsure of safe sleep practices or fail to implement them. This presentation will display safe sleep guidelines that are recommended by the American Academy of Pediatrics.

HENRY HALL ATRIUM 030

Colorizing Anatomical Specimens in the GVSU Plastination Lab

Participants attending 12:00 PM - 1:00 PM
Presenter: Allison Soffa
Mentor: Timothy Strickler

In the early days of plastination (1980's) it was common to leave the plastinates with their natural color, usually a brown/gray after preservation with a formalin fixative. The first attempts at coloring plastinates included the use of the chemicals eosin and merthiolate, but neither of these methods were successful in producing a permanent life-like color. Later on, colored epoxy and silicone were used with some success. The epoxy and silicone were able to carry pigments throughout the vascular system and into the capillary network to produce a life-like color. Attempts at coloring GVSU plastinates have involved acrylic based paint and oil based paint diluted with Mineral Spirits. These and other possible techniques involved in creating aesthetically appealing plastinates and the increased educational value of colorized specimens will be discussed.

HENRY HALL ATRIUM 031

Small Angle X-ray Scattering Characterization of BshC

Participants attending 12:00 PM - 1:00 PM
Presenter: Shea Siwik
Mentor: Paul Cook

Bacillithiol (BSH) is the low molecular weight thiol produced by some pathogenic organisms such as *Bacillus anthracis*. The molecule helps detoxify the cell and has been implicated in resistance to drugs such as the FDA-approved fosfomycin. BSH is produced by three enzymes. The last enzyme in this pathway, BshC, is a cysteine ligase that attaches a cysteine to glucosaminyl malate, resulting in BSH. A crystal structure of BshC has been determined by Cook lab, which depicts BshC as a dimer via a coiledcoil domain with an overall dumbbell-shape. However, it has not been shown that BshC forms a dimer in solution. Small angle x-ray scattering (SAXS) data will be used to determine the overall shape of the protein in solution. Here we report progress on the purification of both wild-type BshC and a coiled-coil domain truncation of BshC and results from SAXS measurements. More structural information about BshC is necessary for rational drug design to help overcome fosfomycin resistance.

HENRY HALL ATRIUM 032: https://scholarworks.gvsu.edu/ssd_posters/21

Comparison of Branching Allometry between *Ginkgo biloba* and Several Native Michigan Trees.

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Collin Fox, Noah Holkeboer
Mentor: Gary Greer

Ginkgo biloba is the only extant species of the gymnospermous order Ginkgoales. Like angiosperms, ginkgo is deciduous with broad leaves and vessel tubes. However, unlike angiosperms, ginkgo possesses a long-shoot x

short-shoot branching system, the latter producing most of the leaves, and opendichotomous leaf venation. Given that branching reflects optimization of photosynthetic capture through structural support and hydraulic efficiency, we compared the degree to which these functions were optimized for ginkgo relative to three native species. DBH, neighbor density and size were measured in field and branch dimensions were measured from photographs and analyzed per Murray's Law for hydraulic optimization and the Uniform Stress and Elasticity Models for structural optimization. Our results reveal intriguing differences in branch architecture between ginkgo and native angiosperms. These reflect differences in hydraulic versus structural optimization.

HENRY HALL ATRIUM 033

Development of a Method for Detection, Characterization, and Quantitation of *Streptococcus mutans* via Capillary Electrophoresis

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

Streptococcus mutans is a common bacteria found in the human mouth. It is most notably responsible for the initiation of cavity formation due to its production of acidic compounds as waste. Here, we report the development of a rapid method of identification and quantitation of *S. mutans* via different modes of capillary electrophoresis (CE), chiefly capillary zone electrophoresis (CZE) and capillary isoelectric focusing (CIEF). CZE was used to obtain data to characterize the surface properties, electrophoretic mobility, and isoelectric point (pI) of *S. mutans*. CIEF was then applied to focus and separate the bacteria by their pI in such a way that it will be detectable amongst other cells and molecules within a salivary sample such as *Streptococcus sobrinus*, *Lactobacillus acidophilus*, *Lactobacillus caseiňr*, *Actinomyces viscosus*. The CIEF method was optimized by varying factors such as ampholyte concentration, use of ampholyte additives, segmental injections, and preparation procedures.

HENRY HALL ATRIUM 035: https://scholarworks.gvsu.edu/ssd_posters/38

Synthesis and Structure-Activity Relationship Study of Novel Nitrodiphenylurea Antibiotics

Participants attending 11:00 AM - 12:00 PM
Presenter: Helen Bahlbi
Mentor: Matthew Hart

According to the World Health Organization, tuberculosis (TB) is the leading cause of death by infectious disease. Tuberculosis is caused by the bacteria *Mycobacterium tuberculosis* and occurs globally. Additionally, in 2017, TB was reported in all 50 states. Due to the scope of TB, strict observation of patients is required to ensure adherence to the current drug regimen. However, most reported cases are in developing countries where proper care is difficult. With the emergence of multidrug-resistant TB exhibiting resistance to current treatments, novel antibiotics are needed. Recently, our lab discovered a family of diphenyl ureas that exhibit antimicrobial activity against several bacterial strains, including *Mycobacterium*. Based on our lab's previous results, we have synthesized several diphenyl urea derivatives to examine their structure-activity relationship. Herein, we report the synthesis of the diphenyl ureas with varying nitro positions, chain-lengths, and sites of variation.

HENRY HALL ATRIUM 042: https://scholarworks.gvsu.edu/ssd_posters/63

The Impact of Vaccination on Grand Rapids Public Schools' Students

Participants attending 10:00 AM - 11:00 AM
Presenters: Jeremy Abreo, Kayeleigh Eder, Jordyn Francis
Mentor: Kelli Damstra

Central Focus: The focus of this paper is to analyze the amount of children vaccinated in the Kent County School District. After determining the percentage of vaccinated children, we plan to implement an intervention to promote vaccination education to parents in the Grand Rapids area as well as increase awareness of the detrimental complications of refusing vaccinations. We are going to interview administrators in the school districts in Kent County, along with school nurses and Primary Care Providers to determine what they believe the issues surrounding the vaccination rates in this area are. After obtaining this information, we are going to create an intervention to promote awareness of the need for vaccinations in the form of an educational session, handout, or pamphlet. Higher rates of vaccination amongst school-aged children provide protection not only for the recipient, but for the student population and society as a whole.

HENRY HALL ATRIUM 043: https://scholarworks.gvsu.edu/ssd_posters/56

Exploring the Effects of Biases in Mark-Recapture Fish Abundance Estimation with Software Simulations

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 4:00 PM - 5:00 PM
Presenter: Christian Yap
Mentors: James McNair, Carl Ruetz

Two-sample mark-recapture sampling is a common method used to estimate fish abundance. The idea is to capture and mark fish in an initial sample. The fish are then released to mix randomly with the whole population. A second sample is obtained, and the number of marked and unmarked fish is recorded. The Chapman estimator uses the number of fish marked in the first sample, the total number of fish captured in the second sample, and the number of recaptured fish to estimate abundance. The assumptions are: 1) the population is closed, meaning no immigration/emigration, and births/deaths occur, 2) all fish are equally vulnerable to capture during each sample, meaning marking does not change fish behavior, and 3) marks are not lost/overlooked. Violations of the assumptions happen frequently, and examining bias when a combination of assumptions are violated is difficult. Therefore, we created a software that lets users simulate different violation scenarios and examine the resulting biases.

HENRY HALL ATRIUM 045: https://scholarworks.gvsu.edu/ssd_posters/12

Digital Cultural and Historical Preservation

Participants attending 1:00 PM - 2:00 PM
Presenter: Natalie Heacock
Mentor: Mark Schwartz

The intent of this research is to test the effectiveness of photogrammetry and 3D scanning technology for the purpose of digital cultural and historical preservation. The case studies presented are of two historic pots, a lithic, a bitumen sample, a shipwreck, and an historic windmill. This research proves that 3D models for digital perseveration can be created through data acquisition, image processing, and the use of different software. Each study shown provides an example of how photogrammetry software can further efforts in historical and cultural preservation, as well as research in the archaeological field.

HENRY HALL ATRIUM 053

Phosphomimetic Mutants of Nato3 and Dopaminergic Neuron Related Gene Expression

Participants attending 9:00 AM - 10:00 AM, 4:00 PM - 5:00 PM
Presenters: Sofia Hessler, Maxwell Okros
Mentor: Merritt Delano Taylor

Midbrain dopamine neurons (mDA) can arise from the floor plate of the midbrain and are responsible for the symptoms of Parkinson's disease as the cells degenerate. One gene involved in dopamine neurogenesis is the basic helix-loop-helix transcription factor Nato3. Previously collected lab data has shown greater upregulation in mDA related gene expression by some phosphomimetic (PM) Nato3 variants compared to the wild type of Nato3 in vivo. We hypothesized that PM Nato3 mutants would drive the expression of genes associated with mDA neurogenesis in cell culture as well. Our data show that the effect PM-Nato3 condition on dopamine gene expression in the SN4741 cell line is variable and may be regulated by incubation period in culture- studies are currently testing this. PM Nato3 regulation of these genes will further insight into transcriptional regulation of neurogenesis and/or neuroprotection and the development of clinical therapeutics for Parkinson's disease.

HENRY HALL ATRIUM 054

Effects of Competition on the Diet, Behavior, and Physiology of Brook Trout (*Salvelinus fontinalis*)

Participants attending 1:00 PM - 2:00 PM
Presenter: Grayson Kosak
Mentor: Eric Snyder

Changes in the diet, behavior, and physiology of brook trout as a result of competition with brown trout were investigated in a comparative study of an allopatric population of brook trout in Frost Creek and a population of brook trout living in sympatry with brown trout in Cedar Creek, Kent County, Michigan. Electrofishing samples and a controlled in-stream enclosure experiment were used in conjunction with blood samples and metabolism chambers to measure and observe feeding and resting behaviors, metabolic respiration, blood cortisol levels, population dynamics, and fitness metrics of brook trout in isolation vs. in competition with brown trout. Diet breadth and resource utilization of brook trout and brown trout were determined based on stomach contents collected via gastric lavage. Behavior, physiological stresses, and fitness metrics were deduced from observations and measurements obtained from both the wild and in-stream enclosures.

HENRY HALL ATRIUM 055: https://scholarworks.gvsu.edu/ssd_posters/64

Language regard in Michigan's Upper Peninsula: Perceptual Dialectology through the Mental Maps of Nonlinguists

Participants attending 9:00 AM - 10:00 AM
Presenter: Karissa McFarlane
Mentor: Wil Rankinen

As a geographic region and speech community, Michigan's Upper Peninsula (UP) is well positioned to examine language regard using hand-drawn mental maps to determine how the general population perceives dialect differences inside and outside their community. The present study examines the geographic distribution of perceived "Finnish-ness," "Yooper-ness," and "Canadian-ness" categories across the UP. This 92-participant study, stratified by four UP counties, reveals that perceived "Finnishness" and "Yooper-ness" are focused on the UP's

northwestern regions, while "Canadian-ness" shows variation loosely focused on the eastern UP.

HENRY HALL ATRIUM 056

Progress Towards the Structure of a Bacterially Expressed Snake Venom Metalloproteinase Inhibitor from the North American Opossum (*D. virginiana*)

Participants attending 12:00 PM - 1:00 PM
Presenter: Lauren Miling
Mentor: Robert Werner

Numerous mammalian species, including the mongoose, hedgehog, and opossum appear to be resistant to a variety of snake venoms. This resistance is conferred through two mechanisms: 1) the resistant animal displays a mutation in the receptor targeted by the snake's toxin, and/or 2) the resistant animal contains serum proteins, that form non-covalent complexes that neutralize toxic components of the venom. One such protein, oprin, has previously been identified in the N. American opossum (*Didelphius virginiana*) as a snake venom metalloproteinase inhibitor (SVMPI). This work presents our efforts to insert the oprin gene into the bacterial expression vector pET28 using Gibson assembly in order to overexpress and purify this protein. This recombinant protein contains a 6xHis-tag at the C-terminus to assist in purification. In addition, we will discuss evidence that the pET28-oprin construct can be successfully used to express the oprin protein.

HENRY HALL ATRIUM 062: https://scholarworks.gvsu.edu/ssd_posters/19

Scoliosis and its Treatment in Adults

Participants attending 3:00 PM - 4:00 PM
Presenter: Hilary Skalski
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Melissa Tallman

Scoliosis is a greater than ten-degree curve in the spine in the coronal plane. There are many types of scoliosis, with the most common being adolescent idiopathic. The most common type in adults is degenerative scoliosis, caused by the wear and tear of the spine. In adults, treatment options are selected based on symptoms caused by the curvature. Treatments include lifestyle changes, medications, physical therapy and surgery. Two common surgical treatments are a laminectomy for decompression or a spinal fusion. The dissection of a 92-year-old male cadaver revealed scoliosis of lumbar vertebrae one through five (L1-5). A post-mortem laminectomy then revealed that the spinous processes of L2 and L3 appear fused together. Additionally, a metal wire was wrapped around both sides of the fused spinous processes, with attachment points above L2 and below L3. This research project further investigated the possible reasons for the spinal abnormalities seen.

HENRY HALL ATRIUM 074: https://scholarworks.gvsu.edu/ssd_posters/39

Structure-activity Relationship of Novel Diphenyl Ureas Targeting *Mycobacterium*

Participants attending 12:00 PM - 1:00 PM
Presenter: Piper Burghduf
Mentor: Matthew Hart

In 2017, the World Health Organization reported that 10 million people were infected with tuberculosis, 1.6 million of whom died. Tuberculosis is caused by a bacterium called *Mycobacterium tuberculosis*, which primarily infects an individual's lungs. Unfortunately, failure to adhere to the long and arduous drug regimen has contributed to the emergence of antibiotic-resistant strains of *M. tuberculosis*. Therefore, the need for novel antibiotics is imperative

to saving millions of lives. Our lab has recently developed a family of diphenyl ureas that exhibited increased antimicrobial activity toward *Mycobacterium*. Reported herein is the continuation of our previous research involving the synthesis of compounds with increased ester chain lengths and varying substituents on the phenyl ring. Compounds were confirmed using NMR spectroscopy and tested for antimicrobial activity using disk diffusion assays.

