

25TH ANNUAL

STUDENT

Scholars

DAY

APRIL FOURTEENTH
2021



Morgan Lammers

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SSD Committee

Feryal Alayont	Mathematics
Alice Chapman	History
Elizabeth Flandreau	Psychology
Lauren Keough	Mathematics
Andrew Lantz	Chemistry
Vinicius Lima	Visual and Media Arts
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
Shelley Sickrey	Office of Undergraduate Research and Scholarship
Danielle Uribe	Office of Undergraduate Research and Scholarship
Richard Vallery	Physics
Todd Williams	Psychology

Welcome to Student Scholars Day 2021!

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 25th year, Student Scholars Day adapted to a virtual world, where COVID-19 posed a challenge for our large, in-person event. The SSD Committee decided to use the [Symposium by ForagerOne](#) website to host both recorded and live presentations via ZOOM.

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 for Student Scholars 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, and LaMaiya Wright who made this process manageable and enjoyable. We thank the members of the 2021 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.

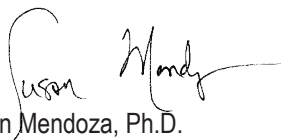
Once again, our deepest gratitude goes to Dan Slaughter for all of his work in the web registration for SSD, and especially for his help this year in using a new website to virtually host our event.

Thank you to Morgan Lammers 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. Morgan'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

Live Presentations

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

See page 10 for detailed schedule and abstracts.

Recorded Presentations

On Symposium April 12 - April 26

See page 16 for abstracts.

Live Plenary Speakers

April 14, 12:00 PM & 4:00 PM; April 15, 1:00 PM

See page 5 for detailed schedule.

Statement from the Cover Artist

Morgan Lammers

This design was inspired by the creativity and perseverance of GVSU students and faculty during the recent difficult times. Regardless of facing such adversities, students have continued to excel in their studies and find joy in learning. Around the border of the design are some of the highlights of our beautiful campus, such as the library, the statues, the nature, and the iconic clock tower.



Live Plenary Speakers

April 14, 2021, 12:00 PM

Michale Dykstra: Physics, Mayan Health, and Harvard Med: Charting a Path Through Uncertainty

My academic and personal journey has taken me places I couldn't have dreamed when growing up on a small farm in Western Michigan. It started at GVSU combining physics with pre-med, cascaded through research experiences across the country and abroad, and ultimately led to Harvard Medical School and beyond. If there has been one central theme throughout this path, it has been uncertainty. I will elaborate on this academic and personal journey and apply it to the vast uncertainty we all are feeling in the present moment.



Michael Dykstra is currently completing an internship in internal medicine at Beth Israel Deaconess Hospital in Boston and will begin residency in radiation oncology at the University of Michigan in July 2021, where he hopes to continue working at the intersection of novel cancer technologies and improving healthcare for marginalized populations domestically and globally.

April 14, 2021, 4:00 PM

Littisha Bates: From Success to Significance: Leveraging the Ivory Tower for Public Good

This talk will discuss broadening our understanding of what success is within and outside of higher education. The talk will also discuss ways in which we can align our personal and professional goals and success with doing public good.

Littisha A. Bates is the Associate Dean for Inclusive Excellence and Community Partnerships and an Associate Professor of Sociology with a Faculty Affiliation with the department of Africana Studies at the University of Cincinnati.



April 15, 2021, 1:00 PM

Scholars Strategy Network of Michigan: Communicating with the Media and Policymakers: How to Make Your Research Translatable

How do you connect and share your research with policymakers and journalists? Our presentation will help you identify and develop connections to share your work. We will also provide guidelines and tips on writing about your work and making relevant connections to policy debates. Sarah Reckhow and Jon Spiegler will be co-presenting.

History of Student Scholars Day

by Neal Rogness and Shelley Sickrey

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

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

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

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



Highlights of OURS Programs

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

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

The Student Summer Scholars (S3) program provides funds for a student and faculty mentor to devote about twelve weeks/400 hours to a research and/or creative project during the spring/summer semester. The Modified Student Summer Scholars (MS3) program 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 2020 Student Summer Scholars presenting at this year's SSD include:

Jillian Ashton, Alex Baker, Trevor Beardsley, Jakob Benjamin, Taylor Blad, Hailee Cederquist, Catherine DeFouw, Michelle Dykstra, Jessica Ensing, Nathan Funckes, Ysabela Golden, Jake Gunn, Sofia Hessler, Haley Kuhnle, Colin McHugh, Grace Miller, Jordan Pattison, Lauren Proctor, Phathit Renas, Elise Richards, Levi Smith, Hanna Szydlowski, and Jonathan Wassink.

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



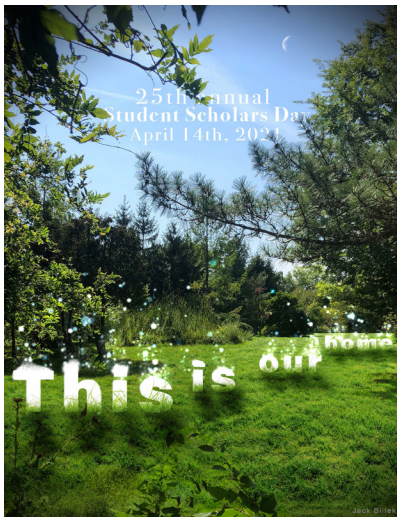
Highlights of Student Work

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.

Jack Billek
Our Home



Grace Close
Cover Design



Jack Billek
UFO transfer



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
P. Douglas Kindschi Undergraduate Research Fellowship in the Sciences
Student Summer Scholars (S3)/Modified Student Summer 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

Live Sessions & Extended Sessions, Abstracts & Schedule

Beginning at 9:00 AM

VIRTUAL SYMPOSIUM 502

NRM Capstone Griff's Section

Presenters: Lyndsie Calhoun, Jake Golding, Tyler Lidgard, Senci Pace-Monasterski, Audrey Patrick, Kristen Reidenbach, Eric Roberts, Jenna Sorenson, Kayleigh Zechmeister

Mentor: Griff Griffin

9:00 AM: The effects of anthropogenic climate change on Michigan winters and snowshoe hare habitat (Lyndsie Calhoun)

Snowshoe hares evolved to depend on snowfall beginning and end dates to change their colors and hide from predators. With changing winters, they are at risk of changing their colors at times that are inconsistent with the snow, which puts them at increased risk for predation. The purpose of this research was to determine the effect of anthropogenic climate change on Michigan winters and the habitat of snowshoe hares. Temperature and precipitation data were examined over the past 50 years, and was used with vegetation data to create a habitat suitability model for snowshoe hares using ArcGIS. The results indicate that winters have gotten warmer with less precipitation, as well as later snowfall starting dates, which have pushed snowshoe hare habitats north. This is one of many species whose habitat is being negatively impacted by climate change.

9:30 AM: An Ecological Restoration Plan for a Dry Sand Prairie at Townsend Park in Cannonsburg, Michigan (Tyler Lidgard)

Spotted knapweed is an invasive species that was introduced to America in the 1800's. Since its arrival, it has grown to dominate disturbed areas such as old fields. The purpose of this restoration plan is to restore a spotted knapweed infested area at Townsend Park, Michigan, to a dry sand prairie community. A nested quadrat survey was done to determine the percent cover of spotted knapweed present. Another nested quadrat survey was done at a reference site to determine the grass and forb species present within a healthy dry sand prairie. To successfully restore an area into a healthy target community, all invasive species need to be eradicated and the area should be monitored and treated annually. To alter this area's current condition, the spotted knapweed will be removed through fire treatments, herbicide treatments and prairie species plantings.

10:00 AM: Developing a Monitoring Plan to Determine the Effects of Dust on Plants of the Alvar on Drummond Island (Jenna Sorenson)

Alvars have a very fragile ecosystem. These limestone plains contain almost no soil, creating a unique environment sensitive to change. As a result, the alvar is home to many rare species. The alvar on Drummond Island, MI, is frequented by off-road vehicles (ORVs) on gravel paths. ORVs displace dust as they travel, which settles onto plants. The purpose of this study is to develop a monitoring plan to determine how dust from ORVs affects alvar plant species. This study examined species type, plant density, and distance from trail to see if dust from the trail impacts plants. A literature review was conducted to identify how dust can affect plants in general. The monitoring plan focuses on analyzing plant information at 0.10 mile transects along the gravel path.

11:00 AM: The Effect of Slope on Camping Buffers in Wildernesses (Kayleigh Zechmeister)

The purpose of this research was to determine the impact slope has on 200-foot camping buffers recreational users are recommended to follow while camping in Wilderness. The reason for 200-foot camping buffers from bodies of water is to protect the water quality and to not let wildlife feel threatened by human presence. Throughout certain Wilderness recommendations, the slope is too steep for campers to camp on. The importance of this research is to show that Wildernesses do not use a 200-foot camping buffer, instead, they use a 100-foot buffer because recreational users are not able to set up their tents on steep slopes to camp on. GIS techniques were used to determine the slope of different terrain and tell that some Wildernesses have a 100-foot buffer instead of a 200-foot buffer because the slope of the terrain is too steep.

11:30 AM: Accuracy of the Environmental Impact Statement Predictions for the Removal of Dams on the Elwha River and the Effect on Fish Populations (Audrey Patrick)

The installation of the Elwha and the Gilles dam caused salmon and trout populations decrease dramatically. This paper investigates whether the Environmental Impact Statement (EIS) for the Elwha River dams removal was accurate, the focus was on fish populations before and after dams were removed. Before the dams were built in the early 20th century, approximately 400,000 chinook salmon migrated annually within the Elwha River. By the late 20th century that number had decreased to 3,000. The EIS stated that populations would return to pre-dam levels. Data were collected from government agencies, including the National Park Service, using various fish population counting techniques. The results indicate that the current numbers of fish are higher than years prior to removal, but there is still a long way to go.

2:30 PM: Identifying Suitable Hemlock Habitat at Risk of Hemlock Woolly Adelgid Infestation (Eric Roberts)

Native plant and animal species are threatened by the introduction of invasive pests. The purpose of this research is to create buffer zones around known *Tsuga canadensis* (Eastern Hemlock) that are infested with *Adelges tsugae* (Hemlock Woolly Adelgid [HWA]). Habitat preferences of similar hemlock populations were used to identify potential hemlock habitat that is at risk for infestation. The focal location of this study - Oceana County, Michigan - has a large population of Eastern Hemlock located along the shoreline in dune systems. As HWA continues to spread, Eastern Hemlock populations will experience higher mortality. The threat of HWA on Eastern Hemlock and the ecosystems it inhabits is becoming increasingly important to research and manage. Current management strategies can be made most effective by knowing more about the potential distribution of the pest.

3:00 PM: ASSESSING WILDFIRE PROBABILITY IN THE MAINSTEE NATIONAL FOREST (Jake Golding)

Fire management over the last half-century is now focusing on the idea of pre-fire planning and risk-informed decision making. The purpose of this paper is to provide critical data in order to help assess wildfire probability in the Manistee National Forest to help maintain a high level of ecological health. A geographic information systems (GIS) evaluation was used to categorize data and illustrate the risk of wildfire. The risk of fire in the Manistee National Forest was based on a custom fire risk assessment model that features biophysical characteristics like fuel load, vegetation composition (flammability), and slope. The findings are discussed in order to give the Forest Service (USFS), a better understanding of which areas surrounding and within the Manistee National Forest are at a high risk for wildfire as well as how to manage these areas.

3:30 PM: Climatic Changes in The Kirtland's Warbler Habitat in Michigan (Senci Pace-Monasterski)

In this study I analyzed how climate change is altering the *Pinus banksiana* (Jack Pine) and how it is potentially impacting the *Setophaga kirtlandii* (Kirtland's Warbler). I examined how changes in temperature and precipitation are causing the Jack Pine to migrate, and how that is directly impacting the Kirtland's Warbler in Michigan. I used

the Midwestern Regional Climate Centers (MRCC) temperature data from the last 30 years to create a spatial interpolation map using Geographic Information Software (GIS) to depict temperature changes in habitat. I then mapped temperature predictions in MI for the next 30 years. I discussed how this could impact the Kirtland's Warbler.

4:00 PM: Ecosystem Diversity in the National Wilderness Preservation System (Kristen Reidenbach)

The National Wilderness Preservation System (NWPS) was created in 1964 by the Wilderness Act. A major goal of the Wilderness Act is to help ensure ecological and landscape diversity. The NWPS began with 9.1 million acres and today contains about 111 million acres. There are 803 Wilderness Areas that amounts to about 5% of the United States with Alaska containing about 2% of the Wilderness. In the past ecosystem diversity was one of the criteria RARE II evaluated for potential wilderness additions. The purpose of this research is to identify the ecosystem diversity within the NWPS. Using Geographic Information System (GIS) a spatial representation of the ecological diversity within Wilderness was created in ArcMap. This evidence can be used to evaluate potential future wilderness additions which will provide information to identify types of ecosystems that are scarce.

Beginning at 1:00 PM

VIRTUAL SYMPOSIUM 515

LGBTQ Health Care

Presenters: Nicole Drabek, Heather Lewis

Mentor: Leifa Mayers

Barriers to Healthcare for Non-Heterosexual Individuals (Nicole Drabek)

Barriers in physical and mental healthcare are damaging for non-heterosexual individuals, exacerbating disparities in physical and mental health issues and worse outcomes. This project examines what barriers to healthcare are prevalent through an interview-style survey using a mixed approach of content analysis and interview analysis. The larger themes from the data are used to show what kinds of barriers appear to be the most prevalent, as well as tell us what kinds of things non-heterosexual people would like to see fixed in the healthcare system. Preliminary findings show that most people just want their sexuality taken seriously in healthcare settings, as well as the desire for same-sex sexual health knowledge and training for those who work in the field. These findings support the literature in terms of changes for healthcare providers to make to give better care to their non-heterosexual patients.

Healthcare Inclusivity (Heather Lewis)

Healthcare systems around the world are becoming increasingly focused on social determinants of health, defined as factors in the environment that shape health perception and outcomes for individuals (HealthyPeople.gov, 2020). Despite this growing awareness, many areas of public health still leave vulnerable populations out of the conversation about health care provisions (Fry-Bowers et al., 2014). This project will examine available information regarding public health initiatives of the six largest Michigan cities. Content and visual analysis will be used to look at how public health agencies describe the specific barriers and inequities experienced by people facing poverty and people with LGBTQ+ identities. The data will also examine plans to reduce these gaps and address inequities. This research has implications for the inclusiveness of public health in Michigan and may help identify healthcare gaps for people with multiple minoritized identities.

Beginning at 2:00 PM

VIRTUAL SYMPOSIUM 509

Psychology Department Synchronous Session

Presenters: Dominic Bonanni, Rachel Carpenter, Abigail Coffing, Elise Richards, Connor Thompson

Mentors: Lawrence Burns, Luke Galen, Benjamin Swets, Todd Williams

Effects of Social Media Use on Reading Comprehension (Dominic Bonanni)

Critics argue that social media use has detrimental effects on cognitive function. Language is an essential cognitive function, and social media use may have an impact on language comprehension. To investigate this possible effect, we conducted a study where participants answered a series of questions measuring social media usage and consumption of written media. They then read both a social media excerpt (presumably more linguistically superficial) and a newspaper excerpt (presumably fostering deeper language comprehension). After each reading, participants answered questions that occasionally contained semantic anomalies (e.g., "How many animals did Moses bring on the Ark?", which is anomalous because it was Noah who was on the Ark). We test whether exposure to social media is associated with superficial processing and a decreased ability to detect semantic anomalies.

Developing a Short Form of the Positive and Negative Perfectionism Scale (PANPS-SF) (Rachel Carpenter)

This study assesses Terry-Short et al.'s (1995) Positive and Negative Perfectionism Scale (PANPS), which is based on reinforcement theory. The results of the first study (CFA of the original structure of the PANPS) support acceptable levels of fit with RMSEA but suggest that improvements to the scale may allow more confidence in the theoretical utility of positive and negative perfectionism. Using the Item Response Theory (IRT) metrics, the PANPS was reduced to 20 items. The PANPS-SF showed a good fit with the data when we ran a CFA on the newly developed short form. The results of the final study indicate that the PANPS does offer predictive validity over Hewitt and Flett's (1991) MPS subscales in predicting indices of wellbeing. These results challenge objections in the literature to the use of the PANPS to measure perfectionism.

The Self-Enhancing Functions of Binding versus Individualizing Moral Foundations (Abigail Coffing)

Moral Foundations Theory (Graham & Haidt, 2010) suggests two distinct bases for moral judgments: Individualizing (care, justice) and Binding (group loyalty, obedience, sanctity). However, these have not been compared regarding their relationship to the centrality of individuals' self-image or their moral self-enhancement. These latter constructs may bias self-reporting in morally relevant contexts. Religiosity, which correlates with higher Binding foundations, has been associated with moral self-enhancement. We manipulated the salience of morality by having participants respond to the moral measures either before or after responding to religious measures. Results indicate that Binding foundations and self-rated morality were lower when preceded by religious measures. Further, only Binding foundations were correlated with self-enhancement and religiosity.