HENRY HALL ATRIUM 082: https://scholarworks.gvsu.edu/ssd_posters/7

Twiggy: An Osteological Reconstruction of a Skeletal Model's Identity

Participants attending 12:00 PM - 1:00 PM
Presenter: Alexis Rausch
Mentor: Gwyn Madden

Since the 1990s, GVSU's Anthropology Department has housed the disarticulated hanging skeleton of an individual nicknamed Twiggy who was originally used as a medical model. Typically little is known about individuals used as medical models, as is true in this individual's case. To continue using these remains as teaching material, it is imperative that we understand more about their life. In alignment with postprocessual archaeological theory, this project aims to reconstruct the life of one individual. In order to do so, a profile will be constructed for the individual by estimating traits such as age, sex, and stature. Their remains will also be analyzed for trauma, pathology, and non-specific indicators of stress. Further research will be done in order to understand the history of anatomical model construction. In doing this, Twiggy will be able to reclaim their identity, as students are able to learn about their story in life and in death.

HENRY HALL ATRIUM 085

Structural Allometry of Three Locally-dominant Deciduous Tree Species in West Michigan

Participants attending 9:00 AM - 10:00 AM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenters: Anne Eckman, Brendan May, Joshua Stayman
Mentor: Gary Greer

Trees in a cold-temperate forest require stem strength sufficient for self-support to maximize canopy height and width while resisting stresses imposed by wind and snow. We compared optimization of selfsupport of three tree species native to Western Michigan (*Acer saccharum*, *Fagus grandifolia*, and *Quercus rubra*) with their dominance in local forest stands. Optimization of self-support was investigated by analyzing branch architecture per the Uniform Stress and West-Brown-Enquist scaling models. Data were collected from thirty trees per species. Height and d.b.h. were measured in the field. Branch diameters and angles of the first three nodes were measured from scaled photographs. The influence of neighboring trees was assessed by measuring the d.b.h. and distance of the nearest trees. Our results are consistent with structural optimization as an important factor in local dominance which is mitigated by the effects of neighbors.

HENRY HALL ATRIUM 086: https://scholarworks.gvsu.edu/ssd_posters/13

Diagnosing Short-Term Memory Scanning Using Systems Factorial Technology: A Conceptual Replication

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenters: Jakob Berg, Lola Erfourth, Tylor Kistler, Jenna Lester, Elliot Perpich, Monica Van Til

Mentor: Mario Fific

Townsend and Fific (2004) published an influential short-term memory (STM) study in which they observed individual differences in serial and parallel STM scanning. The authors employed systems factorial technology —a novel methodology that provides strong diagnostic tests of cognitive structuring —and presented a new method of manipulating probe-to-memory item processing speed for memory loads (N=2). Three variables were manipulated in this experiment: number of processing elements (N=2), phonemic dissimilarity of a target to the particular memorized item (high, low), and duration between the memorized set and a target (short, long). In the original study, 10 subjects each participated in 20 sessions. The present study serves as a conceptual replication in which two-hundred subjects each participated in 1 session and a novel memory load condition was included. Results contributed converging evidence in testing serial/ parallel processing in short-term memory scanning.

HENRY HALL ATRIUM 090

TunnelWorld: A Robot Control Simulation Environment

Participants attending 1:00 PM - 2:00 PM
Presenter: Matthew Shan
Mentor: Jared Moore

Robotic controllers must exhibit effective movements while also being robust to dynamic environments. A specific controller design challenge is the transition between different gaits. For example, in legged systems, the transition from walking to running requires knowledge of the state of each leg to coordinate transitions among the legs preventing stumbling. From a software perspective, walking and running are different modes of operation. Successful transitioning is a difficult process, and designing algorithms to identify *modes* and transition points is an ongoing challenge. In this work, we construct a simulation simplifying the mode switching problem from a legged robotics domain to a voxel-based tunnel world. Digital agents navigate towards a goal while adjusting their shape in response to obstacles placed within the tunnel. The simulation will allow us to examine the behaviors of controllers in the future as they change shape (modes) in response to environmental conditions.

HENRY HALL ATRIUM 094: https://scholarworks.gvsu.edu/ssd_posters/62

Investigating the Toxicity of Nonylphenol in Juvenile *Faxonius propinquus* Crayfish

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenters: Marlee Busalacchi, Natalie Rizza, Haley Ryba, Collin Trainor
Mentor: Daniel Bergman

Nonylphenol (NP) is a commonly used chemical that accumulates in aquatic environments and negatively impacts aquatic life. Previous studies in our lab have shown that NP can reduce olfaction, reproduction, and molting frequency in adult crayfish. Although lethal doses of NP in adult crayfish have been determined, no studies have determined the concentrations in which NP is lethal to juveniles. We hypothesized that juveniles are more susceptible to the effects of NP than adults. Male and female juveniles weighing 3.00g or less were isolated for 2 days prior to a 24-hour exposure to various concentrations of NP. Results indcate that 100% of juvenile crayfish exposed at 0.05 ug/L survived, 75% survived at 0.1 ug/L, 62.5% at 0.125 ug/L, and 0% at or above 0.15 ug/L, indicating that lethal effects occur at very low concentrations. Further studies will investigate the effects of NP on juvenile physiology and could offer insight for other aquatic species exposed to NP during their lifespans.

HENRY HALL ATRIUM 095

Modulation Effect of Picrotoxin in the GABA(A) Receptor Ion Channel

Participants attending 10:00 AM - 11:00 AM
Presenter: Rose Lizzo
Mentor: Agnieszka Szarecka

CYS-loop receptors, e.g. GABA(A), are involved in neurotransmission and belong to a large family of diverse proteins involved in cognitive and neurological functions. GABA(A) receptors are drug targets for anxiety, depression, psychosis, and anesthesia, but the mechanisms of action of these drugs are poorly understood. In this project, we use Normal Mode Analysis to study modulatory effects of picrotoxin (PTX) on human GABA(A) receptors using its cryo-EM structures. Our data shows that neither GABA nor PTX binding affects the global twisting mode. We identified modes 10, 11, 18 and 30 that are affected by either GABA or PTX and GABA binding suggesting they are involved in the gating modulation mechanism. Our data also shows that binding PTX alone does not affect modes 10 and 11 that involve an asymmetric distortion of the extracellular domain and GABA binding pockets.

HENRY HALL ATRIUM 097: https://scholarworks.gvsu.edu/ssd_posters/33

ERK1/2 do not Phosphorylate Proteins in Mitochondria and Myofilaments

Participants attending 10:00 AM - 11:00 AM
Presenter: Tanner Napierala
Mentor: Ruijie Liu

Heart disease continues to be the most prevalent health issue in the United States. Previous studies have demonstrated the cardio-protective benefit of an increase in extracellular signal regulated kinase 1 and 2 (ERK1/2) activity in mice. In this study, genetically modified mice with knockouts of both the DUSP6 and DUSP8 genes (DKO) were used to study whether increased ERK1/2 phosphorylation in DKO mice changes the expression of these death-related proteins. We found out the increase in ERK1/2 phosphorylation mainly stayed in cytoplasm and the expression levels of BCl-2 and Bax were not altered. We also investigated whether myofilament proteins could be the phosphorylation targets. Our data indicated that there was no significant difference of myofilament protein phosphorylation between wild type and DKO mouse hearts. In conclusion, our data suggest that the protective role of ERK1/2 in the heart doesn't influence the phosphorylation of either mitochondrial or myofilament proteins.

HENRY HALL ATRIUM 099

Improving Annotation Recommendations in a Machine Learning Model

Participants attending 4:00 PM - 5:00 PM
Presenter: Justin Kaukonen
Mentor: Jared Moore

Honeybee colonies worldwide are under increasing threats from Colony Collapse Disorder (CCD) (vanEngelsdorp et al., 2010 Neumann and Carreck, 2009) and other environmental risks. Here at GVSU, we are developing a publicly available tool to identify potential problems by analyzing hive weight data with machine learning. Last year, we deployed the model publicly to the Bee Informed web portal. The model performs effectively, but tends to over predict when events requiring bee keeper annotation are required. This year, we are working to improve the accuracy of our model by reflecting on current issues in the pipeline that can be improved. Specifically, we are focusing on data normalization deemphasizing significant weight changes (harvests) in favor of more nuanced

events. We then compare predictions from the new model to those of the previously deployed model in order to improve prediction accuracy.

HENRY HALL ATRIUM 103: https://scholarworks.gvsu.edu/ssd_posters/61

Thing 1 and Thing 2 are in a New Zoo: Changes in Behavior of Amur Tigers Following Introduction to John Ball Zoo

Participants attending 12:00 PM - 1:00 PM
Presenters: Caitlin Gerke, Faith Hensley
Mentor: Jodee Hunt

Animals alter their behavior in response to changes in their environment such as alterations to their enclosure, social group, or husbandry routine. In 2018, two related, young adult Amur tigers (*Panthera tigris altaica*) were transferred to the John Ball Zoo (JBZ). The male siblings were given access to a spacious, wooded outdoor enclosure (area = 920 m²). We used *Zoomonitor* in 2018 and 2019 to conduct focal-animal sampling of the two males. We recorded state behaviors in 30 sec intervals of scan sampling, and all occurrences of event behaviors, both during 30 min sampling sessions. Our study objective was to compare patterns of behavior and enclosure use in 2018 (immediately after introduction to JBZ) and 2019 (one year post-introduction). The two males initially used little of their outdoor space, but expanded their spatial repertoire to include all areas of the enclosure by August 2018; this pattern of more expansive use of the enclosure continued into 2019.

HENRY HALL ATRIUM 104: https://scholarworks.gvsu.edu/ssd_posters/50

Miss Independent: Social Group Composition Influences Spatial Patterns in a Female Lion

Participants attending 11:00 AM - 12:00 PM, 4:00 PM - 5:00 PM
Presenters: Andrew Mayfield, Abigail Smith
Mentor: Jodee Hunt

The introduction of a new animal to a social group can cause individual zoo animals to alter their behavior. In 2019, a male lion was successfully introduced to an adult female at John Ball Zoo, after previously being exhibited with her sister in 2018. A second, older male continued to be exhibited alone, alternating with the pair in the same enclosure. Our study objective was to compare differences in behavior between 2018 and 2019 for the female (“experimental” animal whose social group changed) and the solitary male (“control” animal whose social group did not change). We used *Zoomonitor* to record state behaviors (e.g., walk) in scans conducted every 30 seconds collected during 30-minute focal-animal observation bouts. These data provided both spatial and behavioral detail. The female lion showed increased activity in 2019 and shifted the focal point of her inactive behaviors. In contrast, the solitary male did not alter his behavior between years.

HENRY HALL ATRIUM 109: https://scholarworks.gvsu.edu/ssd_posters/34

How Diet Affects the Environment

Participants attending 11:00 AM - 12:00 PM
Presenter: Jessica Riley
Mentor: Jamie Langlois

While climate events result in large scale economic costs for communities, the social impacts are just as devastating. With the community event titled "How Diet Affects the Environment," the aim was to spread awareness

about the negative environmental impacts of consuming animal products. From the literature and collaboration, attendees were encouraged to acknowledge how their eating habits affect the environment. Raising animals for food is responsible for 30% of the world's water consumption, occupies 45% of the earth's land, and is responsible for 91% of Amazon destruction. By exposing people to this information, there was a push to catalyze a social response for addressing environmental changes that are threatening human health and well-being in communities. By spreading awareness of the effects human diets have on the environment, attendees learned what they can do to work toward a more just and safe environment for all.

HENRY HALL ATRIUM 111: https://scholarworks.gvsu.edu/ssd_posters/44

Evaluation of Wayfinding Design of Senior Residential Communities

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenter: Hannah Rojas
Mentor: Rebecca Davis

Wayfinding is defined as the ability of an individual to find their way in an environment. Long term care (LTC) communities are very difficult for wayfinding, especially for persons with cognitive impairment. There is very little scientific evidence for design elements to assist individuals with wayfinding. In this study we created a tool based on the literature to evaluate the quality of LTC communities for wayfinding design. For this study, the tool was piloted to review the wayfinding design of seven LTC communities. Descriptive statistics were used to determine the highest and lowest scored areas. A table of mean and mode scores and the range will be included in the poster and discussed. This information can be used to determine what alterations can be made to these communities to increase their wayfinding effectiveness.

KIRKHOF CENTER GRR 002: https://scholarworks.gvsu.edu/ssd_posters/1

Psychological Distress in General Undergraduate Students and Baccalaureate Nursing Students

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Kersten O'Brien
Mentor: Katherine Moran

Background/Significance: Psychological distress in undergraduate college students is a significant concern in the U.S. Many stressors, such as academics and finances, are associated with high levels of reported stress, depression and anxiety. Nursing students face additional stressors, such as meeting program requirements, practicing in clinical environments and preparing for their licensure exam.

Purpose: The purpose of this review is to describe psychological distress levels in baccalaureate nursing students compared to general undergraduate students and what interventions help relieve student distress.

Methods: A literature review was conducted using CINAHL and PubMed databases.

Findings: While general undergraduate college students report high psychological distress levels, higher levels have been identified in nursing students. Thus, interventions such as mindfulness techniques, physical activity, and group therapy should be promoted by educators to produce successful nurses.

KIRKHOF CENTER GRR 005: https://scholarworks.gvsu.edu/ssd_posters/23

Building Lasting Relationships Among Refugees and the Grand Rapids Police Department

Participants attending 11:00 AM - 12:00 PM
Presenters: Rachael Bonin, Ezra Odioko
Mentor: Jamie Langlois

Recent survey results indicated that while the Kentwood and Wyoming Police were welcoming and culturally competent to refugees, Grand Rapids police faired much worse. In addition, studies have shown that the refugees who are coming to Grand Rapids have an existing fear of police from their home country which they have carried with them into the United States. This project brings together the Grand Rapids Police Department with individuals from the refugee population. It will incorporate efforts to build trust among the two groups by bringing the Grand Rapids Police Department into the surrounding refugee communities, along with trusted community partners, for a Q and A session. We hope that this will allow for the fostering of positive relationships between the two populations and build more cultural sensitivity within the Grand Rapids Police Department.

KIRKHOF CENTER GRR 011

Characterization of Developmental Changes in Central Nervous System Histaminergic Neurons in *Drosophila*

Participants attending 10:00 AM - 11:00 AM
Presenter: Sisi Hon
Mentor: Martin Burg

Neurotransmitters have been studied in the central nervous system (CNS) of *D. melanogaster*, which includes identifying when cells first synthesize the neurotransmitter during nervous system development. Histamine is a neurotransmitter that has not been studied as extensively as other biogenic amines with regard to cell number changes throughout CNS development. Identifying when cells develop the ability to synthesize histamine will enable a better understanding of changes that histaminergic cells undergo during development. An immunofluorescence whole-mount procedure was performed to detect histaminergic cells in intact CNS dissected from flies at 24 hr intervals throughout larval and pupal development. The specimens were examined using confocal microscopy to obtaining a 3-dimensional image of histaminergic cell locations and axonal projections. Results indicate a conservation of cell numbers in the larval stages followed by significant changes occurring during pupal development.

KIRKHOF CENTER GRR 013

Professional Preparation of Athletic Directors in the State of Michigan: Athletic Directors' Perceptions and Experiences

Participants attending 11:00 AM - 12:00 PM, 4:00 PM - 5:00 PM
Presenter: Carly Livingston
Mentors: Jon Coles, Sally Ross

This study identifies professional preparation and qualifications of high school athletic directors (ADs) in Michigan. Many sport management students seek in a career in high school athletics thus it is important to understand how degree requirements in sport management align with the job of an AD. A 2019 job posting on the MIAAA website for an AD listed a need for a Master of Arts degree in school administration. Another posting sought a valid teaching

certificate and 3 years of successful teaching experience and an administrative certificate. An article in Athletic Business examined the “evolving athletic director position” (Hoch, 2018) and identified management responsibilities that ADs must embrace. Through discovering educational and professional backgrounds for ADs in Michigan high schools, and by understanding what current ADs identify as requisite abilities to be successful in their jobs, sport management educators at GVSU can better prepare students for these positions.

KIRKHOF CENTER GRR 014: https://scholarworks.gvsu.edu/ssd_posters/35

The Role of ERK 1/2 Proteins in Diabetic Cardiomyopathy

Participants attending 3:00 PM - 4:00 PM
Presenter: Megan Coble
Mentor: Ruijie Liu

Diabetes is characterized by inadequate utilization of glucose due to a lack of insulin. Cardiomyopathy is defined as chronic disease of the heart muscle. A correlation between diabetes and the onset of cardiomyopathy has been suggested though a complete understanding of this relationship remains to be determined. Induction of diabetes within mice via the injection of streptozotocin will allow for thorough investigation of this correlation. Enhancement of the proteins ERK 1/2, via the deletion of genes DUSP 6/8, has been shown to be a protective agent against various heart pathologies. By inducing diabetes within both wild type and DUSP 6/8 knockout mice it could be determined if these proteins are protective against the development of diabetic cardiomyopathy. The goal of this study is to further explore the correlation between diabetes and cardiomyopathy, as well as investigate protective effects ERK 1/2 proteins may have on the development of diabetic cardiomyopathy.

KIRKHOF CENTER GRR 018: https://scholarworks.gvsu.edu/ssd_posters/37

Testing the Ancestral Function of Divergent *Candida albicans* Virulence-associated Proteins via Expression in *Saccharomyces cerevisiae* Mutants

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenter: Curtis Mack
Mentors: Ian Cleary, Derek Thomas

Candida albicans is an opportunistic fungal pathogen and a member of the normal human microbiota. It is closely related to the harmless fungus, *Saccharomyces cerevisiae*. Some genes associated with the virulent nature of *C. albicans* are similar to genes in *S. cerevisiae*. Three of these genes, PHO13, NRG1, and TUP1 are known to repress the change from yeast to filamentous growth in *C. albicans*, an important virulence trait. However, similar genes in *S. cerevisiae* are known to have functional differences. Our goal was to see if the ancestral function of these genes have drifted apart by examining the expression of *C. albicans* genes in *S. cerevisiae* mutants. This will lead us to know more about the regulatory mechanisms of *C. albicans*. We have successfully constructed *S. cerevisiae* strains expressing *C. albicans* genes and are ,now in the process of testing phenotypic differences.

KIRKHOF CENTER GRR 019: https://scholarworks.gvsu.edu/ssd_posters/18

The Language Behind Victim Impact Statements

Participants attending 10:00 AM - 11:00 AM
Presenter: Isabel Dowell
Mentor: Leifa Mayers

Survivors of sexual assault are given the opportunity to provide a victim impact statement in front of their abusers

in court. Former Michigan State University gymnastics doctor, Larry Nassar, has 204 statements against him. These statements give survivors the power they need to resist any assumptions made about them before, during, and after the assault; however, in what ways could they also be endorsing these assumptions? For this research, I have randomly selected a sample of statements from the unnamed victims of the People of the State of Michigan v Lawrence Gerard Nassar case in order to understand how the language used in the statements both resists and reinforces the construction of the "ideal" victim.

KIRKHOF CENTER GRR 020: https://scholarworks.gvsu.edu/ssd_posters/16

Eating Disorders in the LGB Community

Participants attending 9:00 AM - 10:00 AM
Presenter: Aubrey Griffith
Mentor: Leifa Mayers

Research has shown that members of the LGB community are diagnosed with eating disorders at an alarming rate. Yet, little research has been done to show how eating disorders affect the LGB community. By examining YouTube videos from a few individuals in the LGB community with eating disorders, along with analyzing their comment sections, I was able to examine how eating disorders affect the LGB community in a specific way. Anticipated findings include white privilege allowing for these YouTubers to have a voice in a muted group of individuals. This study is important because it helps to show how individuals in the LGB community with eating disorders are dealing with their mental illnesses.

KIRKHOF CENTER GRR 024: https://scholarworks.gvsu.edu/ssd_posters/48

The Effects of Hemlock Woolly Adelgid and Imidacloprid on the Abundance and Diversity of Eastern Hemlock Ectomycorrhizae

Participants attending 11:00 AM - 12:00 PM
Presenter: Jessica Avalos
Mentor: Alexandra Locher

Invasive insects like hemlock woolly adelgid (HWA) may compromise belowground functionality of infested hosts. Studies show that HWA affects belowground functionality of hemlocks by reducing ectomycorrhizal fungal associations (ECM). ECM benefit hemlock hosts by expanding the root system and increasing resource uptake. Defoliation from HWA herbivory halts photosynthate production, reducing ECM food supplies. To combat this, forest managers treat with the insecticide imidacloprid. Limited research exists on how imidacloprid may affect ECM colonies. This study aims to determine if imidacloprid affects ECM colonies. PCR amplification and Sanger sequencing will be used to compare the ECM community structure of treated hemlock trees, untreated healthy trees, and untreated infested trees. Results will reveal whether fungal communities diminish in the presence of imidacloprid treatments. We hypothesized that ECM colonies decline around imidacloprid-treated hemlocks.

KIRKHOF CENTER GRR 030

Effects of Cannabidiol on the Caudate Putamen and Nucleus Accumbens of Mice

Participants attending 2:00 PM - 3:00 PM, 4:00 PM - 5:00 PM
Presenters: Alexander Perez, Alexander Ryan
Mentor: Eric Ramsson

Cannabidiol (CBD) is a "non-psychoactive" chemical found in cannabis that is thought to have treatment

applicability for psychological disorders and physical illness. Reportings on the beneficial properties of CBD has led to an increased interest among the public. With this increasing interest in CBD have come many other claims on therapeutic effects that lack research support. Discrepancy in the effects of CBD, as well as escalating interest, demonstrate a need for substantial research on CBD.

The caudate putamen is a region of the brain that is associated with movement and learning. The nucleus accumbens is a component of the reward pathway of the brain, functioning in motivation. Dopamine release in both regions has been well-documented using Fast-Scan Cyclic Voltammetry (FSCV). FSCV is a technique allowing for accurate measurements of dopamine release as it occurs. This study investigates the effects of CBD on dopamine release in the caudate putamen and nucleus accumbens of mice.

KIRKHOF CENTER GRR 032: https://scholarworks.gvsu.edu/ssd_posters/31

Exploration of the Effectiveness of NaProTechnology in Women's Healthcare

Participants attending 9:00 AM - 10:00 AM
Presenter: Cecilia Cerven
Mentor: Kelli Damstra

Many women today struggle with abnormal menstrual cycles and the painful symptoms of reproductive disorders. The standard approach to treatment of irregular menses, PCOS, endometriosis, hormonal abnormalities, PMS, and other conditions is the prescription of a pill for symptom management. A relatively new and innovative method to fertility care is drawing the attention of healthcare providers and prospective clients alike, which offers an alternative approach. NaProTechnology, or Natural Procreative Technology, works with Fertility Awareness-Based Methods (FABMs) to detect and treat various reproductive disorders. This project will assist in bridging the gaps in education and overall awareness of treatment options available in women's healthcare. It will assess the risks and benefits of both natural and artificial approaches, review statistical data on relevant research, and evaluate the holistic impact NaProTechnology and FABMs have on clients who utilize it.

KIRKHOF CENTER GRR 033: https://scholarworks.gvsu.edu/ssd_posters/17

Use of Peer Instruction and TopHat in a Pharmacology Lecture: Observation of Students' Engagment and Perception

Participants attending 11:00 AM - 12:00 PM
Presenter: Hannah Espinosa
Mentors: Jing Chen, Babasola Fateye

Different instructional practices can have different effects on student engagement and learning outcomes in a STEM course. The purpose of this study is to examine the differences in teaching practices and the engagement of students in two different sections of the same BMS course, one section with a traditional lecture style class while the other utilized an interactive online platform, TopHat, in tandem with lecture. This study also investigates the students' perception of the usage of TopHat and whether peer discussions in the TopHat session will lead to better learning results. Data are currently being collected by observing five classes of each section of the BMS course using a coding protocol that characterizes the students' and instructor's time spent in the classroom. The CRiSP survey will be administered at the end of observations to measure the students' perception of TopHat. Final results will be presented at SSD in April.

KIRKHOF CENTER GRR 034

Evaluation of Testicular Morphology in Leptin-deficient Obese Mice with Reduced Fertility

Participants attending 3:00 PM - 4:00 PM
Presenter: Kimberly Jason
Mentor: Chris Pearl

Mice lacking the leptin hormone (ob/ob) or leptin receptor (db/db), become obese and are reported to be subfertile and/or infertile. This study was designed to investigate testicular function in ob/ob and db/db mice. Daily sperm production was significantly reduced in the ob/ob mice while sperm production in db/db mice was similar to controls at 16 weeks of age. Seminiferous tubules appeared normal in the testis of all three genotypes, however, the percentage of tubules with open lumens was reduced in ob/ob and db/db mice at both 8 and 16 weeks. The height of the epithelium in ob/ob mice was higher than controls and db/db mice at both ages. The number of tubules with debris found in the lumen was greatest in ob/ob mice at both ages. Interestingly, fewer tubules contained cellular debris in older mice. Collectively these data suggest a disruption of seminiferous tubule function, specifically in ob/ob mice, that could explain the reduced sperm production and fertility in these animals.

KIRKHOF CENTER GRR 037: https://scholarworks.gvsu.edu/ssd_posters/4

Quinpirole Mediates Aversive Effects of Methamphetamine via Dopamine D2 Receptors

Participants attending 12:00 PM - 1:00 PM
Presenter: Erin Reasoner
Mentor: Shkelzen Shabani

Innate avidity for methamphetamine (MA) use is influenced by sensitivity to its rewarding and aversive effects. MA induces these effects through release of the neurotransmitter dopamine, stimulating dopamine D2 receptors (D2R). The contribution of D2R to MA-induced motivational effects is poorly understood. In this study, we investigated motivational effects of D2R activation by using mice selectively bred for low MA drinking (MALDR) and high MA drinking (MAHDR). In a condition place preference (CPP) procedure, doses of 0.01, 0.1, and 0.5 mg/kg quinpirole, a D2R agonist, were paired with specific environmental cues; mice were later tested for cue preference. In both lines, quinpirole dose-dependently induced significant aversion and suppressed locomotor activity. MALDR mice alone showed enhanced locomotion in a drug-free CPP test. This study suggests that D2R plays a central role in the aversive effects of MA and is a potential therapeutic target for curbing MA intake.

KIRKHOF CENTER GRR 045: https://scholarworks.gvsu.edu/ssd_posters/30

Isolation and Purification of Lignin in Willow Wood

Participants attending 11:00 AM - 12:00 PM
Presenter: Nathaniel Dietlin
Mentor: Dalila Kovacs

Currently increasing amounts of time and energy are spent in search for renewable resources with increasing focus on biomass. Of particular interest is the extraction and chemical 'reforming' of the lignin, a naturally occurring abundant organic polymer. If separated from cellulose and depolymerized, lignin could become a rich resource of chemicals. This project focuses on lignin separation from willow wood collected form GVSU agricultural project lot, and its purification. The lignin extracted from wood was analyzed via Fourier-transform infrared spectroscopy. By comparing the IR results from four different willow wood to available literature data, it was confirmed that lignin

was isolated from willow wood and that further purification is required. A quantitative estimate of efficiency of lignin extraction from the four different types of willow wood ranges from 4.50% to 10.82% lignin by mass.