Machiavellianism, Morality and Secularity (Elise Richards)

Recently, researchers have advanced a two-dimensional conceptualization of Machiavellianism (Monaghan et al., 2020). The *views* dimension assesses negativity and cynicism towards others while *tactics* relates to the use of interpersonal manipulation. This study examined how these dimensions relate to moral values and foundations. A sample of 477 undergraduate students completed the two-dimensional Machiavellianism scale (TDMS; Monaghan et al., 2020) along with the moral foundations questionnaire (MFQ; Graham et al., 2013), a modified version of moral dilemmas (Moore et al., 2008), and the dimensions of secularity scale (DoS; Schell, 2015). Results show that

while tactics correlated with most dimensions of the DoS and MFQ, views only correlated with loyalty. Responses to the moral dilemmas indicated that Machiavellianism is associated with an emphasis on utilitarian values.

The Relationship between Cultural Orientation and Machiavellianism (Connor Thompson)

The personality trait of Machiavellianism comprises two dimensions, views and tactics. Views are characterized by a negative and cynical view of others, while tactics relates to the use of interpersonal manipulation for interpersonal gain. This study examined how views and tactics are related to the dimensions of cultural orientation. 477 undergraduate students completed the two-dimensional Machiavellianism scale (Monaghan et al., 2020) and the Cultural Orientation Scale (Triandis & Gelfand, 1998). Results show that collectivist and horizontal cultural orientations were negatively associated with views and tactics. Conversely, individuals with a vertical and individualist orientation exhibited the highest levels of tactics. Results indicate that cultural orientation influences individual's views towards and willingness to manipulate others.

VIRTUAL SYMPOSIUM 527

Producing Queerness

Presenters: Arahey Garay-Negron, Alivia Johaneck, Megan VanZwoll

Mentor: Leifa Mayers

Poster Child (Arahey Garay-Negron)

Since Netflix began creating Netflix Original Series in 2013, there has been a marked attempt to increase the amount of shows targeted at varied demographics - namely the LGBTQ+ community. The GLAAD *Where Are We Now?* report between the years 2015 and 2020 shows that Primetime Broadcast TV (PBTv) has caught up to streaming media in regards to LGBTQ+ representation in its shows (GLAAD, 2015-2021). This paper analyzes whether there is a qualitative difference in the physical representation of LGBTQ+ bodies - namely, the representation of bodies of color - on promotional posters between those produced by CW, a PBTv Network, and Netflix, a streaming network. I hypothesize that streaming services such as Netflix have more liberty to explore racial diversity in their marketing than network shows, even if the shows themselves have relatively equal representation ratios.

More Than Just Friends? Unpacking Queer Female Sexuality Within the Sleepover Environment (Alivia Johaneck)

Sleepovers are important social environments for adolescent youth that assist with the transition into adulthood and encourage group engagement with individual identity negotiation (Mansfield, 2018). Within sleepover spaces, the exploration of gender and sexuality often facilitates girls' integration into normative feminine identity (Velding, 2015). However, because these spaces exist free from external influence, the possibility for queer engagement emerges. This interview project examines the sleepover experiences of queer individuals assigned female at birth to assess the perceived impact of these experiences on the discovery of identity. I investigate the perceived influence of sleepover environments on one's coming-out process. Articulating how homosocial spaces empower queerness is important to the recognition of social factors that may contribute to understanding one's sexuality.

Experiences of Queer Identity in a Heteronormative Society (Megan VanZwoll)

Queer individuals often struggle to balance their identities with society's rules about how people are "supposed to act," in turn rewarding queer people who assimilate to homonormativity while punishing queer people with identities that deviate from the norm (Bolen, 2016). This project uses a hybrid textual and visual analysis to code YouTube videos for the ways in which queer-identified people experience their own queer identities in relation to their social environment. Preliminary research findings suggest that identity formation is influenced through finding community,

exposure to negative stereotypes, feelings of exclusion or rejection from peers and family, and the negotiation of multiple intersecting identities. This project contributes to the existing research by centering queer individuals' lived experiences.

Recorded Presentation Abstracts

VIRTUAL SYMPOSIUM 001

Investigating Dopamine Signaling In Habit-forming Brain Patches

Presenter: Karen Braun

Mentor: Eric Ramsson

Habitual responses and habit formation are essential skills for organism survival. Located within the brain's striatum, which is important in movement, are groups called patches. Patches have been shown to selectively activate during simple repetitive motor responses when elicited by a stimulant. This suggests that patches may control habitual behaviors and therefore habitual responding. Due to visualizing difficulties of patches in coronal brain slices, the true purpose of the patches in habit formation is not well understood. MOR-mCherry mice allow for better neuroanatomy visibility, due to the expression of the Oprm 1 gene opioid receptor, which produces a fluorescent red color. The Ramsson lab supplied the mice by breeding 1 male MOR-mCherry mouse with 2 phenotypically regular female mice. The product of being heterozygous litters for MOR-mCherry that display the red color. Patches in the MOR-mCherry mice were identified to examine the possible role of dopamine signaling.

VIRTUAL SYMPOSIUM 002

Misconceptions of Race and Mental Health: A Review of the Literature

Presenter: Noemy Parra-Cano

Mentor: Jennifer Stewart

An assumption made in U.S. society is that minoritized populations such as Hispanic, Asian, and Native Americans are more culturally collectively oriented than White Americans who are culturally individualistically oriented. In my initial literature review, no link was found between race and cultural orientation or cultural orientation and stigma against therapy. Having examined these points, the purpose of this study shifted to an analysis of the literature regarding patterns in mental health disorders that vary along lines of race in the US. Relevant findings of this research demonstrated marginalized race groups in the US are underrepresented in psychological studies, frequently misdiagnosed, and overmedicated. Social factors such as racism and lower socioeconomic status increase the severity of mental health disorders as well as their duration. Therapy that involved culturally adaptive models was shown to improve outcomes.

VIRTUAL SYMPOSIUM 003

Improving Statistical Analysis and Reporting with Doctor of Nursing Practice Students

Presenter: Emily Dorn

Mentor: Rebecca Davis

Doctor of Nursing Practice (DNP) students need to have a good understanding of statistics. As stated in previous literature, practices utilized in nursing are driven by evidence-based practice. An understanding of statistics is necessary to apply new research to practice. A quality-improvement project was completed to improve DNP students' statistical analysis and reporting. An audit of previous GVSU DNP students' dissertations from 2019 was conducted to assess statistical analysis and reporting. 52% (13/25) of students analyzed and reported their data appropriately. The most common issue was misreporting statistical analysis. Descriptive statistics and chi-square tests were utilized most often. Based on the results of the audit, new methods were implemented to help DNP

students increase their understanding of statistics. Hopefully, the results of these changes will be seen in the papers written by this year's DNP students.

VIRTUAL SYMPOSIUM 004

RT Diagnostics Symptom Calculator

Presenter: Anthony Neubacher

Mentor: Eric Ramsson

RT Diagnostics Symptom Calculator is a new and improved way to calculate one's symptoms on the web. Modern symptom calculators fall in the range of 1500-2000 symptoms, which is analogous to this one. The difference between this calculator and others is the "plugging in symptoms" feature. This tends to be problematic because it is difficult to know the name of every symptom one is experiencing. This calculator has the user select regions of the body where they are experiencing symptoms and then brings them to an organized list where they can choose their symptoms. If a symptom is complicated, the calculator will allow the user to view a short description so that it is better understood. The efficacy is currently being tested since a healthcare institution is interested in implementing this website for their clinic. Most importantly, I wanted to impact a large magnitude of people so that a positive ripple effect will be able to reach those in need.

VIRTUAL SYMPOSIUM 005

“Blessed Be, You Are Among Witches”: Neopagan Identity Formation and Digital Community

Presenter: Samantha VanderMolen

Mentor: Michael Wroblewski

Modern pagans form spiritual paths based on personal and eclectic practices, beliefs, and deities. While previous research on pagan identity formation highlights individualistic experiences, this study addresses the function of community in an online setting. This study is based on six months of participant observation research in a digital coven, including in-depth interviews with practitioners and analysis of their personal narratives of spiritual development. This research first analyzes the unique conversion process within the pagan community as an expression of inherent spirituality. Second, this study addresses the role of digital communities in providing space for both solitary and group practice, by allowing independent practice within a low-risk social environment. Third, digital pagan communities are able to maintain themselves through the acceptance of diverse spiritual paths and rejection of the authoritarian structures of other religious systems.

VIRTUAL SYMPOSIUM 006

Spirituality/Faith in Nursing

Presenter: Shayanna Schut

Mentor: Heather Wallace

The concepts of Spirituality and faith are neglected in applied nursing research. This rapid review examines the importance of faith and spirituality in nursing practice, with attention to support and burnout. Evidence emphasizes positive patient and family outcomes when faith and spiritual needs are addressed. Due to the lack of knowledge and confidence among nurses in addressing patient faith and spirituality, there is a need for nurses to acknowledge and incorporate faith and spirituality. Research demonstrates that nurses are supported and provide exceptional, holistic care to their patients when they incorporate faith and spirituality in their practice.

VIRTUAL SYMPOSIUM 007

An Integrative Review of Incivility in Nursing Education: We All Suffer Similarly

Presenter: April Butler

Mentor: Susan Strouse

Background: Incivility is a persistent problem in nursing education, with research documenting this phenomenon for over 40 years. This integrative review describes the current literature on incivility in nursing education. Concept mapping of this integrative review revealed many facets and participants in this ongoing problem.

Methods: Torraco's (2016) method guided this integrative review. Databases searched included CINAHL, ProQuest, and PubMed for research studies.

Results: Twenty-four research studies were identified for inclusion in this integrative review.

Conclusion: Incivility in nursing education is well documented in the research literature. Intervention studies mainly focused on changing the behaviors of students without considering the way in which faculty contribute to the problem of incivility. Concept mapping assisted in identifying commonalities between uncivil behaviors experienced by students and faculty.

VIRTUAL SYMPOSIUM 008

Registered Nurses' Images of Nursing During a Pandemic

Presenter: Abigail Slaktowski

Mentor: Susan Strouse

The purpose of this research study was to discover any new or transformed images of nursing during the COVID-19 pandemic in the United States. The research question was "What are Registered Nurses' images of nursing working during a pandemic?" Registered nurses submitted an image and a brief narrative of the image through REDCap®, a secure database, describing how the image and culture of nursing is impacted by the COVID-19 pandemic.

Using Leininger's Four Phases of Data Analysis (1991), the five submitted photos and narratives were analyzed.

Data analysis revealed fourteen categories, then five patterns, then two final themes: "trying to make it work" and "balancing competing and changing priorities." Member check confirmed both themes. New images of nursing were found to have emerged from the pandemic, with implications for practicing nurses, new graduate nurses, and nursing students as they navigate the changed profession.

VIRTUAL SYMPOSIUM 009

Female Infertility Treatment, Maternal Characteristics, and Adverse Birth Outcomes

Presenter: Danielle Uribe

Mentor: Sarah Nechuta

Our objective was to determine the association between fertility treatments and adverse birth outcomes of intended pregnancies using the Pregnancy Risk Assessment Monitoring System (PRAMS). Data from 29,917 intended pregnancies, collected from 2009 – 2018 in the United States, were included in our analysis. PRAMS data consisted of questionnaire and birth certificate data. Logistic regression was used to determine the odds ratios and 95% confidence intervals of an adverse birth outcome of fertility treatment use, as well as the relationship between maternal characteristics on these outcomes. Use of any type of fertility treatment for singleton births was significantly associated with higher odds of a cesarean delivery, preterm birth, and an infant hospital stay over 5 days. Black race, age >40 years, pre-pregnancy obesity, tobacco use, high blood pressure, and depression were also associated with increased odds of multiple adverse birth outcomes.

VIRTUAL SYMPOSIUM 010

Exploring Teachers' Beliefs and Practices With Students Who Stutter

Presenters: Grace Kropiewnicki, Courtney Martin, Allison Shattuck, Sarah Willett

Mentor: Cara Singer

This presentation will describe a study that explored teachers' views, backgrounds, and practices related to students who stutter. An online survey was designed and sent to superintendents across the United States (two per state) for further distribution of teachers; links to interest surveys were also posted on social media sites. Questions in the survey covered respondents' demographics, knowledge and completion of continuing education on stuttering, experience with students who stutter, and views on the needs of students who stutter. Select findings that highlight the needs and views of teachers will be reported and discussed. Implications include ways to support teachers working with students who stutter and further directions for research.

VIRTUAL SYMPOSIUM 011

Can Ageism Be Reduced by Service Learning Built in a Lecture-Based Aging Course?

Presenter: Liam Hart

Mentor: Jing Chen

Ageism, or prejudicial attitudes about individuals based on age, is pervasive in society. Theories such as terror management theory, social identity theory, and stereotype embodiment theory have been used to explain what may give rise to ageism. Research also suggests that education about aging and reciprocal intergenerational interactions can reduce ageism and a combination of these two could be most effective. The present study investigated whether college student's perception of old age can be influenced by taking a psychology class on aging, a lecture and discussion-based course with a project that requires students to participate in activities with residents at a local retirement home. The Fraboni Scale of Ageism (FSA) was administered to the students at the beginning and end of the course. The results showed a significant reduction in the overall score and two out of three subscales of FSA (stereotype and separation but not affective attitudes).

VIRTUAL SYMPOSIUM 012

2017 Program Evaluation of Girl Scouts of Michigan Shore to Shore

Presenters: Alejandro Hoban, Levi Rosendall

Mentor: Sango Otieno

The purpose of this analysis is to generate funding for the Girl Scouts of Michigan. In 2017 the survey "Girl Scout Voices Count (GVSC)" was conducted on the following groups: parents, troop leaders, and the girls. Data cleaning and analysis were completed using SAS 9.4. At the client's request, results were compiled into five separate PowerPoint presentations, one for each of the following: the entire State of Michigan, Kent County, Muskegon County, Ottawa County, and Oceana County. This project is part of STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 013

The Effects of Gut Microbiota and Probiotic Use on Depression in Adults

Presenter: Shannon Reed

Mentor: Amy Manderscheid

The central focus of this project was to answer the following clinical question: How does the gut microbiota and the use of probiotics affect depression in adults over the age of 18? Methods for this project included a search of databases such as PubMed and CINAHL to perform a literature review of research published within the last ten years. The information was organized in an excel spreadsheet that includes the type of study, objectives, subjects, tools, validity/reliability, measurements, findings, strengths, limitations, conclusions, application to practice, and IRB approval as it pertains to each study. Findings revealed that gut microbiota cause metabolic and inflammatory changes that impact both brain activity and mood. Additionally, probiotics could be a novel depression treatment, possibly as an adjunct therapy with traditional antidepressants. Further studies and longer clinical trials are needed. The findings are synthesized and displayed in a poster presentation format.

VIRTUAL SYMPOSIUM 015

Testing the Effect of Over-expressing *BRG1* in Filamentation Mutant Strains of *Candida albicans*

Presenter: Joseph Mariscal

Mentor: Ian Cleary

Changes in morphology are linked to the ability to cause disease in the opportunistic pathogen *Candida albicans*. One important regulator of morphology is a DNA binding protein encoded BRG1. A strain lacking BRG1 grows as yeast under all conditions tested and over-expressing BRG1 drives hyphae growth even in the absence of inducing signals. A number of genetic mutants of *C. albicans* form pseudohyphae under yeast conditions and some, but not all, of these mutants can form hyphae under hyphae-inducing conditions. This study aims to further examine the roles of these genes by over-expressing BRG1 in pseudohyphal mutants and observing whether it can stimulate hyphal growth under the same conditions. Preliminary results from one of these strains suggests that while BRG1 over-expression is able to stimulate cell elongation in these mutants, it is not sufficient to drive formation of true hyphae.

VIRTUAL SYMPOSIUM 016

Use of Mindfulness-Based Interventions for Persons With TBI

Presenters: Katelyn Bennett, Coty Clore

Mentor: Dawn De Vries

In this presentation, we will explore the outcomes of mindfulness-based interventions for persons with Traumatic Brain Injury (TBI). Although more research is needed in this area, the literature suggests mindfulness-based interventions yield positive cognitive and psychosocial outcomes for persons with TBI.

VIRTUAL SYMPOSIUM 017

The Use of Recreational Therapy with Adolescents

Presenters: Kathryn McCartney, Sarah Strange, Desiree Wilson

Mentor: Dawn De Vries

This presentation is about the use of Recreational Therapy regarding adolescents' behavioral health. Specifically, focusing on the effectiveness of Adventure Therapy has on improving adolescents' quality of life.