KIRKHOF CENTER GRR 047

VDECs of Cyclic Graphs

Participants attending 1:00 PM - 2:00 PM
Presenters: Michael Baas, Miah Masvero
Mentor: David Clark

A Vertex Distinguishing Edge Coloring (VDEC) of a graph is an edge coloring such that no two vertices have the same color set of edges incident to them. A strong coloring is a VDEC in which no adjacent edges share a color. We investigate the minimum number of colors necessary to generate a strong VDEC of a graph. Specifically, we explored this for the graph obtained by taking a cycle graph and adding a chord between two vertices separated by one vertex. We give exact values for the minimum number of colors necessary to assign a strong VDEC to this type of graph.

KIRKHOF CENTER GRR 050: https://scholarworks.gvsu.edu/ssd_posters/22

Closing the Gap Between Generations

Participants attending 9:00 AM - 10:00 AM
Presenter: Gabrielle Poeder
Mentor: Jing Chen

Older and younger generations are often living in separate spaces in our society. In this poster, I will discuss the factors that may cause such separation, the effects living alone can have on older adults, and the benefits that can result from creating relationships between the different generations through intergenerational volunteering programs. I will also address how we can bridge the gap between these generations and propose an intergenerational program that can help ease the aging process, benefit younger individuals, and create a more integrated society.

KIRKHOF CENTER GRR 051: https://scholarworks.gvsu.edu/ssd_posters/57

Early Cell-Cell Coupling Impairs Stem Cell Retention when Co-cultured with Hypoxic Cardiomyocytes

Participants attending 11:00 AM - 12:00 PM
Presenter: Jack Tietema
Mentor: David Geenen

Rationale: Bone marrow-derived mesenchymal stem cells (BM-MSC) induce beneficial effects in the heart following hypoxia but loss of these cells would diminish their effect. We hypothesized that coupling between BM-MSC and cardiomyocytes (CM) through gap junctions (GJ) during hypoxia may play an important role in stem cell retention. Methods and Results: Both human and murine BM-MSC express connexin43 (Cx43), a critical protein in the formation of GJ. FACS analysis revealed that BM-MSC exhibited a significant reduction in apoptosis (3-5 fold; $p<0.05$) in co-culture with hypoxic CM and the presence of a GJ inhibitor compared to hypoxic co-cultures in which the inhibitor was not present. Conclusion: Stem cell loss following co-culture with hypoxic CM represents a novel GJ-mediated mechanism that can be attenuated by inhibiting GJ formation. Furthermore, the expression of Cx43 in human BM-MSC suggests that GJ may also be an important target in the efficacy of cell therapy for humans.

KIRKHOF CENTER GRR 059: https://scholarworks.gvsu.edu/ssd_posters/65

Analysis of Dental Topography of Early Eocene North American Tetonius Lineages in the Bighorn Basin, Wyoming

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenters: Emily Dear, Emily Elliott, Emma Miller, Jeremy Wood
Mentor: Laura Stroik

Changes in the structure of ecological communities are often correlated with changes in the surrounding environment. The Bighorn Basin in Wyoming presents fossil evidence that depicts significant shifts in the community structure of North American mammalian species at the Paleocene-Eocene boundary. This diversity can be credited to marked temperature increases during the Paleocene-Eocene Thermal Maximum. The association between temperature and dietary niche of omomyid euprimates, specifically the *Tetonius* lineage, was examined using reconstructed relief index, a dental topographic measure (N=20). A correlation analysis supported the hypothesis that abiotic changes in climate during the Paleocene-Eocene Thermal Maximum were linked to variation in omomyid dietary niches ($P<0.05$). These changes in *Tetonius* dietary niche are associated with anagenetic speciation in the lineage and may have been influenced by both shifts in climate and interactions with other members of the community.

KIRKHOF CENTER GRR 060

Evaluation of Organometallic Iron Complexes as Potential Flow Battery Electrolytes

Participants attending 1:00 PM - 2:00 PM
Presenter: Logan Jurgens
Mentor: Andrew Lantz

Over the years as interest in renewable energy has increased so has the need for more effective energy storage. One possible solution is redox flow batteries (RFBs), which utilize large reservoirs of liquid electrolytes which are pumped into a battery to store energy. Problems with currently used electrolytes, such as vanadium ions, are their cost, low abundance, and toxicity. Currently, aqueous organic molecules have been examined for use as potential alternative anode and cathode electrolytes. Here, we present the evaluation of a variety of organic iron ligands as possible electrolytes in redox flow batteries. Reduction potentials and redox kinetics for organometallic-iron complexes were measured via cyclic voltammetry. Initial flow battery charge/discharge testing with target electrolytes was also performed.

KIRKHOF CENTER GRR 064: https://scholarworks.gvsu.edu/ssd_posters/8

The L'dor V'dor History Project

Participants attending 1:00 PM - 2:00 PM
Presenter: Joel Hill
Mentor: Marilyn Preston

The L'dor V'dor History Project involves the creation of a public exhibit documenting the history of Jews in Muskegon, Michigan through the members of Temple B'nai Israel. The purpose of this exhibit is to educate the community about Jewish history and life in West Michigan to spread awareness and understanding of diverse populations in an increasingly antisemitic society. This project involved collaboration between temple members, Museum staff, and GVSU faculty and students. Using interview data, as well as multiple dialogues and conversations with stakeholders, several themes were identified that will be used in the exhibit to meet the goals.

These themes are Holidays, Ritual, Identity, Tradition, and Tikkun Olam (healing the world). The exhibit not only tells an intimate story of the congregation but is also appropriate for various learning levels, accessible, interactive, and immersive. The design will be implemented at The Lakeshore Museum of Muskegon in the fall of 2020.

KIRKHOF CENTER GRR 067: https://scholarworks.gvsu.edu/ssd_posters/9

Synthesis of β-c-glycosidic Ketones from Unprotected Sugars and Their Use in Aldol Condensations with Hydroxymethylfurfural

Participants attending 9:00 AM - 10:00 AM
Presenter: Jon Chiaramonte
Mentor: Dalila Kovacs

C-glycosides are a growing interest in synthetic chemistry for their use in the pharmaceutical industry as important drug pharmacophores and their potential use in chemical industry as surfactants. Previous literature describes the synthesis of C-glycosides using many steps and toxic reagents, often involving the use of protecting groups. The extra steps result in lower yields, require more reagents and produce more waste, which limits the environmental sustainability of the overall synthesis. This study aimed to reproduce the literature synthesis of β-C-glycosidic ketones from acetylacetone and monosaccharides without the use of protecting groups. These ketones were further reacted in aldol condensations with non-enolizable aldehydes. We probed the scope of this reaction with unprotected disaccharides, and reacted the products with hydroxymethylfurfural, a renewable bio-based platform molecule, in aldol condensation reactions. The results of our investigation will be presented.

KIRKHOF CENTER GRR 069: https://scholarworks.gvsu.edu/ssd_posters/55

Linking Vegetation Change with Functional Traits in a Changing Arctic

Participants attending 9:00 AM - 10:00 AM
Presenter: Katlyn Betway
Mentor: Robert Hollister

The Arctic is warming more than twice the rate of the global average. Plant responses to warming have been documented in northern Alaska for decades and have shown that graminoids, deciduous shrubs, and evergreen shrubs are increasing in cover while forbs are decreasing in cover or remaining constant depending on the location. To better understand why growth forms are responding differently, nine functional traits were measured for 13 species at three sites in northern Alaska. Canonical correspondence analysis reveals that species increasing in cover are associated with high photosynthetic capacity and plant height. Species decreasing in cover are associated with leaf dry matter content. These traits closely correlate with relative growth rate, suggesting that more efficient species will dominate the landscape over time. These shifts in community level trait values can affect ecosystem processes such as carbon cycling and have the potential to affect the Arctic's carbon budget.

KIRKHOF CENTER GRR 070: https://scholarworks.gvsu.edu/ssd_posters/54

Synthesis & Characterization of Potential Pharmaceutical Analogs of a GVSU Lead Compound: an Investigation of Antibiotic & Anti-tumor Activity

Participants attending 9:00 AM - 10:00 AM
Presenter: Nicole Horne
Mentors: Bill Schroeder, Laurie Witucki

In support of ongoing anti-microbial & anti-tumor research, analogs of a GVSU lead compound, a derivative of

the known telomerase inhibitor BIBR1532, were synthesized. These compounds were submitted for biological analysis to determine pharmacological activity toward the discovery of either an antibiotic that can resist bacterial enzymatic degradation or a chemotherapeutic molecule that can destroy tumor cells without increasing toxicity. The anti-microbial interest in these compounds was based on the fact that they are non-penicillin based antibiotics and display a broad range of efficacy against targeted bacteria, including C. diff & MRSA, with minimal toxicity. These compounds were made via nucleophilic acyl substitution chemistry, where various substituted anthranilic acid molecules were coupled via a condensation reaction with either commercially available or synthetically made acid chlorides. Characterization of the compounds was accomplished by TLC, IR, & ^{1}H-NMR analysis.

KIRKHOF CENTER GRR 071: https://scholarworks.gvsu.edu/ssd_posters/14

Connecting the Nano and the Macro: A Study of Pore Structure in Carbon Black Nanocomposites

Participants attending 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM
Presenter: Evangalene Dreyer
Mentor: Richard Vallery

Positronium Annihilation Lifetime Spectroscopy (or PALS) uses the lifetime of the bound state of the electron and its antiparticle, the positron (positronium), to determine the pore size, a nanoscale property. By measuring the evolution of pore size as a function of temperature one can determine the phase. Additionally, a macroscopic property called Young's Modulus affects how much the sample is capable of stretching when a known force is applied. Thus, by measuring the pore size and Young's Modulus, it is possible to gain a better understanding of how alterations at the microscopic level (pore size) affect the macroscopic properties (Young's modulus) of carbon filled PDMS polymers. For this study, Young's modulus and pore size will be systematically measured in samples where the particle size is held constant and fraction of particle (relative to the polymer) is increased and where the volume of the sample occupied by the particles is constant but the particle size is changed.

KIRKHOF CENTER GRR 072: https://scholarworks.gvsu.edu/ssd_posters/43

Optimal Control Applied to Cancer Vaccine Protocols

Participants attending 9:00 AM - 10:00 AM
Presenter: Brady Fritz
Mentor: Norma Ortiz-Robinson

This research focused on a mathematical model for the administration of a cancer vaccine. This model involves time delays, making it a more difficult optimal control problem to solve. The mathematical model describes the administration of the vaccine along with certain groups of cells affected over time. The model was programmed into a specialized software called the Sparse Optimization Suite which could output a solution. This solution was then analyzed in order to properly describe it.

KIRKHOF CENTER GRR 077: https://scholarworks.gvsu.edu/ssd_posters/53

The Healing Power of Music

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenter: Kathleen Szczesny
Mentor: Barbara Hooper

The value of holistic and individualized care in honoring a patient's story and promoting their quality of life is of

the highest importance when providing nursing care. Nursing is more than just a profession, it is an art that is consistently changing and adapting, requiring critical and creative thinking to deliver high quality, safe care that is evidenced-based. Nurses must continuously seek innovative ways to enrich lives and enhance the healing process through interventions strongly supported by research. The purpose of this project was to explore music as an alternative form of medicine that can be utilized as a therapeutic intervention in nursing care. The project included conducting a literature review of pertinent articles and studies in preparation for writing a research paper. The paper focuses on the history of music therapy, using music in healthcare settings, music's impact on different patient populations, and how nurses can implement music to improve patient outcomes.

KIRKHOF CENTER GRR 080: https://scholarworks.gvsu.edu/ssd_posters/5

Quantifying Water Content in Olivine From North Carolina Dunites Using Fourier-Transform Infrared Spectroscopy

Participants attending 2:00 PM - 3:00 PM
Presenter: Thomas Byars
Mentor: Ginny Peterson

The focus of this study is to quantify the water content in grains of the mineral olivine collected from the Buck Creek Ultramafic Suite–a fragment of ancient ocean crust emplaced into the Appalachian Mountains in North Carolina. Previous work on these samples includes Electron Back Scatter Diffraction (EBSD) analysis. EBSD data can constrain temperature and stress conditions of olivine deformation under different levels of hydration. The water in olivine was analyzed using a Fourier-Transform Infrared Spectroscopy (FTIR) at the North Carolina Museum of Natural Science. The olivine grains are doubly polished in preparation for FTIR analysis. The machine scans the grains with an infrared beam, collecting wavenumbers absorbed by the infrared beam. Amplitude peaks at specific wavenumbers are related to specific compounds, one of which is water. These analyses of water content will be used to inform and further constrain deformation conditions inferred from earlier work on these samples.

KIRKHOF CENTER GRR 085

Treatment Options for Traumatic Cervical Spine Injuries: A Review

Participants attending 12:00 PM - 1:00 PM
Presenter: Alec Carroll
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Melissa Tallman

Prompt medical and/or surgical intervention of cervical spine fractures is synonymous with good clinical outcomes. If not properly managed, these fractures can cause an array of neurologic complications ranging from radiculopathy to paralysis to, in severe cases, even death. The type of management for cervical fractures depends on the level and location as well as the presence of ligamentous injury as this can cause the instability of adjacent structures. In this study, the different types of treatment pathways for cervical fractures based on current medical standards were reviewed and evaluated in a cadaveric model. During dissection, significant scar tissue and metal rods were discovered in the nuchal region of a 77-year-old male cadaver. After review of current protocols and careful dissection we diagnosed this individual with a type III cervical spine fracture which was repaired through a C2-3 posterior cervical spine fusion with C2 fixation via pedicle lag screws.

KIRKHOF CENTER GRR 086: https://scholarworks.gvsu.edu/ssd_posters/66

Non-attacking Queen and Rook Placements

Participants attending 9:00 AM - 10:00 AM

Presenter: Nicholas Layman
Mentor: Feryal Alayont

In 1848, Max Bezel introduced the problem of placing 8 queens on an 8 × 8 chess board so that none of the queens could attack each other. One generalization of this — the placement of *n* non-attacking queens on an *n* × *n* chess board — is the famous *n*-queens problem. A different but similar problem is that of placing non-attacking rooks on a generalized chess board which has connections to restricted permutations and has more general solutions known as compared to its queen counterpart. In this presentation, we investigate the intersection of these two problems — placing *n* pieces (either queens or rooks) on an *n* × *n* board.

KIRKHOF CENTER GRR 090

Democratic Governance and Economic Growth: An Evaluation of Causality and the Case for Economic Freedom

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Jordan Pattison
Mentor: John Constantelos

The current economic growth paradigm often emphasizes the role of democratic governance as a primary catalyst of positive outcomes. Despite this, a number of states with low levels of political rights and civil liberties have experienced strong economic growth as measured by positive changes in GDP per capita. To effectively evaluate the role of democratic governance on economic outcomes, it is necessary to control for the effect of other factors conducive to economic growth. This project empirically evaluates the role of political rights and civil liberties on economic growth by constructing multivariate models that consider the individual effect of democratic governance, economic factors, and economic freedom. It is demonstrated that democratic governance does not correlate with economic growth when controlling for economic factors and varying degrees of economic freedom. Importantly, economic freedom is found to be a primary factor that determines economic growth outcomes.

KIRKHOF CENTER GRR 092: https://scholarworks.gvsu.edu/ssd_posters/2

Predator Odor Stress on Stress and Metabolic Endocrine Outcomes in Male and Female C57BL6/N Mice

Participants attending 10:00 AM - 11:00 AM
Presenters: Morgan Block, Katie Wilk
Mentor: Elizabeth Flandreau

It is known that the brain and gut 'talk' to each other, which is important for both physical and mental health as shown by associations between metabolic syndrome and mental illness in humans. Neuropeptides found in both the brain and gut are active in this communication and may mediate links between stress, metabolism, and psychopathology. This study aims to determine whether single exposure to predator odor is able to produce long-term changes in the endocrine system as measured by plasma concentrations of the "stress hormone" corticosterone and "hunger hormone" ghrelin. Male and female mice were exposed to one hour of predator stress with blood collection 48 hours, 7 days, or 14 days later to assess concentration of the hormones. Body weight and food intake were also recorded throughout the study to determine the impact of stress on metabolic efficiency. Results from this study are important to better understand how stress can lead to both metabolic syndrome and/or mental illness.

KIRKHOF CENTER GRR 094: https://scholarworks.gvsu.edu/ssd_posters/49

Structural and Functional Characterization of New Clinically Relevant Enzymes Involved in Antibiotic Resistance

Participants attending 12:00 PM - 1:00 PM
Presenter: Violet Ruiz
Mentor: Bradley Wallar

The rise of antibiotic resistance is a global health threat requiring development of novel treatments. β-lactamase enzymes found in many multi-drug resistant bacteria contribute to resistance of β-lactam antibiotics. The enzyme cleaves the β-lactam ring, preventing the drug from reaching its cellular target. A class of β-lactamases, *Acinetobacter*-derived cephalosporinases (ADCs) are found in the multi-drug resistant bacteria *Acinetobacter baumannii*. Specific ADCs were selected from a group of antibioticresistant infections. With no known structures of these newly identified ADCs, it is key to discern how minor differences in sequences between ADCs contribute to drug resistance. In this project, structural and kinetics characterization of ADCs will aim to develop a relationship on how small structural variations can affect the enzyme's ability to bind and destroy antibiotics. The results will help identify potential inhibitors against enzymes that contribute to antibiotic resistance.

KIRKHOF CENTER GRR 095: https://scholarworks.gvsu.edu/ssd_posters/24

Binding Morality Foundations, Moral Enhancement, and Religious Attributions Using a Bogus Feedback Paradigm

Participants attending 1:00 PM - 2:00 PM
Presenters: Lucretia Dunlap, Jayce Masters
Mentor: Luke Galen

The illusory belief that one is morally superior to others is widespread. There are individual differences in the need to see one's self as moral. For example, religious individuals tend to self-enhance their perceived level of morality. In our study, participants completed measures of moral attitudes and behaviors and received either high or low (bogus) feedback on their moral performance. Those high in binding moral foundations (e.g., valuing obedience and group allegiance) who received high feedback were significantly more likely to attribute their motivation to religious sources. Binding moral foundations may be particularly linked to self-enhancement.

KIRKHOF CENTER GRR 096: https://scholarworks.gvsu.edu/ssd_posters/32

Everyday is Halloween: The Role of Fashion and Music in Goth Subculture

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Lucretia Dunlap
Mentor: Abdullah Alrebh

Goth subculture has been around since the 80s, first emerging as a reaction to the commercialized pop and rock scenes. This movement originated with the rebellious punk subculture of the West and United Kingdom. Very quickly, goth music and fashion were appropriated by other bands and magazines (Spracklen & Spracklen, 2014). Goth subculture has had massive effects on popular culture, influencing movies, various music scenes, and fashion styles. My research was motivated by a desire to contribute to the literature about goth subculture, with a focus on how those within the culture view the culture and their peers within it. During my study, I conducted a content analysis of interview transcripts. The purpose of my research was to understand how those within the culture define the term 'goth', how individuals are introduced to goth culture, whether there are different types of goths, and how

different types of goths are categorized.

KIRKHOF CENTER GRR 103: https://scholarworks.gvsu.edu/ssd_posters/45

Perceptions of Identity Transitions: Race and Gender Not Equally Alterable

Participants attending 4:00 PM - 5:00 PM
Presenter: Maria Sanchez Rodriguez
Mentor: Christine Smith

Growing acceptance of transgender identities in the absence of parallel shifts regarding race can be perceived as somewhat paradoxical, especially in light of how differently each construct is imagined to be rooted in biology. Perceptions of race and gender as alterable aspects of identity were explored using four identity transition scenarios. Participants' beliefs about identity transitions were dependent upon both the type of transition and political ideology. Results indicate that identity transitions involving gender (both male to female and female to male) and one race transition (white to black) were perceived similarly whereas the black to white transition was perceived as relatively less plausible. Coded rationales suggest that gender identity is more frequently perceived as driven by choice relative to racial identity. Participants' political ideology was associated with their acceptance of identity transitions.

KIRKHOF CENTER GRR 110

The Effect of Nocturnal Competitors on Common Marmoset Monkey (*Callithrix jacchus*) Feeding Behavior

Participants attending 1:00 PM - 2:00 PM
Presenter: Lauren Gapp
Mentor: Cynthia Thompson

Marmoset monkeys obtain food by gouging holes in trees to stimulate gum secretion. Although marmosets are among few mammalian species who consume gum, there is limited evidence that they may face competition from nocturnal foragers. We studied common marmoset monkeys (*Callithrix jacchus*) at Tapacurá Field Station in Brazil and monitored animal visits at feeding sites. We assessed revisitation rates and latency between feeding visits to identify if marmosets changed their feeding behavior in the presence of nocturnal foragers. Marmosets had higher revisitation rates for feeding sites that were shared with other species compared to sites that were not. Across all feeding sites, marmosets had significantly higher revisitation rates and smaller time spans between feeding visits after a nocturnal forager had visited. As such, the degree of competition marmosets face from nocturnal foragers may be sizeable enough to generate behavioral modifications.

KIRKHOF CENTER GRR 111: https://scholarworks.gvsu.edu/ssd_posters/36

The Impact of Study Abroad on Cultural Competence

Participants attending 9:00 AM - 10:00 AM
Presenter: Megan Minix
Mentors: Susan Strouse, Melodee Vanden Bosch

The purpose of this research was to assess the impact of study abroad on nursing students' perspectives of cultural competency. This study used a survey tool to assess demographics and cultural competency before and after a nursing study abroad to Ghana. Students completed pre- and post-trip surveys. A modified Giorgi method was used to analyze qualitative data and a one-tailed, paired t-test to analyze quantitative data. Themes identified included

1) using a theoretical approach prior to the trip, 2) developing an application of cultural competency post-trip, and 3) gaining a better understanding of own culture and nursing universality. Cultural competency scores significantly increased post-trip. The findings suggest that study abroad increases nursing students' perspectives about providing culturally competent care. Students gained experience and skill related to cultural competency prior to nursing practice; therefore, study abroad should be utilized in nursing curricula.

KIRKHOF CENTER GRR 113: https://scholarworks.gvsu.edu/ssd_posters/42

The Significance of Transient Elastography in the Prevention and Early Detection for Individuals with Nonalcoholic Fatty Liver Disease (NAFLD)

Participants attending 10:00 AM - 11:00 AM
Presenter: Emmalee Peck
Mentor: Lori Houghton-Rahrig

Early detection and intervention are key to reverse Nonalcoholic Fatty Liver Disease (NAFLD). Newer imaging modalities such as the transient elastography (FibroScan) is a method in which healthcare providers can detect fibrosis and cirrhosis, as measured by the amount of liver stiffness, in individuals with NAFLD. The purpose of this review was to synthesize the literature comparing transient elastography to invasive and noninvasive diagnostic techniques for the detection of liver fibrosis in people with NAFLD. Thirty articles met the inclusion criteria and were included in this review. Overall, transient elastography was found to be a sufficient tool in conjunction and comparison with invasive and noninvasive diagnostic techniques for the detection of liver fibrosis in people with NAFLD. Nurses can have a greater awareness of the tools used to detect liver stiffness which aids in the assessment and data collection for patients with NAFLD.

KIRKHOF CENTER GRR 114

Gender-Based Differences In Eating Disorder Presentation: A Rapid Systematic Review

Participants attending 9:00 AM - 10:00 AM
Presenter: Matthew Smith
Mentor: Lori Houghton-Rahrig

Problem. Traditionally, eating disorders (EDs) have been perceived as a female-specific issue. This notion has been influenced by the research of predominantly female populations, which has guided the design of diagnostic criteria, screening tools, and treatment methods. Male clinical presentation of EDs varies from female-derived norms, suggesting that disparities in screening and treatment may exist.

Purpose. The purpose of this systematic review is to identify sexually dimorphic ED symptoms. Though the identification of varying traits, ED screening tools and treatment methods can be reviewed for validity in male populations.

Search Strategy. Databases searched include CINAHL, PsychINFO, PubMed, and the Web of Science.

Results. The database search resulted in 1,593 articles; 34 articles met eligibility criteria. Significant differences were found in global ED pathology, body image perceptions, exercise behaviors, and physiological manifestations of EDs between genders.

KIRKHOF CENTER GRR 116: https://scholarworks.gvsu.edu/ssd_posters/58

The Organic Synthesis of Anthranilic Acid Derivatives as Potential Active Antibiotics

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

Presenter: Paul Chappell

Mentors: Rod Morgan, Laurie Witucki

The objective of this research project was to synthesize multiple derivatives of anthranilic acid. These derivatives will then be tested for antibiotic activity against *Staphylococcus aureus* and *Escherichia coli* (*E. coli*). As bacteria become more resistant to penicillin-based antibiotics, the exploration of anthranilic acid-based antibiotics could serve an important role for future medical use. This research project included data collection via ^{1}H-NMR, ^{12}C-NMR, TLC, MP, and IR to determine purity for biological testing.

KIRKHOF CENTER GRR 119: https://scholarworks.gvsu.edu/ssd_posters/41

Social Movements: An Analysis of the Youth Climate Strike

Participants attending 9:00 AM - 10:00 AM

Presenter: Hannah Pierson

Mentor: Jennifer Stewart

Youth dominated social movements have been occurring throughout the last several decades, however recently they have been taking the world by storm. From the Civil Rights Movement and Anti-Apartheid to March for Our Lives and Friday's for Future, these organizations have covered many bases and involved themselves in activism to new degrees. This research project is designed to understand and apply the social movement framework to a specific organization. Therefore, the goal is to determine if The Youth Climate Strike organization is, in fact, a social movement. If The Youth Climate Strike is a social movement then what are the possible effects this organization can have? Alternatively, if this organization is not a social movement then how can it become one? With these questions in mind, identifying this organization as a social movement or a potential social movement can educate other organizations on how to do so, while also aiding in drawing attention to this group.

KIRKHOF CENTER GRR 135: https://scholarworks.gvsu.edu/ssd_posters/11

Linking CO2-flux with Tundra Vegetation

Participants attending 9:00 AM - 10:00 AM

Presenter: Mackenzie Lift

Mentor: Robert Hollister

The Arctic climate is rapidly changing and perhaps the most impactful ecosystem change is the shifting balance between photosynthesis and respiration towards respiration. Here we correlated CO2-flux data generated from experimentally warmed and control plots established by the International Tundra Experiment (ITEX) at the dry heath tundra in Utqia!vik, AK with several abiotic and vegetation measurements conducted on the same plots. We found significant correlations between the vegetation and CO2-flux measurements. Linking the change of CO2-flux to the changes in tundra vegetation will provide a deeper understanding of the impacts of climate change on the Arctic and allow for more accurate predictions of future carbon dynamics.