VIRTUAL SYMPOSIUM 018

The Effects of Recreational Therapy through Dance Movement on Individuals with Parkinson's Disease

Presenters: Brianna Clark, Meredith Fritzler, Rachel Hardies, Kelsi Hukill

Mentor: Dawn De Vries

In this research project, we are evaluating the available literature in order to understand the effects of Recreational therapy, specifically dance, and how it effects the gait, cognition, and movement of people with Parkinson's disease. The data will be collected through the Grand Valley Library system, PUBMED, CINAHL, and Temple's RT Wise Owl database. The projected outcome of this study is that dance movements will positively impact the individual in their physical and mental health.

VIRTUAL SYMPOSIUM 019

The Use of Therapeutic Recreation in Adopted Adolescents

Presenters: Kylee Chojnacki, Kassidy Connors, Lindsey Meyers, Lydia Page

Mentor: Dawn De Vries

This presentation looks at the outcomes of wilderness and adventure-based therapy related to attachment in adolescents who have been adopted. We will be focusing on both positive and/or negative attachment tendencies in adolescents.

VIRTUAL SYMPOSIUM 020

Constructing an Action Spectrum for Phototropism in Rice Roots

Presenter: Grace Miller

Mentor: Mark Staves

Phototropism is a developmental response important for orientation of plant roots and shoots. Phototropism in shoots has been extensively studied while the response in roots has not. Gravity and light integrate to produce a final growth angle that is optimal for plant development. We created an actionspectrum of phototropism for rice (*Oryza sativa*) roots by illuminating roots with unilateral light of specific wavelengths and then measuring the curvature response. We saw the maximum curvature in roots at four hours followed by a relaxation to a slightly lesser curvature, likely due to proprioception. The maximum curvatures were used for the action spectrum. The wavelength that induced the maximum negative phototropic response was 580nm and the minimum phototropic response was 720nm. Most colors induced a negative phototropic response. We've now expanded this work to use phototropic curvature to test between models for the mechanism of gravisensing in roots.

VIRTUAL SYMPOSIUM 021

Educating Individuals with Intellectual Developmental Disabilities about Healthy Relationships

Presenters: Elizabeth DiMeglio, Hannah Heide, Amy Kosiba, Abigail Samson

Mentor: Dawn De Vries

The purpose of this study is to discover the most beneficial teaching methods for individuals with intellectual developmental disabilities (IDD) to build upon social skills that are learned and developed within sexual education and healthy relationship building. This paper will explore what should be included in the curriculum of sexual education, how to facilitate this curriculum and why a Recreational Therapist should teach a course like this. The significance of this study is to improve professional practice and service delivery as well as address a social problem. The parents can oftentimes not agree with the sexual education curriculum, therefore it may be the role of a Recreational Therapist to advocate for the client. The goals of a recreational therapist while facilitating a sexual education course is to expand the client's social networks, build healthy relationships, and avoid being taken advantage of by others.

VIRTUAL SYMPOSIUM 022

Aquatic Therapy Benefits to Reduce Symptoms of Multiple Sclerosis

Presenter: Maleena Male

Mentor: Dawn De Vries

Research has shown that the benefits of participating in aquatic therapy have positively impacted middle aged adults who have been diagnosed with Multiple Sclerosis. These benefits include reduction of symptoms and an increase in quality of life.

VIRTUAL SYMPOSIUM 023

Girl Scouts of Michigan Shore to Shore (GMISTS), 2019 Girl Scout Voices Count (GSVC)

Presenters: Paige Carlson, Ashlyn Pretzel, Brenna Skinner, Drew Stevenson

Mentor: Sango Otieno

This presentation is the culmination of the analysis and inference conducted by four undergraduate students in the STA 419 capstone course. These students were tasked by the Girl Scouts of America to analyze survey data from scouts in the program, parents with vested interest, troop leaders, and volunteers in order to quantify the "Girl Scout Experience". The survey data provided to the students were from Girl Scout Troops in Michigan during the year 2019. Of particular interest to the client were Kent, Ottawa, Muskegon, and Oceana counties, on which the students focused their research and analyses with the goal of creating easily-understandable figures that the organization could use to both better improve their internal efficiency and advertise their success to others.

VIRTUAL SYMPOSIUM 024

Role of ERK 1/2 Proteins in Diabetic Cardiomyopathy

Presenter: Megan Coble

Mentor: Ruijie Liu

Rationale: Diabetic cardiomyopathy (DCM) is a heart pathology with an unknown molecular mechanism seen in

individuals diagnosed with diabetes. ERK 1/2 enzymatic activity has been shown to be protective against various heart pathologies.

Objective: Determine whether enhanced ERK1/2 activity protects mice from developing DCM.

Materials/Results: Knockout mice (DKO) with enhanced ERK1/2 activity was achieved via deletion of genes that transcribe for the phosphatases, DUSP 6/DUSP8, that negatively regulate ERK 1/2. Wild type and DKO were administered streptozotocin (50 mg/kg) to induce diabetes. After 14 days of streptozotocin stimulation, plasma glucose levels were elevated in both WT and DKO mice. However, Mason's trichrome staining did not reveal significant fibrosis in the heart in either group.

Conclusions: These results suggest that 50 mg/kg streptozotocin is not optimal concentration to induce disease in our mice. Further optimization of experimental procedures is needed.

VIRTUAL SYMPOSIUM 025

Electronic Health Record Adoption

Presenter: Jenna Sturgill

Mentor: Jie Du

The purpose of this study is to understand people's perception and intention towards EHRs and how those intentions play a vital role in improving the adoption of EHRs. We would like to investigate the impact of specific factors on health professional's intentions of using EHR systems. The contribution of this study is the better understanding of health professionals' intentions and behaviors when using an EHR. The results of our data collection found that trust is a significant influencing factor to the adoption and acceptance of EHR system by health care professionals. Some of our hypotheses were not supported by our results but have been supported in previous, similar studies. This study then recommends that further investigation in to the barriers and motivators of EHR adoption be done. By identifying and understanding the determinants of adopting EHRs, interventions and education can be designed to improve the adoption of EHRs.

VIRTUAL SYMPOSIUM 026

Medication Errors in Nursing Practice

Presenter: McKenna Craine

Mentor: Lori Houghton-Rahrig

Medication safety was brought to attention by the IOM report, To Err is Human. Errors continue to harm patients at increased rates. In 2015, medical errors were the third leading cause of death in the U.S. (BMJ,2016). A rapid review examines the efficacy of medication interventions in U.S. hospitals. A hospital reduced medication errors by 47 percent with a No Interruption Zone (Anthony, Wiencek, Bauer, Daly & Anthony, 2010). Barcode technology improved a hospital's medication accuracy to 96 percent (Seibert, Maddox, Flynn & Williams, 2014). Automated dispensing systems reduced errors by 31 percent (Pop & Finocchi, 2016). An on-unit pharmacist reduced adverse events by 66 percent (Anthony et al., 2010). The tool TeamSTEPPS improved team skills (Pettit & Duffy, 2015). The tool SBAR improved patient safety (Müller, Jürgens, Redaelli, Klingberg, Hautz & Stock, 2018). Multiple interventions are needed to be nearly error free, yet any improvement made is necessary for patient safety.

VIRTUAL SYMPOSIUM 027

Crueler Than Fiction: Rape Myth Acceptance in Contemporary Society

Presenter: Jordan Skutar

Mentor: Spencer Everhart

This project examines the impacts that rape myths have on women within contemporary society as perpetuated through social media, television, film, and current legislation. The widespread perpetuation of these myths within rape culture creates negative perceptions of women's sexuality, often resulting in slut-shaming and victim blaming. Rape culture, used in this context to reference American society, is defined as a community where rape is normalized, and rape myths are pervasive due to stereotypical attitudes regarding gender and promiscuity. Confronting these myths within media and American law is a necessary step towards dismantling such harmful norms on gender and sexuality statuses within society.

VIRTUAL SYMPOSIUM 028

Mathematical Modeling in Finance

Presenter: Owen Sweeney

Mentor: Firas Hindeleh

Financial instruments play an integral role in our day-to-day lives. From student loans and mortgages to car payments and savings accounts, financial instruments or tools dictate the cash flows of individuals and businesses. Many of these instruments use pre-defined tools to calculate payment amounts, interest, and account balances. These tools do not usually provide the flexibility needed when new parameters are introduced. By utilizing mathematical modeling, these standard formulas can be derived and even improved to provide the needed flexibility. This project is part of an Honors thesis.

VIRTUAL SYMPOSIUM 029

Microbial Exposure Shapes the Release of TNF-alpha by Macrophages Stimulated with Flagella or Lipopolysaccharide

Presenter: Julia Fagaly

Mentor: Kristin Renkema

Cohousing specific pathogen free (SPF) mice with pet store mice, which carry numerous microbes, facilitates natural pathogen exchange, resulting in global changes to the immune system. Here, we investigate the effects of microbial exposure on the release of tumor necrosis factor alpha (TNF- α) by macrophages stimulated with bacteria-derived flagella or lipopolysaccharide (LPS). Enzyme-linked immunosorbent assays (ELISA) were conducted on the culture supernatant of stimulated cells from intraperitoneal lavage collected from SPF mice and cohoused mice with varying lengths of exposure. The preliminary data suggested a potential trend of a greater concentration of TNF- α in the IP-lavage supernatant of cohoused mice than SPF mice. However, additional experiments are still needed to confirm this relationship. These preliminary results help us to understand the role of microbial exposure in a pro-inflammatory immune response.

VIRTUAL SYMPOSIUM 030

Structural Investigation of BrxA: A Bacilliredoxin Involved in Bacillithiol Metabolism

Presenter: Colin McHugh

Mentor: Paul Cook

The low molecular weight bacillithiol is an important compound involved in intracellular redox homeostasis and fosfomycin resistance mechanisms of some Gram-positive bacterial pathogens. Cellular regeneration of active bacillithiol (BSH) from a disulfide (BSSB) or mixed disulfide state (BSS-Protein) involves the bacilliredoxin enzymes BrxA/B. An X-ray crystallographic structure of apo BrxA from *Bacillus subtilis* has been previously characterized, but no BrxB or BSSB-bound Brx structure existed. Here we present X-ray crystallographic structures of BrxA from the pathogen *Staphylococcus aureus* with abacillithiol disulfide (BSSB) bound in the active site. Elucidation of the BrxA structure will help understand how BSSB binds in bacilliredoxins and provide insight into the Brx catalytic mechanism.

VIRTUAL SYMPOSIUM 031

The Lived Experiences of Assisted Living Administrators during the COVID 19 Pandemic

Presenters: Paige Bekker, Elizabeth Hill

Mentors: Rebecca Davis, Susan Strouse

The purpose of this phenomenological, qualitative study is to learn about the lived experiences of assisted living (AL's) administrators during the COVID-19 pandemic. Little is known about how the AL's are coping with the ever-changing mandates (including visitation, testing, communal activities, acceptance of COVID positive residents, etc.). Semi-structured interviews with AL administrators were conducted. Interviews were transcribed verbatim, and analyzed through a modified Giorgi's approach. Meaning units were first categorized, then analyzed to situated units, generalized units, and eventually themes. Results from this study can inform policies and strategies for providing care to this often-overlooked population of senior citizens. Preliminary data analysis shows a multitude of feelings and actions related to the well-being of the staff, residents, and residents' families. Identified is the complexity of the AL administrator's lived experiences during the pandemic.

VIRTUAL SYMPOSIUM 032

Continuous Guessing Games With Two Secret Numbers

Presenter: Nicholas Layman

Mentor: David Clark

A guessing game is a game played between a questioner and a responder. The two players first agree upon the set, N , in which the game will be played as well as the number of questions, Q , which will be asked by the questioner. The responder first chooses two distinct numbers from N . The questioner then asks questions of the form "How many of your chosen numbers are in the set $S \subseteq N$?" to which the responder answers truthfully. The goal for the questioner is to determine the responder's two numbers using at most Q questions. We study a continuous version of this game where N is the closed interval of real numbers from 0 to 1. In our research we introduce and examine strategies for the questioner using a geometric approach. We introduce a strategy which is optimal in some cases and near-optimal in others.

VIRTUAL SYMPOSIUM 033

Properties of Independence Irreducible Graphs

Presenter: Nicholas Layman

Mentor: Taylor Short

An independent set I in a graph is a set of vertices where no two vertices in I are adjacent. Finding an independent set of largest cardinality in an arbitrary graph is a well-studied and hard problem. The neighborhood of I , denoted $N(I)$, is the set of all vertices adjacent to at least one vertex in I . A critical independent set S is an independent set such that the value of $|S| - |N(S)|$ is maximized over all independent sets in the graph (it is possible that $S = \emptyset$). The problem of finding a largest cardinality independent set can be reduced by first finding a critical independent set. Unfortunately, this reduction cannot be applied to graphs where the empty set is the only critical independent set. We explore these graphs; specifically, we attempt to characterize the graphs where the only critical independent set is the empty set.

VIRTUAL SYMPOSIUM 034

Impact of the COVID-19 on US College Students: A Photovoice Project

Presenters: Miranda Crawford, Judith Essemiah, Rylin Fryz, Reilly Olson

Mentor: Babasola Fateye

Objective: This study seeks to understand the experiences of college student as they completed their education during the COVID-19 lockdown. Participants: Students at a large 4-year college in Midwestern USA. Methods: We conducted a photo-survey of students' experiences during the lockdown. Student researchers and faculty collaborated to analyze images and texts in a way that privileged students' interpretation. Results: Students frequently reported worsening mental health during the lockdown. Nonacademic aspects of students' lives such as work and the home environment significantly contributed to perceived stress. Students, especially freshmen coped maladaptively with unmet psychosocial and educational needs. Faculty may underestimate the indirect impact of the pandemic on students' lives and academic outcomes. Conclusion: Perspectives presented herein add the crucial voice of students to ongoing conversations to meet pandemic related mental health needs of college students.

VIRTUAL SYMPOSIUM 035

Utilizing Adventure Therapy With Youth At-Risk

Presenters: Nichole Kievit, Melissa Kolis, Kira Metcalf, Carlie Polen, Karissa White

Mentor: Dawn De Vries

This presentation discusses the results of our systematic literature review of the use and outcomes of adventure therapy with youth at-risk ages 10-18. Outcomes were measured based on the improvements in social and emotional functioning of the youth.

VIRTUAL SYMPOSIUM 036

Depression in Older Adults

Presenters: Annie Heggeland, Sydney Stites, Melissa Vinalay, Jacob Walters

Mentor: Dawn De Vries

How does animal assisted therapy and therapeutic use of the arts decrease symptoms of depression (Improve

quality of life) in a long-term care setting?

VIRTUAL SYMPOSIUM 037

Yoga for Individuals with Schizophrenia

Presenters: Grace Frank, Lauren Garling, Brielle Mayday, Chelsea Randle, Miranda Sluja

Mentor: Dawn De Vries

We have examined the effects of yoga on the negative symptoms of individuals with schizophrenia.

VIRTUAL SYMPOSIUM 038

Program Evaluation of Girl Scouts of Michigan Shore to Shore using 2018 Girl Scout Voices Count (GSVC) Survey

Presenters: Claire Kirkbride, Emily Pratt, Matthew Tchozewski, Khileah Williams

Mentor: Sango Otieno

The purpose of this project is to identify what areas of work within Girls Scouts are successful and where the organization needs to improve. Reported findings will be based on analysis of data collected via 4 surveys (distributed based on role: girl, parent, trooper and volunteer) in the Girl Scouts of Michigan Shore to Shore (GSMISTS). This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 039

The Value of Psychiatric Genetic Counseling: An Exploration of the Field Present and Future

Presenter: Molly Lombard

Mentor: Mary Karpen

Genetic Counseling is a rapidly evolving field in the United States. In a 14-week internship at Spectrum Health, I explored the career of genetic counseling and observed its impact on those diagnosed with a genetic condition. Genetic counseling offers both medical answers and emotional support for individuals that have struggled with the 'whys' associated with having and passing on a genetic condition. Counseling is essential to the entire process of diagnostic testing and receiving genetic results. During this internship, I researched the specialty of psychiatric genetic counseling. Psychiatric care in the United States is currently centered around medication and therapeutic discussion. The underlying causes of psychiatric conditions are multifactorial and genetic counseling helps patients better understand their condition. This poster explores the process taken during genetic counseling and the benefits of including genetic counseling in the treatment of psychiatric conditions.

VIRTUAL SYMPOSIUM 040

Asymmetric Graphs on n Vertices and e Edges

Presenters: Nicholas Layman, Cian-Kyler Young

Mentor: Lauren Keough

A *graph* is a collection of vertices connected by edges usually represented as dots connected by lines. We are

interested in how much symmetry a graph can have. To measure symmetry, we can define an *automorphism* of a graph to be a permutation of the vertices that preserves adjacency. Then a *distinguishing coloring* is a way to color the vertices such that only the trivial automorphism preserves all of the color classes (i.e. each vertex gets mapped to a vertex with its own color). The *distinguishing number* of a graph is the fewest number of colors needed to make a distinguishing coloring. A small distinguishing number corresponds to less symmetry. Graphs with distinguishing number one are called *asymmetric*. In this project we explore some properties of distinguishing colorings investigate which distinguishing numbers are possible, and find the distinguishing number of some specific graph families. We also investigate the existence of asymmetric graphs on n vertices and e edges.

VIRTUAL SYMPOSIUM 041

Analyzing Planarian Behavior Following RNA Interference and Injury

Presenter: Lauren Proctor

Mentor: Dawn Hart

Neurodegenerative diseases, such as Alzheimer's and Parkinson's Diseases, are associated with neuronal death that leads to changes in brain function and behavior. Because human brains regenerate poorly, we use an animal model — planarian flatworms — to understand how neurons can be regrown after injury or disease. To study neural repair, the immediate goal of my project was to identify behaviors that can be reproducibly measured as an output for brain function. After establishing behavioral assays, I employed RNA interference (RNAi) to knock down the function of 10 genes and then identified changes in planarian behavior with and without injury. Behaviors such as turning 15° or greater were systematically quantified in control animals and RNAi animals. The area regenerated was also measured after RNAi. The outcome of this project is identification of genes important for neural regeneration, which could eventually provide insight into therapeutic targets for human disease.

VIRTUAL SYMPOSIUM 042

Examining Implicit and Explicit Attitudes Towards Stuttering in Undergraduate CSD Students

Presenters: Liya Kahsay, Courtney Martin

Mentor: Cara Singer

Previous research has shown that undergraduate students have negative attitudes toward the approximately 1% of the population who stutters (Walden & Lesner, 2018; Yairi & Ambrose, 2013). Negative attitudes can lead to negative behavioral responses to a person who stutters (e.g., Arnold & Li, 2016). Our study examined implicit and explicit attitudes towards stuttered speech among undergraduate students majoring in CSD. Implicit attitudes are traditionally thought of as unconscious and involuntary; explicit attitudes are intentionally created and easy to record. Implicit attitudes were measured using an Implicit Association Test. Explicit attitudes were measured using a survey that required participants to rate both a person who stutters and a person who does not stutter on several personality traits. Demographics were also collected. Presented results will include the implicit and explicit attitudes of undergraduate CSD students. Potential educational implications will be discussed.

VIRTUAL SYMPOSIUM 043

Changes in Cultural Competency Among Nursing Students Who Studied Abroad

Presenter: Hannah Rojas

Mentors: Susan Strouse, Melodee Vanden Bosch

Research suggests that nursing students who study abroad grow in aspects of cultural competency, self-awareness, and their ability to recognize differences in healthcare. The purpose of this mixed-methods study was to survey junior- and senior-level traditional and RN to BSN nursing students to determine the impact of study abroad on their perception of cultural competency. This study consisted of a pre- and post-study abroad online questionnaire to determine demographic data, cultural competency scores, and students' perception of their experience. Qualitative data was analyzed using a modified Giorgi method. The results of the survey concluded a significant difference between the means of the pre- and post-cultural competency scores ($p \leq 0.0001$). In the qualitative findings, students described culturally competent care prior to study abroad as being aware of others, and after the experience as understanding, acknowledging and respecting cultural values and beliefs.

VIRTUAL SYMPOSIUM 044

Real-Time Nurse Dispatching Using Dynamic Priority Decision Framework Study

Presenters: Emily Gallaway, Alida Semrinec

Mentor: Marie VanderKooi

Nurses are responsible for all aspects of patient care, requiring continuous coordination and evaluation of a multitude of interventions. Recently, delays and omissions of nursing care have had increased prevalence in the United States, causing an extreme threat to patient care and outcomes (Patient Safety Network, 2019); this problem has only been exacerbated by the Covid-19 Pandemic (Lasater et al., 2020). A research team from Boston University collaborated with GVSU doctoral nursing students and faculty with experience in healthcare, in order to develop a survey to address the high complexity of task prioritization and understand how experienced nurses make decisions when faced with multiple demands. Once completed, the survey results will be programmed into Python to create a decision support system that can be paired with Electronic Health Records to generate automated task prioritization guidelines based on patient care needs.

VIRTUAL SYMPOSIUM 045

Translation Poetry: The Art of Translating Literature in The Age of Google Translate

Presenter: Katharine Gardella

Mentor: Amorak Huey

This presentation will focus on my findings from my independent study with writing professor Amorak Huey. Drawing from my experience analyzing and writing poetry, along with my Spanish language skills, I will read a poem that I have translated and I will explain my process of translation while discussing the topic in general.

VIRTUAL SYMPOSIUM 046

Mexican-Americans in World War II

Presenter: Brenden Ploucha

Mentor: Nora Salas

With many of the domestic infrastructure workers being absent due to World War II, Mexican workers came to

the country under contract to fill these positions through the Bracero Program. The program was a diplomatic agreement between the U.S. and Mexico and promised safe and secure agricultural work for the Mexican laborers who would come to the U.S. for the extent of the war. Some Mexican-Americans were also either drafted or enlisted into the military, but wherever they were, they faced discrimination from white Americans. This project explains the exploitation that Mexican-Americans were subjected to during this time. Despite their contributions, they were valued solely for their labor, experienced racism during their war work, and confronted barriers to achieving equality during and after the war.

VIRTUAL SYMPOSIUM 047

Assessing the Relationship Between Storm Event Frequency and Incidence of Giardiasis and Cryptosporidiosis in the State of Michigan: An Ecological Study

Presenter: Rachel Thompson

Mentor: Doug Graham

Giardiasis and cryptosporidiosis are intestinal parasitic infections of persistent concern to human health. Infections with pathogenic *Giardia* and *Cryptosporidium* persist in industrialized countries despite modern sanitation infrastructure. A common route of transmission is via ingestion of contaminated drinking water, with periods of increased rainfall and runoff posing increased risk of exposure. The purpose of this study is to assess the relationship between storm event frequency and incidence of giardiasis and cryptosporidiosis in the state of Michigan. This will be accomplished by performing time series analysis on the weekly statewide incidence of both diseases between 2013 and 2020 and calculating the time-lagged cross-correlation of each with the weekly number of NOAA-reported storm events. Choropleth maps will be produced and visually appraised to identify Michigan counties exhibiting a strong association between annual storm event frequency and disease incidence.

VIRTUAL SYMPOSIUM 048

A Guide to Performing Empirical and Scholarly Research

Presenter: Jodilyn Jenkins

Mentor: Gayle Schaub

The aim of this literature review and project was to define exercise dependence, attempt to discover if personality type, age, gender, and type of exercise are correlated with one's risk of exercise dependence, and show the research process used in the making of this review. A secondary aim was to review the importance of physical exercise. There is an overwhelming amount of evidence showing the physical and mental benefits of exercise. These benefits include a stronger heart, body, and brain, to an increase in hormones and neurotransmitters that fight symptoms of depression and anxiety. However, alongside reaping the benefits of exercise, regular exercisers are at higher risk for developing exercise dependence than non-exercisers. Those who are diagnosed with exercise dependence may not show identical symptoms. Lastly, a third aim of this project was to use my own research as a guideline to performing empirical and scholarly research.

VIRTUAL SYMPOSIUM 049

Collecting the *Encyclopédie*: An Annotated Bibliography of English Sources

Presenter: Ian Curtis

Mentor: Amber Dierking

In the research process, the actual searching for information often takes longer than anticipated and, especially for

research with deadlines, encroaches on valuable time for reading and analysis. This collection of sources on the French *Encyclopédie* serves to reduce the amount of time spent on finding resources, allowing scholars to focus on individual research needs. Within this searchable annotated bibliography are select English sources that are all available online; however, many can also be found in print journals and books. While containing a variety of topics and authors, significant subject areas are digital humanities, censorship, plagiarism, and authorship and notable scholars include Frank A. Kafker, Richard Schwab, and Arthur Wilson. This is not intended to be an exhaustive list but aims to guide students and scholars alike to sources fitted for their specific interests. It is the first step in an ongoing project to collect and annotate all sources on the *Encyclopédie*.

VIRTUAL SYMPOSIUM 050

Examining the Effects of Increased Excitability on Histaminergic Neuron Development in the Early Larval Brain

Presenter: Sisi Hon

Mentor: Martin Burg

Past investigations have used increased neuronal excitability to demonstrate developmental plasticity at the neuromuscular junction of *D. melanogaster* larvae. The *eag¹ Sh¹²⁰* double mutant was used in this study to determine the effects of hyperexcitability on the number of synaptic varicosities and amount of neurite branching in histamine-containing interneurons in the CNS. Histamine (HA) containing interneuron's ability to demonstrate plasticity was examined by comparing differences in synaptic morphology between a hyperexcitable and normal nervous systems. An immunofluorescent procedure was performed to detect HA cells in the early larval brain, and histaminergic neurons were then imaged using confocal microscopy 3D imaging. Preliminary results indicate an increase in varicosity number is caused by an increase in excitability, although a larger sample size is needed for verification. This result suggests that these CNS histaminergic neurons demonstrate developmental plasticity.

VIRTUAL SYMPOSIUM 051

Evaluating the Microbial Experience Influence on Anti-tumor Immune Response

Presenter: Jessica Ensing

Mentor: Kristin Renkema

Despite the steady increase of hygienic standards, the CDC continues to report an increase of immune-mediated diseases such as allergies and asthma. This may be caused by reduced exposure to microbes and pathogens. We investigated if increased microbial exposure results in an immune system more prepared to respond to cancer (B16 melanoma injection) by measuring levels of activated lymphocytes between two groups of C57Bl/6 mice: SPF mice (which had no microbial exposure) and CoH mice (which were microbially exposed). The CoH mouse model mimics a human adult's immune system, while the SPF mouse model mimics that of a human infant. Activated lymphocyte levels were quantified with weekly bleeds using antibody staining flow cytometry. Response to cancer exposure was evaluated through multiple harvests. CoH mice were expected to have heightened levels of activated lymphocytes and a more successful response to cancer exposure than SPF mice.

VIRTUAL SYMPOSIUM 052

The True Cost of Education

Presenter: Antonia Gordon

Mentor: Davia Downey

Despite years of education reform, Michigan still has low k-12 student performance in its Inner-city schools. Traditionally, education policy research in Michigan has focused on the state's largest municipality, Detroit. The implications of focusing on a singular case study makes it difficult to determine if disparate education outcomes are perpetuated systematically throughout the state due to flaws in federal and state legislation. This study uses a comparative case analysis of Detroit Public Schools and Muskegon Heights Public Schools - a city with a similar demographic composition - to test if education policy enacted in the mid 1990's led to decreased test scores in both schools. The research will draw attention to overlooked schools in West Michigan that do not receive the same scrutiny in education research, while identifying flaws in education policy to suggest reform to change the downward trajectory of Michigan student performance.

VIRTUAL SYMPOSIUM 053

Perceptions of Professionals on School-based Interventions for Students with Mental Health Problems in Ghana

Presenter: Marigold Cobbina

Mentor: Dianne Green-Smith

Studies show a 7.25% prevalence rate of mental health problems (MHP) among basic school students in Ghana. Though evidence worldwide reveals that school-based interventions are effective, accessible, and feasible, there is no research on these interventions in Ghana. Hence this qualitative research sought professionals' perceptions on the various interventions made available in both the private and public basic schools of Ghana. Six participants were selected through convenience and snowball sampling techniques and interviewed with a semi-structured interview guide. After thematic analysis, the preliminary themes were on the population served, the kind of intervention utilized, their effectiveness, and implications for policy and practice. In conclusion, the interventional approaches practiced in Ghanaian basic schools are inadequate, despite professionals' dedication to helping students, thus showing the need for effective implementation of educational and mental health policies.

VIRTUAL SYMPOSIUM 054

Using Stable Isotopes to Test Working Hypotheses of Travel Time in a Shallow Aquifer, Ottawa County, Michigan

Presenter: Hanna Szydlowski

Mentors: Patrick Colgan, Ian Winkelstern

Aquifers provide water to streams via groundwater discharge. In this study, we measured stream stage, groundwater levels, and isotope ratios of precipitation and springs in Ottawa County, Michigan to test two hypotheses regarding aquifer properties and travel time. A small aquifer would show a rapid response in groundwater levels and significant change in seasonal isotope values in spring-fed streams, while slow response and little variation would be observed in a large aquifer.

From May 2018 to Dec 2020, groundwater levels and stream stages were measured weekly. Precipitation and stream samples were collected from Nov 2019 to Jan 2021. Contrary to our initial hypothesis, the isotope ratios of streams are not highly variable, suggesting mixing of a large aquifer. Groundwater levels, however, show a

response of a week to large rainfall events. Our preliminary results suggest that the groundwater aquifer at Hemlock Crossing is larger and more complex than we initially thought.

VIRTUAL SYMPOSIUM 055

Program Evaluation for Girl Scouts of Michigan Shore to Shore during Covid-19

Presenters: Brady Emerson, Samuel Judd

Mentor: Sango Otieno

This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms. In this presentation, we compare the data from the Kent, Muskegon, Ottawa, and Oceana counties to the overall state of Michigan based on the 2020 Girl Scouts of Michigan Shore to Shore survey administered during Covid-19. Data cleaning and analysis is performed using SAS.

VIRTUAL SYMPOSIUM 056

The Association Between Religiosity and Psychological Well-Being of Master of Social Work Students

Presenter: Mariekie Barone

Mentor: Joshua Bishop

This study examines the relationship between six subscales of psychological well-being and three subscales of religiosity using a sample of 84 MSW students from two large universities in the Midwest. Half of the participants in the study do not engage in religious activity and on all but Self-Acceptance, participants responded by having a normal or above-normal scores of psychological well-being. Bivariate analyses demonstrate that there is a significant relationship between Self-Acceptance and organized religious activity as well as intrinsic religiosity, but not with non-organized religious activity. Personal Growth is significantly correlated with non-organized religious activity, but only when non-organized religious activity is simplified into two categorical variables. Multiple demographic variables were related to each of the subscales.

VIRTUAL SYMPOSIUM 057

Virus of Disinformation

Presenters: Alex Baker, Capriana Calvachi, Anna Steinberg-Abreu

Mentor: Kristin Hedges

This presentation will focus on examining biocommunicability and how sociopolitical contexts are influencing the health decisions individuals are currently making in the COVID-19 pandemic as a result of the erosion of trust in global public health and government institutions. Additionally, we delve into the recent spread of viral conspiracy theories and how they have contributed to vaccine hesitancy. The use of logical fallacies and misleading information can only be combatted through access to education, effective communication, transparency at the community level. The COVID-19 pandemic has shown us that there is a need for global pandemic surveillance systems, risk assessment communication, and vaccine confidence campaigns.

VIRTUAL SYMPOSIUM 058

End of Semester Student Feedback for Online Courses During COVID-19 Year Versus Non-COVID 19 Years

Presenters: Joseph Ferkull, Charlie Marcou

Mentor: Sango Otieno

Laker Impressions of Faculty Teaching (LIFT) evaluations are emailed to Grand Valley State students towards the end of their course. These evaluations are composed of student ratings of the course as well as open ended responses. Due to COVID-19, many classes were moved online in 2020. A major focus of the analysis will be examining the impact of this on student responses. SAS was used to analyze the response rates and scores over time. QDA Miner and R were used to identify trends within the open ended responses. The findings will help inform the course instructor of potential areas to improve their courses. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 059

Segregation in America

Presenter: Emily Odenbach

Mentor: Joel Stillerman

While for many people segregation has just become a fact of history, by looking deeper into its roots, it's found that modern segregation was not as accidental as one might think. By exploring author Richard Rothstein's *The Color of Law*, he finds the US government created and supported racial segregation through a variety of racist tactics such as redlining, restrictive covenants, blind claims of falling property value, blockbusting, exclusion of African Americans from labor laws, and unions and a failure to protect African Americans who faced violence as a result of integration. Across the nation, African American families continue to suffer from the long-term effects of the tactics. In comparing the dissimilarity, isolation, and exposure indices of St. Louis, MO, Las Vegas, NV, and Houston, TX, continued residential and school segregation is seen, with St. Louis being the most segregated, in addition to a unanimously lower income of people of color as compared to White Americans.