KIRKHOF CENTER GRR 137

Statistics Activity Generator

Participants attending 10:00 AM - 11:00 AM

Presenter: Nicholas Rozema
Mentor: Bradford Dykes

My project is an automated generator of activities, assignments and exams for introductory statistics classes and other classes covering statistical concepts (e.g., economics and sociology). The generator was created in R, a statistical computing language, and implemented as a web app using R's Shiny package. Users can either provide their own dataset or go with the app's default dataset and then choose questions or sets of questions automatically tailored to the chosen data. These questions will then be output neatly in the user's preferred format.

KIRKHOF CENTER GRR 145: https://scholarworks.gvsu.edu/ssd_posters/60

Impact of Cell Density on Cx43 Expression in Endothelial Cells

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM
Presenters: Madison Goen, Kyle Morrison
Mentor: David Kurjiaka

Consumption of omega-3 fatty acids benefits the cardiovascular system by reducing blood vessel inflammatory responses. Our recent work showed omega-3 fatty acids decrease connexin 43 (Cx43) expression in cultured endothelial cells after 1 day. Our interest in Cx43 was as marker of inflammation as omega-3 fatty acids are strongly implicated as anti-inflammatory agents. Localized inflammatory responses drive the growth of the atherosclerotic plaques responsible for a majority of cardiovascular diseases. Anything that affects the inflammatory response will affect the growth (and stability which is also important) of those plaques. This poster will summarize current knowledge of atherosclerosis and inflammation as well as the impact of omega-3 fatty acids on inflammation.

KIRKHOF CENTER GRR 146

Jaucourt's Contribution to 18th Century Ideas about Crime and Punishment

Participants attending 11:00 AM - 12:00 PM
Presenter: Kyezie Bwanangela
Mentors: David Eick, Tonisha Jones

During the Enlightenment, many important philosophers contributed ideas on the topic of crime and punishment in Europe, including John Locke, Montesquieu, Voltaire, Beccaria, and Bentham; however, one scholar who has not received enough recognition but should is Chevalier Louis de Jaucourt, who contributed a staggering 17,000 entries to the great *Encyclopédie* (1751-72) of the French Enlightenment. The *Encyclopédie* was created to change the common way of thinking through the expansion of knowledge and the development of critical modes of thought. This study will examine Jaucourt's contribution to the topic of crime and punishment, that is, which aspects of his thought dovetail with other Enlightenment philosophers, and what is original and unique.

KIRKHOF CENTER GRR 147: https://scholarworks.gvsu.edu/ssd_posters/26

Analyzing the Role of a Protein Downregulated After Induction of Filamentous Growth in *Candida Albicans*

Participants attending 10:00 AM - 11:00 AM, 2:00 PM - 3:00 PM
Presenter: Jazmine Vasquez
Mentors: Ian Cleary, Derek Thomas

Candida albicans is a commensal fungus, habitually living with its human host; however, it has the ability to cause

invasive infections making this organism opportunistic. *C. albicans* is the fourth most frequent cause of nosocomial infections affecting a vulnerable immunocompromised population. *C. albicans* exhibits different morphologies including yeast, pseudohyphae, and hyphae. The varying morphological potential of this organism is a virulence trait. Because of this, research has focused on what drives and impedes morphological switching. During a filamentation assay, a novel observation pertaining to a subgroup of proteins being downregulated early after germination was made. Here, we examine the effect of one of these proteins in hypha inducing media to determine if it will have an impact on virulence. With the conditions tested thus far, no significant impacts on morphology have been observed. However, effects on virulence have been observed.

KIRKHOF CENTER GRR 149: https://scholarworks.gvsu.edu/ssd_posters/47

Accuracy of Garmin Forerunner 645 During High Intensity IntervalTraining

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenter: Camelia Meindertsma
Mentor: Christopher Dondzila

Introduction: Previous research has shown that wrist-worn devices are accurate during structured exercise such as running or walking, but accuracy decreases when it comes to high-intensity interval training (HIIT). The purpose of this study was to investigate the validity of Garmin Forerunner 645 against the gold standards of both the Polar HR chest strap and the Actigraph GT9X during HIIT. I hypothesized the Garmin Forerunner 645 would be statistically different in time spent in HR zones and calories burned when compared to the Polar HR chest strap and Actigraph. Methods: For three weeks, I collected data by completing three 30 minute HIIT workouts in a week. During each session, I wore the Garmin Forerunner 645, Polar M400 with HR strap and Actigraph. Each device gathered data on time spent in HR zones, average HR, max HR, calories burned, and steps taken. Testing days were separated by 48 hours. Results: Data collection is currently ongoing and results will be presented at SSD.

KIRKHOF CENTER GRR 150

How to Make Syllabi Sexy for You and Your Students

Participants attending 10:00 AM - 11:00 AM, 2:00 PM - 3:00 PM
Presenters: Evan Badgley, Rachel Veenkamp
Mentor: Babasola Fateye

Syllabi are the first point of contact for students and are the “contracts” that govern student experiences and learning outcomes in college classes. What are students’ perceptions of syllabi? We conducted a photovoice study on syllabi from undergraduate classes across GV. Posted syllabi were printed and posted around the classroom for students to view and voice how they felt when viewing the syllabi -- what they supported and disliked about them, and why. Based on themes that emerge from the discussion of these photos, the research team will construct an “ideal” syllabus from a student’s perspective.

KIRKHOF CENTER GRR 151: https://scholarworks.gvsu.edu/ssd_posters/59

The Effect of Frenectomy Procedure on Breastfeeding Self-Efficacy

Participants attending 9:00 AM - 10:00 AM
Presenter: Mary Chenge
Mentor: Kelli Damstra

Structural restrictions from tongue-tie are associated with altered sucking and decreased self-efficacy in

breastfeeding mothers. Frenectomy is a procedure to correct tongue-tie by detaching the frenulum. There is a need to review the evidence regarding the effect of tongue-tie release on maternal breastfeeding self-efficacy. This review aims to examine the effect of frenectomy on a mother's confidence in breastfeeding using the BSES-SF tool. Database searches were conducted in PubMed and CINAHL. Keywords: "Frenectomy" AND "Breastfeeding self-efficacy." Exclusion criteria: non-English studies. Evidence suggests that frenectomy is associated with improvement in breastfeeding self-efficacy and nipple pain in the short-term. The BSES-SF tool is an excellent measure of maternal breastfeeding selfefficacy following a frenectomy procedure. To improve maternal self-efficacy, clinicians need to assess tongue-tie in infants and recommend frenectomy procedure.

KIRKHOF CENTER GRR 152

Competitive Viability of Non-Virulent Salmonella Transformants with regards to a Wild-Type Salmonella

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Yazan Chabti, Michael Garnaat
Mentor: Aaron Baxter

Salmonella is a leading cause of food borne illness. The pathogen invades epithelial cells in the small intestine via genes that encode for invasion, adherence, proliferation and survival. The goal of this research is to analyze a non-virulent Salmonella containing a fimbrial gene known to enhance biofilm formation, and determine if it outcompetes wild type bacteria in vitro. Mutant strains were transformed with a plasmid containing RFP or GFP in order to separate them from wild type bacteria. Fluorescent microscopy confirms the transformants have similar morphologies and fluorescence. Growth curves show that all transformants grow about the same rate. Various methods including biofilm and invasion assays are required to confirm competitive viability and lack of virulence. If successful, introduction of the nonvirulent strain into poultry will be done to analyze if the mutant strain can outcompete wild type Salmonella, thereby reducing the rate of salmonellosis in humans.

KIRKHOF CENTER GRR 156

Determination of *Hdc* Promotor Function in *Drosophila melanogaster* Using Transgenic Flies

Participants attending 12:00 PM - 1:00 PM
Presenter: Selina Ruiz Mendoza
Mentor: Martin Burg

The *Hdc* gene of *D. melanogaster* encodes histidine decarboxylase, an enzyme that synthesizes histamine. The promoter region of the *Hdc* gene should play a role in controlling its expression. This project's goal is to examine *Hdc* promoter function using transgenic tools. A full promoter region ($pHdc^{L}$) or a shorter promoter region ($pHdc^{S}$) were separately combined with the Green Fluorescent Protein (GFP) gene to generate pHdc-GFP gene fusions that were used to generate transgenic flies. To examine $pHdc^{L}$ expression, histamine immunostaining and GFP fluorescence in the nervous system was examined. Results indicate that the $pHdc^{L}$ region functioned as expected. Examination of recently generated $pHdc^{S}$-GFP transgenic flies is being done to determine whether the *Hdc* promoter region remaining in $pHdc^{S}$ is sufficient to induce expression as occurs using $pHdc^{L}$, as molecular analysis suggests that *Hdc* expression may be incomplete using the $pHdc^{S}$ fragment in a $pHdc^{S}$-GFP transformant fly.

KIRKHOF CENTER GRR 163: https://scholarworks.gvsu.edu/ssd_posters/27

Alternative Reproductive Tactics in Lake Michigan Populations of Invasive Round Goby

(*Neogobius melanostomus*): How Fish Increase Fitness by Doing Less
Participants attending 9:00 AM - 10:00 AM
Presenter: Alex Florian
Mentor: Charlyn Partridge

Understanding the reproductive biology of invasive species is an important step in managing populations. Yet little is known about the reproductive strategies of invasive round goby (*Neogobius melanostomus*) in Lake Michigan. Fertilization in round goby occurs externally in nests guarded by "paternal" males. However, some males pursue alternative reproductive tactics (ARTs), where males sneak into a larger male's nest and fertilize a portion of the eggs. We investigated how the proportion of round goby ARTs varies between sites. We caught 264 fish from 4 drowned-river lakes along Lake Michigan. We measured their color, morphology, and gonad traits to determine reproductive type. Our results suggest ARTs represent at least 20% of reproductive round goby males. As predicted, sneaker males had larger testes relative to body mass, and paternal males had larger accessory glands relative to mass. Our next step is to model how the proportion of ARTs in these populations may be impacting them.

KIRKHOF CENTER GRR 164: https://scholarworks.gvsu.edu/ssd_posters/52
Using GIS to Analyze Graminoid and Shrub Composition Change from 1997 to 2017 at Atqasuk, Alaska
Participants attending 9:00 AM - 10:00 AM
Presenter: Rebecca Daigle
Mentor: Robert Hollister

Shrubs are expanding across the Arctic due to longer growing seasons and rapidly increasing air temperatures. Likewise, graminoid height is increasing. Changes in community composition may impact critical feedback loops and result in trophic cascades. Here, we analyzed vegetation cover change at a long-term research site in Atqasuk, Alaska. We compared cover across forty-eight, one-square-meter plots between 1997 and 2017. Shrubs and graminoids increased significantly over time, while bryophytes decreased over time. Other functional groups were inconsistent or showed no trend. We mapped the shrub and graminoid vegetation change in order to examine cover trends within the context of the surrounding landscape. Future studies may examine the shrub and graminoid change at Utqiagvik, AK.

KIRKHOF CENTER GRR 165: https://scholarworks.gvsu.edu/ssd_posters/3
Annual Veg Change on the ARCSS Subplots at Atqasuk and Utqiagvik
Participants attending 9:00 AM - 10:00 AM
Presenter: Jacob Harris
Mentor: Robert Hollister

This research describes changes in plant cover in the landscapes near Atqasuk and Utqiagvik, Alaska. In each location 30 plots distributed in a matrix across the landscape were sampled annually from 2010 to 2019. Plant cover was classified into eight functional groups (deciduous shrubs, evergreen shrubs, forbs, graminoids, bryophytes, lichens, litter and standing dead). In Atqasuk, graminoids and litter have increased in cover while bryophytes, lichens and standing dead have decreased in cover. In Utqiagvik, graminoids and leaf litter have increased in cover while bryophytes and standing dead have decreased in cover. Graminoid cover increases at both sites appear to be driven by moisture inputs and air temperature. We anticipate changes in cover, especially increases in graminoids, will continue as the region warms.

KIRKHOF CENTER GRR 172: https://scholarworks.gvsu.edu/ssd_posters/15

Landscape Effects and Changes in Permafrost Depth in Atqasuk, Alaska

Participants attending 10:00 AM - 11:00 AM

Presenter: Hannah Clarida

Mentor: Robert Hollister

Thaw depth was measured in a tundra ecosystem in Atqasuk, Alaska. This project focuses on the Atqasuk dry site which has been studied to understand the impacts of experimental warming on the tundra ecosystem. We were interested in how the spatial distribution of plots influences thaw depth measurements. The site has 48 plots. Thaw depth was measured in mid-August from 1996-2019. ArcGIS was used to interpolate the results of each year's thaw depth and estimate the effect of the landscape on thaw depth. The average thaw depth was 110 cm across all plots and all years. There was significant variation between years but no clear trend over time. Experimental warming had no impact on the thaw depth. There was significant variation between plots, but these differences were not consistent across years. This study shows the depth of thaw is dynamic and difficult to predict over time and across the landscape.

Oral Presentations, Abstracts & Schedule

Beginning at 9:00 AM

KIRKHOF CENTER 2263
Citizenship Through Conversion: Catholic Marriage in Senegal's Communes, 1870-1897
Presenter: Julia Jesko
Mentor: David Eaton

Until recently, scholarly interest in African history concentrated on politics or economics, ignoring the lives of many ordinary Africans, especially women. Senegal, situated in West Africa, was no exception. However, the colonial archives in Dakar contain letters, court cases, and other materials that, if properly analyzed, reveal how ordinary people grappled with the new administrative landscape created by 19th century French colonialism. One well-documented colonial court case focuses on two Catholic African foreigners in the coastal city of Saint-Louis named Michel Moussa Sow and Marie Sagna. Their efforts to naturalize into a Commune city, a necessity before they could be legitimately married, offer valuable insights into the impact of the colonial state on everyday people in colonial Senegal.