VIRTUAL SYMPOSIUM 060

Demographic/Geographic Profile of Visitor/Campers at Michigan's State Park Campgrounds

Presenters: Kevin Ho, Elayna Saint Amour, Hayden Steinhuis

Mentors: Patty Janes, Sango Otieno

The data was collected by a descriptive survey sent out to all visitors of the campgrounds under Michigan's department of natural resources. The survey was sent to 255,062 visitors, and we only have 16,319 respondents, which means there is extreme nonresponse bias and the data is not representative of the entire population. We will cluster and determine if a significant relationship exists between the satisfaction of the campers and the different variables and by state parks based on their type of park. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 061

Coping Mechanisms Among International Students and Services to Address Mental Health Issues at One Midwest University

Presenters: Ethan Brown, George Daudlin

Mentors: Sango Otieno, Julia VanderMolen

This project is part of STA 419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms. The survey was administered to international students at GVSU that have been in the USA for more than 6 months. Data analysis was performed using SAS to determine how the services provided by GVSU for international students affect anxiety levels and depression levels.

VIRTUAL SYMPOSIUM 062

Faculty Perceptions of Academic Entitlement Among Students in the Physician Assistant Programs

Presenters: Nicholas Gurney, Lucas Smielewski

Mentor: Sango Otieno

The goal of the study was to assess whether Physician Assistant (PA) faculty feel that students in PA programs in the USA show characteristics of academic entitlement. A questionnaire comprising of questions from two previously validated surveys regarding academic entitlement was designed on Qualtrics and survey link sent via email to PA departments all over the country asking for faculty participation. The questions from the survey were split into four groups: Demographic Data, Entitled Expectations, Externalized Responsibility, and the 5 Key Facets of Academic Entitlement. Data analysis was performed using SAS. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 063

Gauging How Intercultural Communication Competence (ICC) Impacts Quality of Healthcare

Presenters: Devin Kolff, Jared Siangani

Mentor: Sango Otieno

Students self-evaluated their competency in cross cultural communication through an anonymous survey designed to compare and contrast awareness of cross-cultural communication deficiencies/strengths between undergraduate and graduate students in the medical field. Data analysis was performed to provide support to the overall goal of creating curricula that develops the medical students' communication skills with patients across the cultural spectrum, and thus improve the outcomes in the quality of care provided in patient interactions. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 064

Depth Camera Implementation for a Tunnel World

Presenter: Justin Kaukonen

Mentor: Jared Moore

MorphWorld is a 3D simulation environment facilitating the study of robot behavior. Animats are challenged to navigate from one end of the world to the other while passing through gaps in obstacles quickly and efficiently. The brain perceives the environment through multiple laser depth sensors. In this work, we expand on the sensory capabilities of animats by creating a depth camera implementation. The depth camera instead projects multiple rays from a single point similar to a Microsoft Kinect camera producing a picture-like image of the area in front of the sensor. Enhancing the sensory capability allows a controller to interpret an object in totality, developing a clearer picture of the world. Initial results show that effective controllers do arise with the depth camera, but the additional computational overhead has delayed direct comparison between the two sensors.

VIRTUAL SYMPOSIUM 065

TAG: Automated Image Captioning

Presenter: Nathan Funckes

Mentors: Erin Carrier, Gregory Wolffe

Many websites remain non-ADA compliant, containing images that lack accompanying textual descriptions. This leaves sight-impaired individuals unable to fully enjoy the rich wonders of the web. To address this inequity, our research aims to create an autonomous system capable of generating semantically accurate descriptions of images. This problem involves two tasks: recognizing an image and linguistically describing it. Our solution uses state-of-the-art deep learning: employing a Convolutional Neural Network that "learns" to understand images and extracts their salient features, and a Recurrent Neural Network that learns to generate structured, coherent sentences. These two networks are merged so as to input arbitrary images and output relevant captions. The model's accuracy is quantified using the Bilingual Evaluation Understudy language metric. After training, we hope to serve the community by deploying our model on the local Grand Valley State University social media feeds.

VIRTUAL SYMPOSIUM 066

Network Science and Mathematical Models of the Spread of Covid-19

Presenter: Joseph Groszkiewicz

Mentor: Lauren Keough

Network science is the analysis of real world networks as varied as friend groups, telecommunication systems, or biological processes. In a friendship network, each node would represent a person and each edge between a pair of nodes would represent a friendship; a network is a graph like this. During the Covid-19 pandemic several competing models have been used to anticipate the spread of the virus, some of which have applied mathematical epidemiology to mobility networks. One such attempt models the hourly movements of people from their Census Block Group (CBG) to different Points of Interest (POI's) in a network. After this network is created, a Susceptible-Exposed-Infectious-Removed (SEIR) model is imposed on the network to predict new infections based on the graphical representation of people's mobility during that hour. In order to understand the mathematics behind this model, we scale certain parts of the model down and apply it to mobility data collected in Kent County.

VIRTUAL SYMPOSIUM 067

Promoting Intergenerational Relationships Through a Mentorship-like Program

Presenter: Bethany Schmid

Mentor: Jing Chen

In this project, I will be proposing an evidence-based, mentorship-like program aimed at fostering intergenerational connections and reducing ageist attitudes. I will first discuss an array of research studies that have demonstrated the detrimental effects of ageist attitudes on health at a global level followed by a review of the benefits of intergenerational interaction in reducing ageist attitudes. Taking into consideration generational differences of participants, I proposed an intergenerational integration program that allows each generation to not only learn from each other, but to assist in expanding each other's knowledge bases. In addition to describing the core features of the program and steps involved in carrying out the program, I will discuss the program's potential to combat ageism and increase intergenerational connections and how to overcome obstacles that may lie in the way of implementing the program.

VIRTUAL SYMPOSIUM 068

Solution Driven Amino Acid Migration in Group 1 LEA Proteins

Presenter: Michelle Dykstra

Mentor: Sheila Blackman

Late Embryogenesis Abundant (LEA) proteins mediate water interactions in seeds. These proteins have an unusual amino acid composition that might cause them to change conformation in response to salt concentration. To test this hypothesis we calculated and then plotted Half-Sphere Exposure of each amino acid from NMR Protein Data Bank files as a function of solvent concentration. Although the amino acid composition of LEA proteins did not predict a greater response to changes in salt content, different segments of the proteins had significantly different variances in the salt-sensitivity of the amino acids. Overall, we conclude that: proteins loosen in high salt concentrations; uniformity in response to salt concentration may be important in LEA function; and solvent salt concentration is an important determinant of Half Sphere Exposure and hence protein structure. This may have implications for the solvents used to study proteins in the laboratory.

VIRTUAL SYMPOSIUM 069

Distinguishing Numbers of Johnson Graphs

Presenter: Miah Masvero

Mentor: Lauren Keough

A distinguishing coloring of a graph is a coloring of a graph such that the only automorphism that preserves color class is the trivial automorphism. The distinguishing number of a graph is the smallest number of colors necessary to make a distinguishing coloring. A Johnson graph $J(n, k)$ is a set of vertices representing the k -subsets of an n -set. Two vertices are adjacent if the intersection of the two representative sets has order $k-1$. Our research summarizes current knowledge on the subject, as well as adds novel research into the symmetries of Johnson graphs.

VIRTUAL SYMPOSIUM 070

Virtual Reality Biomolecular Models

Presenter: Lena Sigurdardottir

Mentor: Mary Karpen

Biomolecules are very complex and hard to visualize, but understanding their architecture is essential to understanding their role in nature. It has been a challenge for many students to learn biochemistry by looking at the molecules on a piece of paper and trying to see the interactions present within. In this study we develop a virtual reality (VR) library of biomolecules, for studies assessing student retention of structural information. We have developed VR representations of biomolecular architecture such as amphipathic helices, amphipathic beta sheets, hemoglobin conformational changes, and enzyme active site structure. We used the Sketchfab program, popular among 3D game developers, to display our VR molecular models. Students can manipulate the molecules in the 3D environment, where they can better see biomolecular architecture and interactions. These models will help us explore whether virtual reality helps students retain spatial information when learning biochemistry.

VIRTUAL SYMPOSIUM 071

The Link Between Nativity Status and Racial Infant Mortality Disparities

Presenter: Hannah Pierson

Mentor: Anna Hammersmith

The United States has one of the highest rates of infant mortality in the developed world. Studies have shown that infant mortality varies greatly across racial groups. Black women are twice as likely to report preterm birth/infant death relative to White women. Foreign-born Black women have similar rates to that of native-born White women rather than native-born Black women, suggesting the link between race and reproductive health is more complex than previously understood. Thus, this study examines the interplay between nativity, race, and reproductive health. The cumulative disadvantage perspective will be employed to better unpack how life course stressors may be negatively linked to reproductive health of native-born Black women relative to the foreign-born. The National Longitudinal Study of Adolescent and Adult Health will be utilized to examine if a person's nativity is linked to their reproductive health outcomes based on unique life course stressors they may have endured.

VIRTUAL SYMPOSIUM 072

Being LGBTQ on Campus: An Investigation into Diversity, Equity, and Inclusion Efforts on College Campuses

Presenter: Evan Bonello

Mentor: Leifa Mayers

Research shows that universities employ heteronormative discourses that give rise to harmful power structures that disproportionately affect LGBTQ-identified students (Preston & Hoffman, 2015). Consequently, these students benefit when their identity is given space and when biases that construct harmful systems are recognized (Hoffman et al., 2019). This study explores the availability of resources and programming for LGBTQ-identified students at seven mid-size Master's comprehensive and research institutions in Michigan. Inferences are made based on analysis of electronic university promotions of diversity, equity, and inclusion (DEI) efforts. This research is informed by the concept of the traditionally heterogendered institution (THI) and a poststructural framework of DEI efforts on college campuses. This project may provide insight into the preparedness of institutions to foster inclusive and welcoming campus environments that support all LGBTQ-identified students.

VIRTUAL SYMPOSIUM 073

Using Machine Learning for Detection of COVID-19 in Chest CT Scans

Presenter: Justin Rickert

Mentor: Gregory Wolffe

Currently, the most widely-used diagnostic tool for COVID-19 is the RT-PCR nasal swab test recommended by the CDC. However, some studies have shown that chest CT scans have the potential to be more accurate, and are also capable of detecting the virus in its earlier stages. Unfortunately, CT results are not instantaneously available as it may be days before a radiologist can review the scan. This delay is one of the factors preventing the widespread use of CT scans for COVID detection. We have been researching Convolutional Neural Networks (CNNs), an advanced form of machine learning used for image classification. CNNs have proven very effective at extracting patterns from images, and have been used to detect clinical signs of COVID. The goal of this project is to develop an improved CNN that can accurately predict whether a patient is COVID-19 positive based on their CT scan; potentially providing a valuable pre-screening tool for overwhelmed radiologists.

VIRTUAL SYMPOSIUM 074

Microbial Source Tracking: An Investigative Study Into the Bacterial Contamination of Little Black Creek

Presenter: Margaret Brenneman

Mentor: Richard Rediske

An investigation of *Escherichia coli* concentrations in Little Black Creek, (LBC) was conducted to source track fecal contamination impacting water quality. Located in Muskegon County, LBC discharges into Lake Michigan at the P.J. Hoffmaster Campground Beach. Water contaminated with *E. coli* "indicator bacteria" is assumed to contain other enteric pathogens as well. 2020 testing using Colilert-18 methods revealed *E. coli* levels of 597 cfu/100 mLs in the discharge area that exceeded total body contact criteria of 300 cfu/100 mLs. A follow-up study found *E. coli* concentrations exceeding the total body contact criteria at multiple creek locations, as well as levels of 860 cfu/100 mLs where a Hoffmaster Campground drainage pipe empties into LBC. Samples collected after a rain event found *E. coli* levels > 2,400 cfu/100 mLs in the mouth of LBC. Spatial and temporal trends of microbial data will be discussed for the beach and the creek, as well as results of qPCR using the human marker, HF183.

VIRTUAL SYMPOSIUM 075

A Program Evaluation to Assess Readiness for NCQA-PCMH Application

Presenter: Alida Semrinec

Mentor: Marie VanderKooi

The Patient Centered Medical Home Model (PCMH) is associated with enhanced patient experience (Sarinopoulos et al., 2017) and quality improvement outcomes (Mahmud et al., 2018). This model has the capacity to guide primary care practices to enhance quality, provide more comprehensive, patient centered care, and increase practice revenue (Philip et al., 2019). Following the recent implementation of the nurse care manager role, a PCMH requirement, an urban, nurse managed community health center (CHC) is interested in applying for PCMH recognition. The purpose of the project was to evaluate the current practice, policies, and processes in place at the CHC through the lens of the National Committee for Quality Assurance's PCMH 40 core competencies. Additional evidence of core competency completion was verified through reports generated from the electronic health record.

As a product of this evaluation, a business plan was created to guide the CHC to core competency completion.

VIRTUAL SYMPOSIUM 076

Impact of Arbuscular Mycorrhizal Fungal Inoculum from Till and No-till Fields on Corn Growth and Soil Health

Presenters: Catherine DeFouw, Isabella Szebelledy

Mentor: Jennifer Winther

Arbuscular mycorrhizal fungi (AMF) can impact plant productivity and soil health. AMF have a direct link to plants and soil via internal and external hyphal networks. The mechanical break up of soil (tilling) is a major agricultural practice that adversely impacts AMF. We set out to better understand the factors that affect AMF in west Michigan, but Covid-19 restrictions during the 2020 growing season meant a need for remote work. A literature review was done, compiling existing work into a database to understand gaps in knowledge. 24 corn plants were grown remotely and inoculated with local AMF from till or no-till fields. After 60 days of growth, the plants and soil were stored. Data on growth, spore concentration, AMF infection, and glomalin were analyzed. The experiment taught us about the scientific process while the literature review highlighted how little is known. Experimental results are complicated but suggest mixed effects on the parameters evaluated.

VIRTUAL SYMPOSIUM 077

Shape Changing: Using Morphology to Alter Tunnel Maze Navigation

Presenter: Matthew Shan

Mentor: Jared Moore

Animals and humans easily transition from walking to running. This is not the case for most robotic controllers as the transition between stable gaits remains a challenging problem. Here, we abstract the transition problem from complex morphologies (such as limbs and joints) into a 3x3x1 animat capable of changing its body shape. The animat's goal is to navigate through a tunnel world (with obstacles of varying gap sizes) by processing sensory information and deciding whether to move or morph into a different body shape of similar volume/area. In our experiments, two main factors were evaluated. First, a morph penalty specified the time an animat was forced to wait after a shape change. Second, localization describes whether a controller receives information of its relative location in the tunnel. Twelve treatments combine 6 morph penalty values and whether to provide localization. We find that localization doesn't matter and increasing morph penalty favors moving over morphing.

VIRTUAL SYMPOSIUM 078

Dental Topography Reveals Dietary Niche Patterns of Early Eocene North American Omomyids After the Paleocene-Eocene Thermal Maximum

Presenters: Emma Foy, Tala Hag Ali, Emma Miller, Jeremy Wood

Mentor: Laura Stroik

Evolutionary timescales reveal structural changes in paleocommunities due to large-scale environmental change, and this has been demonstrated in the Bighorn Basin, Wyoming, during the early Eocene. Omomyids, the first euprimates in North America, immigrated to the area during a dramatic climatic event known as the Paleocene-Eocene Thermal Maximum. With subsequent significant fluctuations in temperature and precipitation, it is predicted that the dietary niches of omomyids changed significantly, as measured by dental topography. Three dental topographic measures were collected on second mandibular molars (N=39): relief index, Dirichlet normal energy,

and orientation patch count rotated. Results demonstrate a correlation between changes in dental topography (dietary niche) and shifts in isotopic ^{13}C and ^{18}O levels ($p < 0.05$). Thus, it is likely that omomyids underwent dietary niche changes due to abiotic factors and resulting changes in intra-community interactions.

VIRTUAL SYMPOSIUM 079

Perceptions of Hildegard of Bingen

Presenter: Ysabela Golden

Mentor: Alice Chapman

Hildegard of Bingen (1098-1179) was one of the most extraordinary figures of twelfth-century Europe. Not only was the German Abbess a celebrated prophetic author, but a musical composer, political correspondent, and natural scientist. For her accomplishments, Hildegard was recognized as both a Saint and a Doctor of the Church, but not until 2012, 833 years after her death.

This presentation will explore the changing perceptions of Hildegard over time, from her unofficial papal approval during her lifetime, to her supposed posthumous diagnosis as a migraine sufferer, to her renewed scholarly interest in her works after the 800th anniversary of her death. The project uses a gender studies framework to take into account her social status as a woman when examining the writings of Hildegard and her contemporaries, as well as that of the historians, theologians and scientists who have preserved and interpreted her works in the centuries after her death.

VIRTUAL SYMPOSIUM 080

Evaluating the Effectiveness of the Black Maternal Health Omnibus Act of 2021

Presenter: Chloe Binando Scott

Mentor: Melissa Tallman

Maternal mortality rates within the United States are the highest in the developed world, and this crisis is most severe for Black women. The proposed Black Maternal Health Omnibus Act of 2021 builds on existing legislation and works to comprehensively address the entire maternal health crisis. I gathered information from scholarly databases regarding the disparities that Black women face in the United States in order to evaluate the effectiveness of this proposed legislation. I have compared each of the twelve individual bills within this omnibus with the specific disparities they attempt to neutralize to determine their impact. This act will be a great start to improving Black maternal health but will not be able to entirely reduce the disparities Black women face without additional legislation. Significant racial disparities exist within maternal health in the United States and a multi-pronged approach is needed to reduce these disparities.

VIRTUAL SYMPOSIUM 081

Female Genital Cutting Represented in the US Media

Presenter: Amber Wychers

Mentor: Leifa Mayers

Across the globe, over 200 million girls alive today have experienced female genital cutting (“Female Genital Mutilation (FGM)”). While culturally important, these practices can impact a woman’s physical, mental and sexual health (Williams-Breault 226). The US media often negatively portrays women’s issues, causing them to universally denounce FGC practices, categorizing them as “backwards” cultural phenomena (Pandy 1). This project uses feminist discourse analysis to examine the language used to portray these practices within popular American news

outlets, and code for assumptions and cultural othering. Preliminary findings suggest that this language contains ethnocentric assumptions about “brutal” practices in other countries, Islamophobic views, religion shaming and anti-immigration biases. The implications of this media portrayal create stereotypes which negatively affect women globally.

VIRTUAL SYMPOSIUM 082

'Addy'-Ing It All up: University Student's Perspectives on Substance Use

Presenter: Alex Baker

Mentor: Kristin Hedges

The purpose of this study was to understand undergraduate university students' perspectives on substance use and abuse. The study was conducted in collaboration with the Anthropology department and Alcohol & Other Drugs (AOD) services at a Midwestern university. Using data collected throughout 2019, methods included participant observation, open-ended and semi-structured interviews, and online self-report assessment surveys. Ethnographic findings demonstrated important recurring themes around motivation for use, self-medication, and self-regulation of use patterns. Quantitative findings demonstrated gender and age differences between positive screens. Results were used to identify perceived barriers and strive towards improving service uptake within the AOD program.

VIRTUAL SYMPOSIUM 083

Systemic Impacts of Advanced Neck Cancer

Presenter: Tara Olen

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

The dissection of an 88-year-old male revealed advanced metastatic cancer in the right side of the neck, which was the primary cause of death. Further dissection of the neck revealed the large tumor affected several other systems of the body, including the muscular, skeletal, and cardiovascular systems. Specifically, the tumor caused bone resorption in the mandible, invasion of tumor cells within the sternocleidomastoid, and altered the pathways of blood supply to and from the cervical region. This study discusses the affects cancer can have on other systems of the body, and the importance of early detection of cancer to prevent systemic alterations as well as their impacts on the overall health of the individual.

VIRTUAL SYMPOSIUM 084

An Exploratory on Partial Anomalous Pulmonary Venous Return (PAPVR)

Presenter: Gabriella Pitingaro

Mentor: Timothy Strickler

This synthesis gives insight into Partial Anomalous Pulmonary Venous Return (PAPVR). The recording gives a brief overview explaining the congenital heart defect, the embryology surrounding it, and possible symptoms and conditions that can be associated with it. With PAPVR's rarity (0.4-0.7% of the population), not much is known. Hypothetically, since PAPVR often goes undetected, our numbers for cases are estimated to be an underestimated value. For more information, please consult my paper on GVSU ScholarWorks named "An Exploratory on Partial Anomalous Pulmonary Venous Return (PAPVR)".

VIRTUAL SYMPOSIUM 085

Effects of the Lack of Histamine on Post-mating Responses of *Drosophila* Females

Presenters: Eric Gonzales, Elizabeth Heinz, Erika Spafford, Zach Timmer, Jonathan Wassink, Jordan Yokubonus

Mentor: Martin Burg

Histamine has been studied as a neurotransmitter in *Drosophila* and is required for numerous nervous system functions. Histamine has recently been localized outside of the nervous system in the secondary cells of the male accessory gland. The secondary cells have been shown to be required for a number of male-induced post-mating responses (PMRs) of females, 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 condition-mated with normal or *Hdc* mutant males (lacking histamine). Results indicate that disruption of histamine synthesis in *Drosophila* males does not interfere with the PMR of egg laying and sperm viability, but partially disrupts the PMR of female receptivity. This work demonstrates that histamine functions in tissues outside of the nervous system and appears to be essential for some, but not all, post-copulatory behaviors in female flies.

VIRTUAL SYMPOSIUM 086

The Effect of Histamine Deficiency on the Differentiation of Secondary Cells in *Drosophila melanogaster*

Presenter: Jonathan Wassink

Mentor: Martin Burg

The accessory gland of *D. melanogaster* is composed of two cell types: main cells and secondary cells. Secondary cells have been implicated in the induction of post-mating responses in females, although it is not clear how secondary cells perform this function. Histamine has been detected in secondary cells and recent evidence suggests that one of the post-mating responses of females is affected by the absence of histamine in males. This study sought to determine whether histamine deficiency blocks differentiation of secondary cells or disrupts accessory gland morphology. *Hdc* mutant flies (that lack histamine) were compared to normal flies, using the UAS-GFP system to label secondary cells with GFP (Green Fluorescent Protein) in accessory glands stained for histamine and examined using 3D confocal imaging. Results indicate that while histamine deficiency does not completely block the differentiation of secondary cells, evidence does suggest that differentiation may be impaired.

VIRTUAL SYMPOSIUM 087

Anatomic Variations in Urogenital Anatomy Due to Radical Cystectomy and Ileal Conduit Surgery

Presenter: Morgan McCrie

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

An ileal conduit urinary diversion and the absence of a urinary bladder were uncovered in the dissection of a 79-year-old male cadaver. In typical urogenital anatomy, urine flows through the ureters into the urinary bladder and is then voided through the urethra. Due to bladder cancer, the patient underwent a radical cystectomy, which is the surgical removal of the bladder. A type of urostomy called an ileal conduit was then performed to reroute the flow and voiding of urine. This cadaver's urinary diversion is a typical example of an ileal conduit surgery, in which a small portion of the ileum of the small intestine is surgically isolated and used to create a new bladder. The ureters are attached to this portion of the ileum and an artificial opening is made in the abdomen for voiding of urine into a catheter bag. In this project, the anatomical variations present in this cadaver due to his surgical interventions are

explored.

VIRTUAL SYMPOSIUM 088

Exploration of the Healthcare Conditions in the Occupied Palestinian Territory

Presenter: Awatef Ayesh

Mentor: Heather Wallace

The occupation of Palestine by Israel has had a significant impact on the health care services of the Palestinian citizens. The disparities were seen in infant, child, and maternal mortality rates, life expectancy, and measures of mental wellbeing. The health disparities are due to multiple factors involving economic conditions, food insecurity, environmental exposures, psychological trauma and stress, and access to health services most of which are directly or indirectly linked to the Israeli military occupation of the Palestinian Territories. This project explores the health indicators and examines the social determinants of health in the Occupied Palestinian Territories that may be responsible for the health disparities and limitations to health care services in the region. Data was obtained from publications and websites of the World Health Organization, The World Bank, United Nations, as well as reports from non-governmental organizations, research studies, and news articles.

VIRTUAL SYMPOSIUM 089

Familial CPS Cases: Social Support, Parental Stress, and Diagnosed Mental Illness

Presenter: Maria Sanchez Rodriguez

Mentor: Mary Russa

Much research has focused on the effects of child maltreatment (CM), but little has examined characteristics of caregivers engaged in maltreatment. CM, defined by the World Health Organization as abuse and neglect experienced by children under 18, may result in lifelong impairments, including mental health issues (2016). Caregivers diagnosed with mental illness are at an increased risk for maltreating their children (Maybery, Darryl, et al., 2005). This risk may increase further when significant life stressors and low social support are present (Emery et al., 2018). This study assessed social support, parenting-related stress, and mental health in perpetrators of CM in Kent County, MI. Parental stress did not moderate mental health outcomes, and there was no significant evidence of a mediational effect of parental stress on the relationship between social support and mental health. However, our findings demonstrate an association between low social support and increased risk for CM.

VIRTUAL SYMPOSIUM 090

Spinal Deformities in Aging Adults

Presenter: Megan Taulbee

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

Deformities of the lumbar spine may occur throughout one's life. Many of these deformities are caused by the aging of the spine, scoliosis and/or trauma. A variety of treatment options are available based on the severity of symptoms. Medications, lifestyle changes, spinal fusion and laminectomy are all used to alleviate pressure on the spinal cord. The dissection of a 61-year-old female cadaver revealed a spinal fusion procedure with two bilateral lumbar screws spanning lumbar vertebrae four through five (L4-L5). Spinal fusion may have been performed due to deformities of the spine, herniated disk, spinal instability or trauma. This research project will exam the possible reasons for why this type of procedure was performed.

VIRTUAL SYMPOSIUM 091

Inside the Brain: Anatomic Pathology of Alzheimer's Disease

Presenter: Analis Floyd

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

During previous cranial dissections, the brain of a 65-yr old cadaver affected by Alzheimer's disease (AD) was preserved for future use. Alzheimer's causes shrinkage in the brain due to an accumulation of amyloid plaques and neurofibrillary tangles. In a healthy brain, the gyri (folds) of the brain are full and closely packed together. In contrast, a brain with Alzheimer's has folds that are much narrower and sulci (grooves between folds) that are significantly wider. Upon inspection of the brain, it was observed that overall, the brain's sulci were noticeably wider, and the gyri were smaller compared to a healthy, female, 86-yr old brain. The callosal sulcus, a structure that separates the corpus callosum from the cingulate gyrus, was enlarged on the anterior side of the corpus callosum. This study will outline the key differences observed between the brain of a healthy cadaver and a cadaver with Alzheimer's along with discussing the etiology and implications of Alzheimer's disease.

VIRTUAL SYMPOSIUM 092

2020 Grand River Water Quality Sampling: A Comparison of 1990 and 2020 Water Quality Data

Presenter: Jillian Ashton

Mentors: Tara Kneeshaw, Peter Wampler

The Grand River Expedition, launched by Verlen Kruger in 1990, documented Grand River water quality. The 2020 expedition was postponed due to COVID-19, which required changes to our sampling plan. Samples were taken at 1990 sampling locations and additional sites using an In-situ Aqua Troll 500 Sonde. Data was collected every two seconds, including: temperature, dissolved oxygen (DO), pH, salinity, conductivity, total dissolved solids (TDS), and oxidation reduction potential (ORP). Discrete water samples were also collected at each location and analyzed for E. coli, chloride, nitrate, ammonia, total phosphate, and orthophosphate. Preliminary comparison of 1990 and 2020 water quality data shows that DO and total phosphate concentrations remained essentially unchanged while pH, temperature, TDS, chloride, nitrate, ammonia and E. coli concentrations decreased. ArcMap Geographic Information System (GIS) will be used to analyze reaches with high spatial and temporal resolution data.

VIRTUAL SYMPOSIUM 093

Aristotelian Sportsmanship: Reinstating Sportsmanship into Youth Sports Through Virtue Ethics

Presenter: Mallory Wietrzykowski

Mentor: Jeffrey Byrnes

The current United States sports culture is working to address significant concerns over the behavior and safety of athletes. These concerns are especially acute for children playing sports simply because they are still developing and are vulnerable to injury. Frequently, these concerns are addressed by educating coaches, parents, and the officials of youth sports on how to prevent injuries and manage behaviors. While these methods can be effective, I believe that preventing injuries and bad behaviors requires a broader rethinking of sports culture. This can be done by incorporating virtue ethics into coaching practices, what I will call Aristotelian sportsmanship. By demonstrating how sports culture can unintentionally create an environment that encourages young athletes to act in ways that lead to injuries and bad behaviors, I will explain why the best solution is a cultural change through Aristotelian

sportsmanship.

VIRTUAL SYMPOSIUM 094

GVSU Historical Interactive Map

Presenter: Myren Mitchell

Mentor: Leigh Rupinski

This interactive map allows viewers to explore the development and growth of Grand Valley State University's Allendale campus. Using the timeline feature, viewers can see a visual representation of the construction and demolition of academic buildings and living centers. When a user clicks on a building, they are given more information about the building's development and use along with a relevant photo. By using this tool, students can understand more about GVSU's beginnings and how it has grown and developed through the decades.

VIRTUAL SYMPOSIUM 095

Institutions, Structural Policies, and Economic Development: Evaluating the Interrelationships Between Rule Spaces for Developing Countries

Presenter: Jordan Pattison

Mentor: John Constantelos

Research on economic development has consolidated around the central role of economic and political institutions. Within these rule spaces, structural policies form a subset of incentives that affect economic behavior. To measure the separate effects of the institutional and business regulatory environments, I construct two original indices: An Institutional Index (II), composed of measures of property rights, civil liberties, political rights, and the rule of law; and a Structural Policy Index (SPI), derived from the World Bank's Ease of Doing Business metric. Controlling for income inequality and trade flows in a sample of 82 developing countries, I found that while the II and SPI both predict variations in income levels alone, an interaction effect predicts disproportionately high and low income levels. I conclude with case studies of Botswana, Zambia, Lesotho, and Uganda. These profiles effectively illustrate the effects of the II and SPI in shaping economic outcomes over time.

VIRTUAL SYMPOSIUM 096

Expanded Understanding: Investigating the Effect of Muller F Element Expansion on Gene Structure Across *Drosophila* Species

Presenters: Asher Bury, Rebecca Clark, Sean Fleisher, Kayla Keckler, Collin Louis, Michael Pellizzari, Rachel Stoudt, Steven VanderWeide

Mentor: Martin Burg

The Muller F element (or chromosome 4) in *Drosophila melanogaster* is the smallest chromosome, containing about 5.2 Mbps. Subsequent analysis of the genomes from other *Drosophila* species has revealed that the F element size can vary drastically, with the Muller F element in *D. ananassae* being more than 18.7 Mbps in size. The goal of the Muller F Element Expansion Project, as part of the Genomics Education Project, is to investigate this expansion trend across *Drosophila* species in order to determine its impact on gene characteristics. Students from the 2021 CMB 440 class will highlight their contributions by detailing the gene annotation process in *D. bipectinata*. As the class has annotated about 1/3 of the F-element genes in *D. bipectinata*, a selection of student-annotated genes will be examined for specific changes in characteristics of gene structure such as in tron size, coding exon size, gene synteny, and gene spacing.

VIRTUAL SYMPOSIUM 097

Predictive Survey for a Sports Commitment Questionnaire

Presenters: Joshua Holmes, Austin Snyder

Mentors: Christina Beaudoin, Sango Otieno

The primary aim of this study was to measure sport commitment, motivation, and athletic identity among professional women football players. Data was collected using an online survey consisting of four sections namely, the Sports Motivation Scale II (SMS II), Sports Commitment Questionnaire II (SCQ II), Athletic Identity Measurement Scale (AIMS) and a set of Demographic questions. This project is part of STA419 course designed to provide students with an opportunity to gain experience in statistical consulting, manipulating data via a computer, applying the appropriate statistical technique for a given situation, correctly interpreting the results, and communicating the findings in clear, non-mathematical terms.

VIRTUAL SYMPOSIUM 098

Star Wars: Phenology of *Nitellopsis Obtusa* (Starry Stonewort; Characeae) In Two Michigan, USA Drowned River Mouth Lakes

Presenters: Brooke Keck, Emily Neuman

Mentor: Sarah Hamsher

Invasive species have been introduced into new areas through anthropogenic interactions causing economic, environmental, and social impacts. *Nitellopsis obtusa* is a newly introduced aquatic invasive species in North America. *N. obtusa* is a rapid colonizer that spreads through asexual bulbils and creates monotypic meadows. The focus of this study is to document the timing of the peak biomass of *Nitellopsis obtusa* in Pentwater and Muskegon Lakes and relate this peak to light, temperature, and the biomass of other species present. For sampling, six quadrats were placed randomly at each site and macrophytes in each quadrat were harvested, sorted by species, dried, and weighed. *N. obtusa* peaked at different times at each site and the relationship between the growth curves of *N. obtusa* and abiotic/biotic factors will be discussed. These results may allow us to better understand the factors that influence the growth of *N. obtusa* and assist in the management of this invasive species.

VIRTUAL SYMPOSIUM 099

The Effects of Metastatic Uterine Cancer on Multiple Body Systems

Presenter: Adam Gizowski

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

During the dissection of a 93-year-old female who expired from uterine cancer and protein caloric malnutrition, two separate tumors were exposed outside of the pelvic cavity. The first tumor is located in the anterior subscapular space along the medial border of the scapula, which elevated the scapula off of the thoracic wall. The second tumor was uncovered within the right lobe of the thyroid gland. The subscapular tumor's location appears to have affected bilateral tone of the muscles associated with motion of the scapula. Tumors within the thyroid are commonly associated with increased levels of thyroid hormone, which would alter the individual's metabolism. This study will investigate the systemic effects of metastasized cancer on the affected tissues and systems.