Beginning at 10:00 AM

KIRKHOF CENTER 2259
Un-Gerrymandering Michigan: A Hypothetical Look into Our Congressional Maps Following the 2020 Census and Redistricting
Presenter: Andrew Nurmi
Mentor: Whitt Kilburn

“Gerrymandering” is the practice of drawing legislative maps of all levels (local, state, and federal) in a way that benefits the party in control of redistricting. Michigan’s maps have been gerrymandered for decades, but in November 2018, the voters of Michigan passed Proposal 18-2, which created a nonpartisan redistricting commission in the hopes of ending biased redistricting. In this project, I submit my own proposals for what various lines could be for our state’s congressional map in 2022, when these new districts will take effect. My project includes maps that are gerrymandered to benefit Democrats, to benefit Republicans, designed for competitiveness, and most importantly, what my subjective idea of a “fair” map could be. This is done using an online app called Dave’s Redistricting App, which allows users to create their own district lines of various legislative maps across the country.

KIRKHOF CENTER 2263: https://scholarworks.gvsu.edu/ssd_orals/4
Living with Disabilities in Ireland vs. America
Presenter: Cecelia Findlay
Mentor: Susan Sunden

This presentation is a look at the differences in respite care facilities in Ireland as campared to in the United States of America. The purpose of this project was to gain an understanding of key differences in the respite care options

for individuals who have developmental disabilities in Ireland from America. The preliminary research completed served to gain an understanding of laws and societal norms in Ireland surrounding individuals who have disabilities. Then I spent four weeks (31 days) completing an International Studies Abroad service-learning program. The program consisted of completing 20-30 hours of volunteering with a local organization in Galway, Ireland that serves individuals with developmental disabilities and completing a variety of reflective assignments. This presentation will reflect on the findings pertaining to my time spent completing the project.

KIRKHOF CENTER 2270

Projecting the Spread and Impact of Chronic Wasting Disease on White-tailed Deer in the State of Michigan

Presenter: Bret Neitzel
Mentor: Neil MacDonald

Infectious wildlife diseases such as chronic wasting disease (CWD) can threaten populations of whitetailed deer. Understanding the rate of disease spread and the impact natural and artificial barriers have on the rate of spread is important for disease management. Using current location data for all confirmed CWD positive deer in Michigan, along with deer density estimates and potential movement barriers, a map was created using geographic information systems. Using Wisconsin as a comparable location with similar terrain and barriers, an estimated rate of spread of 1.13km/year is assumed for Michigan. Results indicate CWD will continue to spread at a relatively slow rate in Michigan and after 10 years, may be found in all townships surrounding the foci of confirmed cases if additional management practices are not introduced. Given the importance for CWD management, insights from this research may be valuable to management agencies in their efforts to slow the spread of this disease.

Beginning at 10:30 AM

KIRKHOF CENTER 2270: https://scholarworks.gvsu.edu/ssd_orals/6

"What's Happening Brother": Detroit's Revolutionary Black Workers and the Vietnam War

Presenter: Nicholas Busby
Mentor: Louis Moore

The decade of the 1960s was pivotal in Detroit's history. At a time when people struggled against imperialism and racism, Detroit's Black community was especially cognizant of their role in this struggle. Based on extensive archival research findings, Detroit's Black community intensely opposed racism and oppression, and Black auto workers were at the vanguard of this struggle within Detroit. These workers had strong reactions to the Vietnam War. The *Inner City Voice* and the League of Revolutionary Black Workers were militant groups in Detroit's Black community during the Vietnam War. The politics and ideals of these Black groups were aligned with the North Vietnamese, as both vehemently detested imperialism, capitalism, racism, and oppression. These organizations opposed America's involvement in the war on numerous grounds, but most important was their affinity with the Vietnamese people based on ideals, economic philosophies, and a perceived common enemy: the American Government.

Beginning at 11:00 AM

KIRKHOF CENTER 2266: https://scholarworks.gvsu.edu/ssd_orals/10

Ecuador is Black: Afro-Ecuadorian Literary Resistance in *Drums Under My Skin*

Presenter: Gabriella Davis
Mentor: Regis Fox

The transcendence of Black Ecuadorian literature has the power to rewrite narratives that have constructed them as hypersexual or invisible. By telling their own stories, Black Ecuadorian writers not only place Blackness into the Ecuadorian national narrative. They make their existence the center of everything. In *Drums Under My Skin*, Luz Argentina Chiriboga writes of Rebeca, a *mulata* teenager struggling to accept her Blackness while spilt between the ideological spaces of Quito and Esmeraldas. Chiriboga confronts racism in Ecuador based around *mestizaje* by making Blackness the sole narrative voice and rejects ideas that Blackness doesn't belong in Ecuador. Concurrently, she allows for Rebeca's sexual exploration despite the Ecuadorian narrative of the hypersexual Black woman. I contend that although Rebeca suffers sexual and racial abuse from white Ecuadorian people, she ultimately rejects Ecuadorian racist sexism by accepting her body as a historical memory of Black resistance.

Beginning at 11:30 AM

KIRKHOF CENTER 2259

Examining the Effect of a Hypothetical Safe Injection Facility on HIV and HCV Transmission Rates in Kent County, Michigan

Presenter: Trevor Ditmar
Mentors: Babasola Fateye, Adedipupo King

Previous literature has established that increases in prescription opioid misuse has resulted in similar increases in injection drug use (IDU), collectively referred to as the "opioid epidemic" in the US. Due to this surge in IDU, incidence of Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV) are on the rise in many regions. Research conducted in Canada and elsewhere has supported the use of Safe Injection Facilities (SIFs) and Needle Syringe Programs (NSPs) to mollify disease incidence, but only NSPs are operating in the US despite SIFs having been in use in Canada for several decades. As little research has been conducted in the US about where SIFs could be of benefit, we employ an analytical model to estimate the value of a hypothetical SIF in Kent County, Michigan (MI) using local surveillance data. Addition of such a facility was found to reduce HCV incidence by 7 cases / year, in addition to decreasing HIV incidence by 5%.

KIRKHOF CENTER 2263: https://scholarworks.gvsu.edu/ssd_orals/7

Searching Games: A Bound for the Responder

Presenter: Jose Garcia
Mentor: David Clark

A searching game with two unknowns and a lie involves two players, the *responder* and the *questioner*. Before the start of the game, the two parties predetermine an amount of numbers n to consider, and how many questions k the questioner can ask before the game ends with a victory (or loss) for the responder. The responder thinks of two secret numbers. The questioner asks questions of the form "How many of your two numbers are in the subset Q of

the set *{0,...,n-1}?*", in an attempt to search and find what the two secret numbers are. If the questioner identifies the two secret numbers within the agreed upon number of questions *k*, the questioner wins. The responder is allowed to lie in the game at most one time. We identify a bound on *n* and *k* for which the responder is guaranteed to win. This research was completed as part of an Alayont Fellowship in the Fall of 2019.

KIRKHOF CENTER 2270

The Hidden Cost of Gaycations: An Interdisciplinary Investigation of Queer Cross-Class Contact in Rural Resort Towns

Presenter: Brynn Wilfong
Mentor: Jae Basiliere

This research project explores the cultural collisions that occur between local queer residents of rural gay resort towns and wealthy urban visitors. These towns, which rely on the economic support provided by an annual influx of urban tourists, experience a yearly metronormative colonization of space, the effects of which fail to prioritize the needs of year-round queer residents, thereby alienating them. I will trace the origins and consequences of these class-based ruptures by sharing narratives that illuminate local residents' experiences of place, queer identity and power dynamics within these spaces, as well as tourists' motivations for visiting gay resort towns.

Beginning at 12:30 PM

KIRKHOF CENTER 2259

SARS-CoV2: Impacts and Implications

Presenter: Gage Paul
Mentor: Doug Graham

SARS-CoV2, the virus at the heart of the current global pandemic, belongs to a lineage with a history of causing acute respiratory and intestinal infections in both animals and humans. Members of this family, referred to as coronavirus, caused two earlier outbreaks, Severe Acute Respiratory Syndrome (SARS) in 2003 and Middle East Respiratory Syndrome in 2012, resulting in significant morbidity and mortality. To date, COVID-19, the disease caused by SARS-CoV2, has stricken more than 71,000 persons worldwide and claimed more than 1,800 lives. Cases of COVID-19 were first reported in China in late 2019 and have now been documented in 28 countries including the U.S. Highly infectious and lethal, COVID-19 is not only a public health emergency but has the potential to seriously impact the global economy. This presentation covers general scientific and medical concepts related to COVID-19 and explores how it is impacting the broader arc of human affairs, including student life at GVSU.

Beginning at 1:00 PM

KIRKHOF CENTER 2201

Exploring an Alternative Role for the COP9 Signalosome in the Ethylene Response Pathway

Presenter: Austin VanDenTop
Mentor: Matthew Christians

The gaseous hormone ethylene regulates various responses in almost all developmental stages of all plant species. A key protein in the pathway for sensing ethylene is the ER membrane protein Ethylene Insensitive 2 (EIN2), which is cleaved via an unknown interaction and travels to the nucleus. The protein responsible for this cleavage is unknown, however EIN2 has been shown to co-purify with a subunit of the COP9 Signalosome (CSN), a well characterized protease complex. In this project, we investigated CSN involvement in the cleavage of EIN2 using genetic knockouts of CSN subunits and Western blots of EIN2 mutants. We have found that the mutant *csn5a-1* has a significant shortened hypocotyl, and an abnormal phenotype. Through trials of protein extraction and Western blots, we have shown EIN2 C-terminus, which can be used to quantify EIN2 cleavage. Through characterization of this interaction, we can gain information on critical regulation pathways that are present in all plant species.

Beginning at 1:30 PM

KIRKHOF CENTER 2201: https://scholarworks.gvsu.edu/ssd_orals/12

A Biopsychosocial Interpretation of the Function of Religion Evolutionary Perspectives, Jamesian Principles, and Consequential Effects

Presenter: Austin Avison
Mentors: ATM Azfar Hussain, Sarah King

This article seeks to assess the psychological role in which religion plays within human emotion, behavior, and mental processes. The aims of this research are to provide a psychological oriented basis for interpreting the function of religion within human operation and interaction. First, by incorporating contributions that have been made within the subfield of evolutionary psychology in assessing the evolutionary and adaptive basis in which religious cognition and experience emerged. Further, by addressing the theoretical contributions made within Terror Management Theory in accounting for a psychological function that religion serves. Third, by incorporating the ideas of William James in providing a means of interpreting the experience of individuals. Finally, an assessment is provided of the psychological outcomes that are found to be associated with religion. While interpreting the effects that religion and spirituality have in terms of its consequential functional outcomes.

KIRKHOF CENTER 2266

The Monomyth Strikes Back

Presenter: Kristie DeVlieger
Mentors: Maya Hobscheid, Hazel McClure

The Monomyth, commonly referred to as The Hero's Journey, examines the stages of the hero who goes on an adventure, faces a crisis, and returns victorious. This narrative framework has relevance in a variety of fields, including marketing, narrative creation, classroom instruction, and literature analysis. As a WRT (Writing) major, I encountered many stories that would have benefited from the monomyth and sought a way to provide a tool to fill this need for student writers. My research involved reading related texts and creating a survey to evaluate current student knowledge. I learned several of the invisible research components, user accessibility training, and two software systems. I was able to create a Subject Guide on the Monomyth for the Library Website, that provides a comprehensive introduction to the topic and provides further resources. The Monomyth has continued importance as new applications of the framework develop, something I have been experimenting with since.

Beginning at 2:30 PM

KIRKHOF CENTER 2201

Microbial Experience Influences Tumor-infiltrating CD8+ T Cells

Presenter: Hanna Groeber
Mentor: Kristin Renkema

Immune cells have been harnessed for anti-cancer therapy with varying degrees of success. One reason for immunotherapy failures in clinical trials may be that typical specific pathogen free (SPF) mice do not model human microbial experience. We have adopted a model of microbial experience by co-housing SPF mice with pet store mice, therefore exposing the SPF mice to various pathogens. Our cohoused (CoH) mice are exposed to pathogens, while SPF controls remain pathogen-free; CoH mice also gain CD44hiKLRG1hi CD8+ T cells in the blood and spleen. We injected B16 melanoma cells into SPF and CoH mice and monitored tumor development and T cell activation ex vivo and in vitro. CoH tumors had increased frequencies of CD44hiKLRG1hi CD8+ T cells compared to SPF tumors, and CoH tumorinfiltrating CD8+ T cells exhibited increased activation. Ultimately these findings will contribute to our understanding of how microbial experiences shape anti-tumor immunity for future immunotherapy research.

Beginning at 4:30 PM

KIRKHOF CENTER 2266: https://scholarworks.gvsu.edu/ssd_orals/2

Democracy and Artistophanes' *The Birds*

Presenter: Chavala Ymker
Mentor: James Bell

Almost 2,500 years ago, Aristophanes wrote a scathing critique of Greek democracy and today it has the power to illuminate the failings of America's current political state. Through the comedy of absurd power, the parallels between Pisthetaerus and Donald Trump disturb. This presentation will investigate the statements Aristophanes made against the Ancient Greeks and extend them to the executive branch of America's government.

Session Abstracts & Schedule

Beginning at 10:30 AM

KIRKHOF CENTER 2263
Health through a WGS Lens
Presenters: Ariana Christian, Jennifer Gole, Samantha Gregoire, Shia'Ann Lee
Mentor: Leifa Mayers

Ariana Christian
Of the 23.1% of female undergraduate college students that experience sexual violence, only 1 out of every six women will get help for the effects of the violence. This project examines the language that is used in offering help to survivors of sexual violence on the Western Michigan University, Central Michigan University, and Grand Valley State University campuses. Discourse analysis is used to code the websites' language for assumptions about gender, class, and economic status. This research has implications for the accessibility of supportive services for the victim-survivors of sexual assault.