VIRTUAL SYMPOSIUM 100

Improving Health Care Accessibility among Geriatric Patients in Rural Communities

Presenter: Capriana Calvachi

Mentors: Roger Gilles, Kristin Hedges

Improving healthcare accessibility through the use of interprofessional care and outreach is an essential facet of geriatric medicine. By exploring the deficiencies of geriatric healthcare in underserved areas, as well as highlighting methods that are being implemented to better serve their geriatric patients, we can identify ways in which to restructure our care systems. This review seeks to better understand the barriers that lead to the decreased rural physician and geriatric specialist retention rates, evaluate the causality of insufficient healthcare access due to pre-existing barriers on rural geriatric patients, and compare the effectiveness of various collaborative interprofessional solutions to the lack of geriatric health care available.

VIRTUAL SYMPOSIUM 101

Gap Junctions in Stem Cells Provide an Essential Conduit for Cell-Cell Communication

Presenter: Jacob Gunn

Mentor: David Geenen

Background: Myocardial infarction (MI) results from the death of cardiomyocytes (CM) following obstruction of blood flow and diminished oxygen supply to the tissue (hypoxia). Human adipose tissue-derived stem cells (hADSCs) used in pre-clinical models can replace damaged CM, however, this has not been replicated in human clinical trials due to early loss of hADSCs. We hypothesize that coupling of hADSCs to dying CMs may account for part of this loss. Methods: hADSCs will be cultured for different lengths of time with fluorescent dyes that are either permeable or impermeable to the cell membrane. We will assess the time course of coupling between hADSCs under both normoxic and hypoxic conditions by using fluorescent-activated cell sorting (FACS). Results: Our previous studies demonstrate that stem cells possess membrane proteins (connexins) that contribute to cell-cell coupling. The proposed studies will address the functional significance of connexins related to hADSC coupling.

VIRTUAL SYMPOSIUM 102

Disparities in Healthcare in Ghana and Nigeria: Discussion and Solutions

Presenter: Nicole Andriot

Mentor: Melissa Tallman

There are disparities present in healthcare around the globe but an area that experiences many disparities and also lacks the necessary resources to combat them is West Africa. The purpose of this presentation is to highlight accessibility and rural vs. urban disparities and others present in healthcare in Nigeria and Ghana, focusing specifically on areas of maternal/child health and the available resources in both countries. This project will additionally compare the disparities in these two countries and provide a wider look into West African healthcare systems. These countries are not widely evaluated and discussed, but discussion is imperative to raise awareness for change. There have been various initiatives such as Sustainable Development goals and Millennium Development goals, to work towards combating these disparities and this work emphasizes the importance of continuing and expanding the initiatives in place.

VIRTUAL SYMPOSIUM 103

Chem Sims: Anything But Basic, Using Screencasts to Support Student Understanding of Acids

Presenter: Lizzy Sielaff

Mentor: Deborah Herrington

The ChemSims project aims to develop materials to help students effectively use simulations for learning core chemistry concepts. As part of this larger project, we developed an introduction to acid solutions that students completed individually outside of class, engaging either with guided use of a PhET simulation or a screencast of an instructor using that same simulation. Our iterative design approach allowed for us to reimagine and revise our original screencast into two mini screencasts, and a self-exploration of acid concentration. The first screencast targets relative acid strength, the second focuses on determining pH through its inverse relationship with hydronium ions, and then in the last part students engage with the simulation to explore concentration. This poster will present the results of our initial pre-post analysis and how this along with prior findings from the ChemSims project informed the materials redesign.

VIRTUAL SYMPOSIUM 104

Analyzing Capital in Education

Presenter: Amber Anderson

Mentor: Jennifer Stewart

As a McNair Scholar, I have been researching the literature regarding the effect poverty has on education with the intent of developing research questions. Funding plays a huge role in access to valuable resources, such as test prep courses, private education, tutors, and others; it is important to think of poverty in relation to Social and Economic Capital. Adolescents experiencing poverty do not have the same life chances as those who are not. These disparities come from income and access to prestigious, potentially status advancing social networks. Within high status social networks, students have access to knowledge not taught in K-12 education, like etiquette of unspoken rules in an educational setting. This could be sending professional emails, requesting letters of recommendations, or communicating with professors. Each of these have the ability to help or harm one's education, however they are not widely taught in schools and students cannot know what they are not taught.

VIRTUAL SYMPOSIUM 105

The Use of Non-destructive Methodology to Study Forest Stand Structure in the GVSU Ravines

Presenter: Noah Holkeboer

Mentor: Gary Greer

In crowded forest settings, trees are under strong selection to optimize water transport and self-support. However, tradeoffs exist between optimizing water transport or self-support, because one tissue (xylem) is responsible for both functions. Trees, therefore, need to optimize these functions while maintaining safety margins. One facet of this optimization is the branch architecture of each tree species that results from rates of taper and branching, and the angles of branching. These traits are plastic and hence responsive to environmental circumstances. All published research regarding tree architecture has involved destruction of trees or their limbs. In the GVSU Ravines, we mapped and photographed 178 trees. Correlation and principle components analyses were used to investigate: (1) Does species dominance correspond to tree architecture and/or anatomical traits? (2) Does

architecture for the most common species differ from one another?

VIRTUAL SYMPOSIUM 106

Variations in the Branching Pattern of the Brachial Plexus

Presenter: Alison Camero

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

The muscles of the arm and forearm are innervated by a complex system called the brachial plexus. The brachial plexus is made up of ventral rami of spinal nerve C5-T1, trunks, divisions, cords, and terminal branches. Presented are multiple variants of the brachial plexus in ten cadavers. In all cases, one clavicle was resected in order to access the brachial plexus to the ventral rami. Forty percent of the cadavers had variant morphology: two were within the ramus to trunk formation, one was within the terminal branches, and one had multiple variants between the rami and terminal branches. These variants could create post-operative complications for patients undergoing surgery. Additionally, a person with a variant brachial plexus could also experience abnormal muscle function. This study aims to examine the potential negative effects that could arise from these particular variations in the brachial plexus.

VIRTUAL SYMPOSIUM 107

Evaluation of a-synuclein Protein Expression in Fruit Fly Models for Parkinson's disease

Presenter: Isabel Thompson

Mentor: Sok Kean Khoo

Parkinson's disease (PD) is the second most common neurodegenerative disease in people over 65. a-synuclein (a-syn), a small monomeric protein found predominantly in brain cells, is hypothesized to play a role in neuron-neuron communication and fatty acid transport between cellular membranes. Mutations such as *A53T*, *A30P*, *E46K*, and *A53E* in the human a-syn gene are associated with PD. Presently we are characterizing transgenic *A30P* and *A35T* a-syn *Drosophila* models of PD with immunofluorescence staining and fluorescent microscopy to confirm protein expression and examine a-syn levels in the fly brain. We expect that a-syn protein expression level will be higher in a-syn transgenic flies than wild type flies. Ultimately this work will help confirm a-syn protein expression in a-syn transgenic flies and enable future PD studies using these fly models.

VIRTUAL SYMPOSIUM 108

Investigating Ventriculoperitoneal Shunts with an Adult Cadaveric Donor

Presenter: David Rexford

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

Ventriculoperitoneal (VP) shunts have been used to divert cerebrospinal fluid (CSF) from brain ventricles in patients experiencing hydrocephalus since 1949. Hydrocephalus is defined as a largening of brain ventricles due to inadequate CSF clearance. CSF accumulation increases intracranial pressure causing neural pathologies and death if left untreated. Hydrocephalus treatment presents 40,000 operations and \$2 billion in medical expenses annually. To date, hydrocephalus is only effectively treated with shunt placement due to lack of hydrocephalus research funding. As such, this neurological condition is worthy of deeper study. This project investigates VP shunts as a hydrocephalus treatment with a cadaveric donor as a model. Literature will be reviewed on the etiology and pathophysiology of hydrocephalus as well as the surgical methods for placing VP shunts. Further, potential complications from a VP shunt placement will be assessed to support a holistic exploration of this procedure.

VIRTUAL SYMPOSIUM 109

Investigation of Injuries Due to Cardiopulmonary Resuscitation

Presenter: Callie Sullivan

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

Cardiopulmonary resuscitation (CPR) is performed on a person who is in cardiopulmonary arrest; however, there is only a ~1-3% chance of survival when CPR is performed. Sudden cardiopulmonary arrest is usually due to a problem like heart attack or stroke and in these cases, CPR would fail due to these underlying conditions. In other cases, CPR could increase the chance of survival, but it can also cause physical damage: multiple rib fractures, pneumothorax, lacerations of internal organs, bleeding in the chest cavity, neurological issues and other problems. This can be particularly detrimental to elderly patients who already have disabilities or other health problems prior to CPR. The dissection of a male cadaver at the age 96 revealed multiple rib fractures after known cardiopulmonary arrest, suggesting CPR was performed on the person. This project will look into the physical damage that was done to the cadaver due to CPR.

VIRTUAL SYMPOSIUM 110

College Students on Money

Presenters: Kristina O'Brien, Grace Pols

Mentor: Hsiao-ping Chen

The purpose of this class project is to understand how GVSU students spend their money and other related information. The data was collected through a Google survey we created and emailed to the students in our GVSU DS 202 course. The findings suggest students are both savers and spenders. Other findings demonstrate students are concerned their current financial situation may affect their future, and students use debit cards over credit cards for purchases. The survey includes questions to determine whether students consider themselves savers or spenders, the importance of money to them, and their thoughts on improving their knowledge of money management.

VIRTUAL SYMPOSIUM 111

Structural Analysis of the Sirtuin 1 NAD⁺-Dependent Lysine Deacetylase N-Terminal Domain

Presenter: Isaac DuBois

Mentor: Laura Hawk

Sirtuin 1 (SIRT1) is a mammalian NAD⁺-dependent lysine deacetylase. SIRT1 is a target protein for research about the development of cancers and neurodegeneration. SIRT1 has an extended intrinsically disordered N-terminal domain with deacetylase activity regulation sites. The study was performed to understand the necessity of the N-terminus of SIRT1 for the deacetylation activity of histone lysine residues. Solid-phase peptide synthesis was performed to synthesize phosphorylated and unphosphorylated SIRT1₃₃₋₅₂ and SIRT1₁₅₋₄₁ to compare their structures and interactions with the catalytic core of SIRT1. SIRT1₃₃₋₅₂ was fluorescently labeled with carboxyfluorescein for fluorescence assays. Protein expression of SIRT1 in *E. coli* was performed for protein-observed ¹⁹F NMR and the expressed SIRT1 proteins were characterized via SDS-PAGE. Structural analysis of SIRT1 is necessary to understand the importance of the SIRT1 N-terminus, enhancing our current understanding of DNA transcription.

VIRTUAL SYMPOSIUM 113

The Best Streaming Platform - A DS 202 Research Project

Presenters: Alexandra Cornwell, Jacob Deweerd

Mentor: Hsiao-ping Chen

This presentation focuses on research collected for DS 202. Our group wanted to narrow down which movie/TV streaming services are most popular among college students and find out why. With so many options to choose from, we also figured we could help our audience choose the best streaming service for their needs. We collected this information through a Google Forms survey sent out to college-age adults in late January 2021 and received 40 responses. Our results indicate that Netflix is the most popular and well-rounded streaming service for college students. Participants liked the service's wide range of content and affordable price. 47.5% of our participants voted Netflix as their most-used platform, with the second-most-popular choice, Hulu, coming in with just 15% of the vote.

VIRTUAL SYMPOSIUM 114

Complications of an Enlarged Human Thyroid Gland

Presenter: Lucas Cersosimo

Mentors: Chris Reed, Dawn Richiert, Laura Stroik, Melissa Tallman

The human thyroid gland is a bi-lobed endocrine gland located anteriorly in the lower neck. The thyroid's shape and size are influenced by many factors including age, biological sex, and geographic location. Morphological variation in the thyroid has important clinical ramifications. Specifically, abnormal morphology can be a symptom of illnesses such as Graves' disease or Hashimoto's thyroiditis. During dissection, a significantly enlarged thyroid gland was uncovered in a 90-year-old female cadaver. This thyroid appeared bloated, elongated, and highly vascularized. These qualities reflect the gland's significant growth into the thoracic cavity and impingement on the esophagus. This observed hypertrophy may have contributed to malnutrition, the primary cause of death for this individual. The possible causes of this hypertrophy are multifactorial (e.g. level of thyroid hormone production, nodules in gland itself). This poster will examine and discuss these possible causes.

VIRTUAL SYMPOSIUM 115

Delivering Difficult News: An Interprofessional Collaboration in Healthcare

Presenter: Nathaniel Bobb

Mentor: Sherri Fannon

Purpose: Healthcare students report that delivering difficult news presents challenges in clinical work. There is a need to improve the training of student healthcare providers in communication. The methodology presented will focus on the development and implementation of simulated learning.

Objective: Describe the unique outlook of a Research Assistant (RA) and the role of the student in the growth of creating simulated learning experiences of delivering difficult news.

Background/Significance: An interprofessional partnership was created to assist in the project. The methodology, VitalTalk, is being utilized, bringing real life scenarios into simulation.

Methods: This presentation will include the unique experience of a first year GVSU, DNP student working as a RA.

Results: Results from previous presentation has reflected very positive attitudes.

VIRTUAL SYMPOSIUM 116

Two and a Half Lynx: The Birth of a Kitten Affects Lynx Behavior in a Captive Setting

Presenter: Hailee Cederquist

Mentor: Jodee Hunt

Environmental variables influence animal behavior and the routines of captive animals often change when individuals are moved between zoos, their social group shifted, or enclosure altered. In 2018, two Canada lynx (*Lynx canadensis*) were introduced to John Ball Zoo, then their exhibit subsequently modified in 2019. In 2020 the lynx produced a female kitten. For 3 seasons we used scan sampling with *Zoomonitor* to quantify behaviors and the animals' enclosure use every 30 seconds in 30-minute bouts of sampling. We then compared the animals' behavior and spatial use from 2018 to 2020. The highly used sites in the enclosure changed for both adults each season, as did the adults' time budgets between each season.

VIRTUAL SYMPOSIUM 117

Exploration of Nonylphenol Toxicity in Juvenile *Faxonius Propinquus* Crayfish

Presenter: Natalie Rizza

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 indicate 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.

VIRTUAL SYMPOSIUM 118

Effects of Retrospective versus Anticipated Regret on Eating Behaviors

Presenter: Meghan Billeck

Mentor: Amanda Dillard

Although research has shown that anticipated regret is important to health behavior decisions, little is known about other characteristics of regret such as retrospective regret or regret of actions versus inactions. This experiment examines characteristics of regret in eating behavior by randomly assigning participants to write about either a future or a past eating regret. They were further randomized to describe a regretted action (eating unhealthily) or inaction (failed to eat healthy). Participants rated the intensity of this regret and reported future eating intentions. Next participants were given raisins and M&Ms and invited to eat as much as they wanted. Our hypotheses were that compared to retrospective regret, anticipated regret may increase negative affect, behavior intentions to eat healthy as well as actual healthier behavior in the lab. This research may ultimately provide insight into how best to utilize regret in health behavior interventions.

VIRTUAL SYMPOSIUM 120

Collagen Fiber Orientation in Primate Dura Mater

Presenters: Jocie Madsen, Emily Sherry

Mentor: Chris Reed

The dura mater influences the development of the human cranium through mechanics and genetics. The physical organization of the tissue may give clues about the influence of the dura mater. By observing the orientation and density of collagen fibers, the dura mater may be used as a basis of regulation for the closure of sutures. Primates were used as a model organism to investigate the collagen fiber arrangement of cerebral dura mater. The goal was to observe any patterns of collagen fiber arrangement around the lobes of the sagittal suture. A high density of collagen near the sagittal suture could prove that the dura mater can cause the closure of sutures. Using photomicroscopy and computerized image analysis, the trichrome-stained dehydrated-paraffin tissue samples were examined for patterns of density within the arrangement of collagen fibers. Future directions include investigating the collagen fiber relationship in human dura if positive results are seen in primates.