Jennifer Gole
In 2017 the global market for menstrual products was valued at 31.23 billion dollars. Much of the world's population menstruates, and advertising plays an important role in shaping how global audiences perceive menstruation. In this project, I examine Kotex advertisements in the magazine Good Housekeeping from the initial marketing of menstrual products in the 1920s to the late 1990s. I apply feminist discourse analysis and visual analysis to advertisements obtained through ProQuest's Women's Magazine Archive, coding for shifts and consistencies present in Kotex's messaging over the decades. Preliminary findings suggest that early advertisements work to establish Kotex products as a necessary addition to women's menstrual experiences, and advertisements across all decades convey implicit messages of shame and concealment. Examination of a prominent brand's messaging across decades offers important insight into how those who menstruate and society at large perceive menstruation.

Samantha Gregoire
A death of a mother during pregnancy, childbirth, or postpartum is one of the greatest tragedies that can occur within a family, with wide-ranging consequences for the child, their family, and the larger society. The maternal mortality rate in the United States has been steadily increasing since the early 1990's and has now skyrocketed past the global rate of 10.3 deaths per 100,000 births to 28.3 deaths. This research project analyzes the text of bills and debates in the United States Congress from the early 1990s to the present on the subject of maternal mortality and how the legislation and conversation around the subject has changed over time as the statistic has risen. An intersectional approach is applied as the texts are analyzed to understand the congressional construction of the typical 'mother' of maternal death and their attempts to relieve this public health failure.

Shia'Ann Lee
In the United States, people of color are at greater risk of mental illness due to the constant emotional and physical labor of dealing with racism and other intersecting systems of oppression. Coupled with stigmas of mental health in Black communities, and violence against Black men, this has impacted black men's mental health. Black men in the United States have some of the lowest life expectancy rates and quality of life levels compared to every other racial and ethnic demographic. This research uses an intersectional approach to analyze tweets published on a

Black men's mental health twitter page to see how Black men are conceptualizing their own mental health issues in today's political climate. Preliminary findings suggest that Black men are making connections between racism, white privilege in politics, and mental health issues. While the discussion of Black men's mental health is ongoing, it is important to hear their experiences in their own words.

Beginning at 1:00 PM

KIRKHOF CENTER 2263

Conversations on Representation of Marginalized Communities

Presenters: Gabrielle Angel, Ysabela Golden, Keenan Kangas, Rachael McCollum
Mentor: Leifa Mayers

Gabrielle Angel
Social media is used by many queer individuals to engage with content and cultural texts in an interactive way. This interaction provides an opportunity to give new meaning to these texts through a process of cultural recoding, or the creation of a new meaning for an object. My project uses critical discourse and visual analyses to understand how queer individuals have used cultural recoding to prescribe queerness to cryptids, or hidden animals like Big Foot. I seek to understand the ways in which these cryptids, whose existence is unconfirmed but plausible, have been recoded by queer individuals as both a form of representation and a way to subvert ideas of queer monstrosity. This recoding occurs in a world that is not built to support queer identities. Cultural recoding of objects like the cryptid can operate as a queer survival strategy as people navigate a world that systematically minimizes their existence.

Ysabela Golden
Market research indicates that nearly half of *Magic: The Gathering* players are women, but in-person competitive events are almost exclusively attended by men. Why do the women who make up 38% of the player base seem to only play casually, while men attend prereleases and Grand Prix events? This demographic disparity reflects broader findings on women's relationship with competition from decades of research in sociology and gender studies. This project uses a survey to ask players — both men and women — why they do or don't attend in-person competitive events, with the intent of clarifying the origins of this gender gap. Anticipated findings are that women will report more discomfort than men in competitive in-person settings. Understanding why women may feel excluded from competition in this community can have important implications for addressing women's underrepresentation in a variety of competitive fields.

Keenan Kangas
For hundreds of years, ballet has upheld a gendered binary of dancer archetypes. As a result of this binary, men are forced to assimilate into an ideal mold of masculinity if they wish to be successful in their career. While there is a general consensus on this topic in the literature, widely accessible videos of dance performance have not been analyzed. In my research project, I am applying visual analysis to a variety of ballet YouTube videos. I will code for the ways in which the performances contribute to or resist the expected ideals of masculinity in dance. I anticipate finding specific commonalities and trends among these videos in the stories they tell about masculinity. This study is significant for understanding the gender representations in dance that are widely accessible online.

Rachael McCollum
The title of this report is "Analyzing the Effect of Cure Rhetoric in Science Fiction." Drawing from research in disability media studies, I analyze episodes and story arcs of popular science fiction television shows to study how

they utilize the story element of curing disability. I use narrative analysis and visual analysis to understand media representations of disability in science fiction serials including Doctor Who and Star Trek. I seek to understand how these portrayals reflect the societal stereotypes about the quality of life of disabled people. I anticipate that these findings will indicate the usage of disabled bodies and concepts of cure as a way of indicating the quality of the portrayed future. The implications of this are that they may dismiss the lived experiences of disabled people in order to make a sweeping statement about medical advancements, in a way that goes against the stated desires of disabled people.

Beginning at 2:00 PM

KIRKHOF CENTER 2263
Discrete Mathematics
Presenters: Mirza Komic, Nicholas Layman, Maia Wichman, Cian-Kyler Young
Mentors: Feryal Alayont, David Clark, Lauren Keough, Michael Santana

Polycube and Polyomino Primality
by Mirza Komic, Nicholas Layman, Cian Young

Doubly Chorded Cycles in Graphs: https://scholarworks.gvsu.edu/ssd_orals/5
by Maia Wichman

Beginning at 3:00 PM

KIRKHOF CENTER 2215/2216
Psychology Department Oral Session I
Presenters: Madeliene Albrecht, Austin Bastien, Lola Erfourth, Tylor Kistler, Caryne Sterling, Monica Van Til
Mentors: Tara Cornelius, Mario Fific, Leon Lou, Todd Williams

Madeliene Albrecht
The Effect of Drawing Order on Proportion Accuracy in Observational Drawing
In a human figure drawing, the head is typically drawn earlier than other body parts and tends to be disproportionately larger (Thomas & Tsalimi,1988). An experiment tested whether this proportion error has to do with 1) the tendency to perceptually inflate an attended part, and 2) ascribing more significance to the head than the rest of the body. We ask subjects to draw an object with a top-to-bottom segmentation: a wooden human doll or a vase in the center and another object (mug) in the periphery of the scene. Subjects are asked to draw the center object from the top down or from the bottom up, and to draw the center object or the periphery object first. We expect the center object to be drawn bigger than the peripheral object due to the focused attention on the center. We also predict a bigger head-to-trunk ratio when the head is drawn first, but an absence of a similar bias in drawing the vase.

Austin Bastien
See first author (Albrecht) for abstract.

Lola Erfourth
See first author (Van Til) for abstract.

Tylor Kistler
Barriers to Bystander Interventions for Sexual Assault
Bystander intervention programs have consistently demonstrated beneficial effects on community norms and intervention behaviors (Kettrey, Marx, & Tanner-Smith, 2019). However, much of the research fails to measure opportunities to intervene relative to actual behaviors (McMahon et al., 2015), and how these behaviors relate to a personal history of sexual victimization (Woods et al., 2016). This study aimed to examine the relationship between a bystander's victimization history, perceived barriers, and bystander intervention. Data from undergraduate students (*N* = 583; 79.7% female; *M*Age=18.92) suggested that those with such a history *perceive* themselves as less able to identify risky situations, but are actually *more* likely to notice such situations and *less* likely to intervene. Therefore, it may be necessary to target perceived barriers as well as the disparity between observations and interventions in risky situations.

Caryne Sterling
See first author (Albrecht) for abstract.

Monica Van Til
Diagnosing Short-Term Memory Scanning Using Systems Factorial Technology: A Conceptual Replication
Townsend and Fific (2004) published an influential short-term memory (STM) study in which they observed individual differences in serial and parallel STM scanning. The authors employed systems factorial technology—a novel methodology that provides strong diagnostic tests of cognitive structuring—and presented a new method of manipulating probe-to-memory item processing speed for memory loads (N=2). Three variables were manipulated in this experiment: number of processing elements (N=2), phonemic dissimilarity of a target to the particular memorized item (high, low), and duration between the memorized set and a target (short, long). In the original study, 10 subjects each participated in 20 sessions. The present study serves as a conceptual replication in which two-hundred subjects each participated in 1 session and a novel memory load condition was included. Results contributed converging evidence in testing serial/parallel processing in short-term memory scanning.

Beginning at 4:00 PM

KIRKHOF CENTER 2215/2216
Psychology Department Oral Session II
Presenters: Dominic Bonanni, Molly Dayton, Lucretia Dunlap, Hanali Gilbert, Jayce Masters, Kegan Olsen, Ethan Reischling, Elise Richards, Joshua Thompson
Mentors: Luke Galen, Todd Williams, Michael Wolfe

Dominic Bonanni
See Kegan Olsen, "Does Misinformation..." first author, for abstract

Molly Dayton
See Kegan Olsen, "Does Misinformation..." first author, for abstract

Lucretia Dunlap
Binding Morality Foundations, Moral Enhancement, and Religious Attributions Using a Bogus Feedback Paradigm
Lucretia Dunlap, Jayce Masters & Luke Galen
The illusory belief that one is morally superior to others is widespread. There are individual differences in the need to see oneself as moral. For example, religious individuals tend to self-enhance their perceived level of morality. In our study, participants completed measures of moral attitudes and behaviors and received either high or low (bogus) feedback on their moral performance. Those high in binding moral foundations (e.g., valuing obedience and group allegiance) who received high feedback were significantly more likely to attribute their motivation to religious sources. Binding moral foundations may be particularly linked to self-enhancement.

Hanali Gilbert
See Elise Richards, "Machiavellianism" first author, for abstract

Jayce Masters
See Lucretia Dunlap, "Binding Morality" first author, for abstract

Kegan Olsen
Does Misinformation about Past Beliefs Influence Current Beliefs?
Kegan Olsen, Michael Wolfe, Molly Dayton, Dominic Bonanni & Todd Williams
When belief change occurs, people tend to mis-remember their initial beliefs. Specifically, past beliefs are recalled as closer to their current beliefs than they really are. This implies that current beliefs are salient at the time of recollection, which influences the recollection process. Alternately, it is also possible that current beliefs are themselves influenced by information that is salient at the time they are stated. In this experiment, subjects read a text that was consistent or inconsistent with their previously stated beliefs on gun control. Next, subjects reviewed their previously stated beliefs, where the gun control belief they verified was either accurate, or opposite to what they had reported and then reported their current beliefs. Results may show that misinformation about past beliefs can influence current beliefs.

Ethan Reischling
See Joshua Thompson, "The Under-representation of Women" first author, for abstract

Elise Richards
Machiavellianism Predicts Careless Responding if Incentive is Present
Elise Richards, Hanali Gilbert, Alex Denison, Michael Wolfe & Todd Williams
Using the Two-Dimensional Machiavellianism Scale (TDMS; Monaghan, Bizumic, Williams & Selbom, 2019), we assessed whether Machiavellianism was related to careless responding. The participants were introductory psychology students who had completed the TDMS and the mini-IPIP personality inventory (Donnellan, Oswald, Baird & Lucas, 2006) during a pre-screening session earlier in the semester. The study had participants complete a basic arithmetic task, followed by the mini-IPIP. Participants were instructed to complete the mini-IPIP as quickly as possible, but without sacrificing response accuracy. Results show that when quick responding was incentivized higher levels of Machiavellianism predicted increased levels of careless responding. Careless responding did not vary by Machiavellianism when incentive was not present.

Joshua Thompson
The Under-representation of Women in Magic the Gathering

Joshua Thompson & Ethan Reischling

Magic the Gathering (hereafter MTG) is a trading card game that has more than 20 million active players. MTG is played both recreationally and competitively, and some players compete for substantial prizes at professional events. Although women comprise roughly 38% of all players, they comprise only 1-5% of professionals. We are conducting an online survey of MTG players to explore why women are underrepresented among professionals. Previous studies suggest that women may be underrepresented because, compared to men, they are less competitive, practice and play less, practice differently, receive less social support, or face discrimination. We will present our results and discuss their potential implications for understanding women's underrepresentation in other achievement areas.

Exhibition of Art Statements

9:00 AM - 5:00 PM

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 12: https://scholarworks.gvsu.edu/ssd_orals/8

Pushing Boundaries: Experimental Expressions

Presenters: Abigail Emens, Olivia Kelly, Sydney Kruise, Jillian Neumann, Kimberley Quinn, Meghan Reiman, Jacob Westbrook, Zoe Zaroff

Mentor: Victoria Veenstra

Part One - Natural

As a collective, we aim to explore the interplay between nature and humanity through experimental photographic mediums both 2D and 3d. We hope to convey eight different interconnected perspectives on this concept. To achieve this, we incorporate photographic mediums involving elements from the natural world such as the obvious, plants, butterflies, and spider webs, to the more abstract existence of humans. We were once heavily connected with nature, relying on it to sustain life. While nature continues to be essential to human survival, we have become disconnected.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 13: https://scholarworks.gvsu.edu/ssd_orals/3

Pushing Boundaries: Experimental Expressions

Presenters: Abigail Emens, Olivia Kelly, Sydney Kruise, Jillian Neumann, Kimberley Quinn, Meghan Reiman, Jacob Westbrook, Zoe Zaroff

Mentor: Victoria Veenstra

Part Two - Unnatural

As a continuation of part one, we attempt to accentuate the growing disconnect from nature. In their obsession for perfection, humans have sought to replicate everything natural in a flawless and everlasting way. Not only have we produced fake plants and artificial flavoring, but we have also started manipulating ourselves to form a distorted version of the original. To show this, we are combining human elements with our synthetic products and framing our work in a way that you can clearly see the distortion. Nature is essential to human survival, yet we continue to become unnatural. Survival is not guaranteed.

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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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