VIRTUAL SYMPOSIUM 121

A Comparison of Emergent Cytokine Manipulations in Mesenchymal Stem Cell Therapy for Myocardial Infarction

Presenters: Trevor Dunn, Jacob Gunn

Mentor: David Geenen

Bone marrow-derived mesenchymal stem cells (MSCs) have been shown to reverse the effects of myocardial infarction (MI) in pre-clinical (animal) models and restore functionality. Unfortunately, this has not been replicated in clinical studies. Cytokines secreted by MSCs may play a causal role in cardiac repair. Upregulation of cytokines, including VEGF and FGF, has been shown to improve MSC therapy in animal models. However, across studies, there are differences in the method of upregulation, method of delivery, timing of delivery, dosage, and endpoint of the study. This makes comparison difficult. We explored various treatment protocols and proposed cytokine signaling pathways in order to highlight key characteristics of these cytokines that can be used to make informed decisions when designing an MSC therapy. Special attention was paid to factors such as interaction with hypoxia and feasibility, which are essential considerations when designing a clinical intervention for MI.

VIRTUAL SYMPOSIUM 122

Dispositional Optimism and its Protective Role for Women with Infertility

Presenter: Ava Weber

Mentor: Amanda Dillard

Previous research has revealed that there are psychological benefits to dispositional optimism. We examined if such optimism may be protective for women who planned to undergo fertility treatment when the COVID-19 pandemic occurred. Specifically, we analyzed the association between dispositional optimism and women's perceived impact of COVID-19 on their fertility treatment and psychological health. Women over 18 years and undergoing treatment were invited to complete a survey to assess variables of dispositional optimism, perceived impact of the pandemic on fertility treatment plans, perceived stress and depressive symptoms, and expectations for a future pregnancy. Findings showed that dispositional optimism was associated with perceiving a less negative impact of the pandemic, lower stress and depression, and higher expectations of getting pregnant in the future. So, a more optimistic personality may provide a protective buffer for women who experience infertility during the

pandemic.

VIRTUAL SYMPOSIUM 123

Considering Psychological Impacts of Ulcerative Colitis in the Patient-Centered Care Model: A Scoping Review

Presenter: Elizabeth Martin

Mentor: Melodee Vanden Bosch

Ulcerative colitis (UC) is a chronic, incurable illness without specific etiology. The unpredictability of the illness impacts patient's lives, often unrecognized by caregivers and therefore not incorporated into the patient-centered care (PCC) model. Research exists aimed to enhance PCC delivery for illnesses with poor prognoses, but this research excludes UC. The purpose of this scoping review is to investigate the impact UC has on overall wellbeing to improve the nursing PCC model. Findings of the 12 reviewed studies across all age groups indicate themes of suicidal ideation related to severe pain. Children with UC struggle with fear of not being perceived as normal, while adults feel anger, depression, and helplessness. Improving nurse-UC patient communication leads to a more comprehensive assessment of individual experiences, ultimately offering improved PCC delivery.

VIRTUAL SYMPOSIUM 124

Surviving the Fallout from a Year of Masks

Presenter: Kristina Pacelli

Mentor: Dalila Kovacs

Join me on an overview of materials used in mask production, their effectiveness against small particles (such as Covid-19), and the aftermath of the recent increase in demand for these single use materials. Current global changes in the market for single use masks have created a massive influx of waste that our society was not quite ready to handle in a sustainable, green, ecofriendly way. Are there options for sanitation and reuse of what was previously considered to be single-use masks? Is recycling or repurposing an option? Let's take a look at the current options available and where we can go in the future as a society to be both healthy and sustainable.

VIRTUAL SYMPOSIUM 125

A Destructive Test of the Use of Photographs in the Study of Tree Architecture: A Case Study Using a Large Red Maple

Presenter: Steven Polaski

Mentor: Gary Greer

The woody component of a tree is a standing vascular system that must maximize growth through efficient conduction of water while supporting its mass. These abilities are determined by a species' architecture and microanatomy. How a species' anatomy and architecture integrate to determine its ecological distribution is poorly understood. One reason for this is that tree architecture has been studied exclusively through computer modeling and destructive studies in which one or many trees are injured or felled. Destructive methods generate precise data, but alter or destroy trees. Non-destructive approaches are needed. Our lab has been using digital photography to study tree architecture for the past year. We report on a destructive test of the precision of measurements acquired from digital photographs. A 73 ft (22.3m) red maple tree was photographed and felled in early 2021. Correlations between photo-acquired and destructively-acquired measurements will be explored.

VIRTUAL SYMPOSIUM 126

Remembering Nazi Persecution in the 21st Century: The Memorial to Homosexuals Persecuted Under Nazism as a Site of Contested Meaning

Presenter: Gabi Loche

Mentor: Donovan Anderson

Erected in 2008, the Memorial to Homosexuals persecuted under Nazism sits in the southeast corner of Berlin's Tiergarten, in-between statues to national literary icons Johann Wolfgang von Goethe and G. E. Lessing and across the street from the Memorial to the Murdered Jews of Europe. It is the third memorial to the gay victims of the Holocaust in Germany, and the first to come from the government. It is situated among the many memorials within Berlin, and is also connected to numerous plaques commemorating the gay victims of the Holocaust across Germany. It has been vandalized, and has been the cause of controversy, often centered around the extremely different experiences of gays and lesbians during (and after) the Holocaust. Through an examination of speeches, media articles, secondary essays, and city maps this presentation analyzes the ways in which the function of this memorial in public spaces, both physical and discursive, goes beyond the stated purpose of the memorial.

VIRTUAL SYMPOSIUM 127

Evaluating an Environmental Gradient Along Eastern Lake Michigan

Presenter: Haley Kuhnle

Mentor: Carl Ruetz

Michigan's drowned river mouth (DRM) systems are lake-like, transitional habitats that link a tributary to Lake Michigan. These habitats are a common feature on the eastern Lake Michigan shoreline. We hypothesized that a latitudinal gradient in productivity exists, with more eutrophic conditions in the south and more oligotrophic conditions in the north, which has important implications for DRM and Lake Michigan food webs. To test our hypothesis, we measured chlorophyll-a concentrations (a measure of phytoplankton biomass, which forms the base of the food web) and observe Secchi depths (a measure of water clarity, where larger values are associated with greater water clarity) at three sampling locations in 12 DRMs. We observed greater chlorophyll-a concentrations and decreased Secchi depth in southern DRMs compared to northern DRMs. Thus, our results supported our hypothesis of a latitudinal gradient with DRM productivity decreasing at more northern latitudes in eastern Lake Michigan.

VIRTUAL SYMPOSIUM 128

Indigenous-led Activist Responses to the Keystone XL and Line 3 Pipelines

Presenter: Claire Sysko

Mentor: Leifa Mayers

Oil pipelines in North America create extensive negative environmental and social consequences for Indigenous communities (Datta and Hurlbert 2020). Many Indigenous-led organizations are engaged in activism against pipeline projects in an attempt to protect Indigenous communities' land, water, and identity. This project uses discourse analysis to examine press releases from the websites of Indigenous-led organizations, specifically their responses to government and industry action surrounding the Keystone XL pipeline and Line 3. Data analysis reveals the common rhetoric used by Indigenous activists in response to government and industry actions. This project centers the perspectives of Indigenous activists and contributes knowledge about Indigenous-led organizations' use of online press releases.

VIRTUAL SYMPOSIUM 129

Effects of Tenth Century Viking Activity on the Early Unification of England

Presenter: Joshua Zurek

Mentor: Alice Chapman

This project will explore the effect that the Vikings had on the unification of England in the tenth century after their initial arrival, raids, and subsequent conquests. In this project I will analyze and evaluate a variety of evidence, including primary source documents, such as *The Life of King Alfred* and the *Anglo-Saxon Chronicle*. In addition to these documents, this work will include assessment of archaeological finds as a way to provide an interdisciplinary look at the impact of the Vikings, while also discussing customs and rituals seen in times of peaceful and hostile confrontation between Anglo-Saxon and Viking groups. This project will also discuss Viking activity and how it affected the English lands of Mercia and Northumbria, allowing Anglo-Saxons to take advantage of the malleable boundaries and pliable kingdoms of these areas.

VIRTUAL SYMPOSIUM 130

Trusted Sources of Information and Land Use Management Practices in Pigeon River Watershed

Presenters: Rylie Dorman, Jacob Grimes

Mentor: Amanda Buday

The Pigeon River Watershed (PRW) is an environmentally sensitive area that depends on agricultural production as the main economic source. The region faces failing septic systems and high levels of water pollutants as some of the major threats to this economy and environment. Our research analyzes the opinions, behaviors, and demographics of the community members and their land use practices. We use data gathered using the Social Indicators Data Management and Analysis tool developed by MSU, a questionnaire that was mailed to property owners of the PRW. In this presentation, the trusted sources of information of the residents are compared against implementation of best management practices. People who are currently implementing cover crops reported that they get information about water quality from the internet, conversations with others, and newsletters and that they trusted the county government and the health department less than other sources of information.

VIRTUAL SYMPOSIUM 131

The Monstrous Queer

Presenter: Gabrielle Angel

Mentor: Jae Basiliere

Monsters are phantoms that exist at the edges of society. They are the ultimate Other and are so fundamentally different from the normative that their existence works to guard boundaries of what it means to be human. As such, the monster has become an integral part of the American psyche as it tries to think through societal deviance. Marginalized communities are often branded as monstrous, and queer individuals have consistently been targeted by this rhetoric in order to dehumanize queer identities and limit queer access to power. I seek to examine this link, and I employ archival analysis of newspaper articles in order to track how print media has historically replicated and amplified rhetoric that is suggestive of queer monstrosity. I also analyze the ways in which this rhetoric, in its various incantations, is used to justify homophobic violence and the exclusion of queer individuals from society, as well as how queer individuals police their own behaviors in response.

VIRTUAL SYMPOSIUM 132

Hillbilly Horror and Rural Monstrosity

Presenter: Gabrielle Angel

Mentor: Jae Basiliere

As a genre, horror is meant to provoke fear and instill dread for those who consume it. However, this is not the only purpose of the genre, and research suggests that an underlying purpose of horror is to illuminate and think through social problems through horror's speculative nature. This speculative nature is amplified through the use of the monster, a figure that is at the center of almost any horror movie in some capacity. This project examines a particular sort of monster: the rural monster created through the subgenre of hillbilly horror. It looks at four foundational texts of the genre and examines the ways in which rurality is cast as inherently monstrous and dangerous and thinks through what this means for those communities. It also seeks to challenge the underlying classist assumption of hillbilly horror that suggests that racism, homophobia, sexism and other systems of power only exist in rural spaces.

VIRTUAL SYMPOSIUM 133

Kinetic and Structural Characterization of Novel ADC Variants from Carbapenem-resistant *Acinetobacter baumannii*

Presenter: Trevor Beardsley

Mentor: Bradley Wallar

As bacteria continue to evolve and adapt, resistance to antibiotics becomes more prevalent. Multi-drug resistant *Acinetobacter* is especially worrisome. *Acinetobacter* contain a number of resistance mechanisms, the most prominent being the expression of β -lactamases. These enzymes hydrolyze β -lactam antibiotics, including antibiotics that are considered among the 'last lines of defense'. Class C β -lactamases are referred to as *Acinetobacter*-derived cephalosporinases (ADCs). A recent analysis of carbapenem-resistant *Acinetobacter baumannii* isolates identified the most prevalent ADC β -lactamases conveying antibiotic resistance. A kinetic analysis of three ADC variants was performed to characterize their activity against multiple β -lactam antibiotics. Additionally, to understand the structural basis for the observed activity, the X-ray crystal structures of each variant were determined. This structure-function analysis may be useful in the development of novel β -lactamase inhibitors.

VIRTUAL SYMPOSIUM 134

Protein Knockdown in *Drosophila melanogaster* to Induce a Loss of Function Phenotype

Presenter: Jacob Bommarito

Mentor: Georgette Sass

The *drk* gene codes for the DRK receptor protein, a *Drosophila* homolog of the *Homo sapiens* gene Hsap\GRAP. GRAP recognizes phosphorylated tyrosine residues and is implicated in developmental and cognitive processes. DRK is expressed in the sensory system of *Drosophila melanogaster*. Loss of function mutations introduced in the DRK gene have been associated with nonsyndromic deafness. Levels of DRK protein will be reduced in the chemosensitive antenna of *Drosophila melanogaster* via a genetic knockdown scheme. The goal will be to generate novel phenotypes associated with loss of function mutations in olfactory sensation to better understand how Hsap/GRAP functions.

VIRTUAL SYMPOSIUM 135

Memetic Meaning-Making: The Evolution of Fairy Tales

Presenter: Kristie Winslow

Mentor: Corinna McLeod

The memetic evolution of fairy tales has allowed their narrative form to take on the role of stories of initiation, or rites of passage, providing a safe space for readers to respond to changing life stages. The structure's spaces in the narrative allow meaning making to occur, as the reader fills them with their own experiences. Through this encounter with the text, unconscious desires and repressed traumas can be safely processed by the reader. This also affirms for the reader that their search for happiness is universal while reinforcing societal values and ideological norms, providing social stability. This shift has occurred because of the deliberate alteration of its tellers, revealing the imprints of their cultures while retaining the most relevant features of the narrative. Fairy tales fulfill the role of initiation and personality reintegration through their narrative structures.

VIRTUAL SYMPOSIUM 136

Assessing the Relationship Between Covid-19 Risk Perceptions and Worry, Severity, and Behavioral Intentions

Presenter: Jenna Lester

Mentor: Amanda Dillard

Two studies were conducted to examine the relationship between Covid-19 risk perceptions and behavior intentions, worry, and severity beliefs about the virus. Study 1 included college students (N=248) and Study 2 included adults from the general population (N=300). Four types of risk perceptions were assessed: numerical risk, verbal probability risk, personal risk compared to others (comparative), and feelings-of-risk. Study 1 showed that feelings-of-risk was the only measure that was significantly associated with the preventative behavioral intentions and beliefs about virus severity. Study 2 showed that all risk perceptions were associated with intentions, worry, and severity beliefs, however, feelings-of-risk had the strongest associations. This study suggests that assessing risk perceptions of Covid-19 by looking at feelings-of-risk may be the best way to understand how threatened people feel by this virus, as well as their personal preventative behavioral intentions.

VIRTUAL SYMPOSIUM 137

Cultural and Health Barriers Contributing to Medication Noncompliance in African Americans with Type 2 Diabetes Mellitus: A Rapid Review

Presenter: Madison Shortridge

Mentor: Lori Houghton-Rahrig

This rapid review examines the relationship between health beliefs and medication noncompliance in diabetic African Americans. This population has a higher prevalence of type 2 diabetes mellitus [DMII] compared to other races. Noncompliance of DMII increases adverse outcomes for patients. This review used multiple search engines including CINAHL, PubMed, and Google Scholar with the search terms: type 2 diabetes, type 2 diabetes mellitus (DMII), medication non-adherence, noncompliance, adherence, compliance, African Americans, Black Americans, culture, health beliefs. After finding 1,888 articles, published between 2011-2021, 16 met the inclusion criteria. Cultural factors identified include familial support, community support, religious beliefs, and cultural practices. However, due to a lack of focused research studies into specific cultural groups, more studies are needed to clarify the relationship of culture and medication compliance in African Americans.

VIRTUAL SYMPOSIUM 139

Utilizing the UAS-GAL4 System of Protein Knockdown to Observe Loss of Function Phenotype of p53 in *Drosophila melanogaster*

Presenter: Hannah Jarvis

Mentor: Georgette Sass

The Guardian of the Genome, p53, is known for its role in the development of numerous cancers in humans. It is a tumor suppressor gene that encodes for a transcription factor to activate genes responsible for cell-cycle checkpoints and stimulates apoptosis in response to genotoxic stress. The role of p53 in *Drosophila melanogaster* will be examined using genetic techniques to knockdown the p53 protein in nurse cells of females. We know that nurse cells surround and synthesize proteins and maternal mRNA to be deposited in the developing oocyte; nurse cells must undergo apoptosis in order to generate a fertilizable egg that can support a viable embryo. The purpose of this study is to discover novel phenotypes associated with the loss of function of p53 protein in oogenesis and embryonic development. To observe p53 in *Drosophila melanogaster*, Epi-Fluorescent Microscopy and Confocal Microscopy will be necessary for characterizing p53 expression in nurse cells.

VIRTUAL SYMPOSIUM 140

The Self-Enhancing Functions of Binding versus Individualizing Moral Foundations

Presenter: Abigail Coffing

Mentor: Luke Galen

Moral Foundations Theory (Graham & Haidt 2010) suggests two distinct broad bases for moral judgments: Individualizing (promoting care and justice) and Binding (traditional group loyalty, obedience, and sanctity). However, these have not been compared regarding their relationship to the centrality of individuals' self-image or their moral self-enhancement. These latter constructs may bias self-reporting in morally relevant contexts. Religiosity, which correlates with higher Binding foundations, has been associated with moral self-enhancement. We manipulated the salience of morality by having participants respond to the moral measures either before or after responding to religious measures. Results indicated that Binding foundations and self-rated morality were lower when preceded by religious measures. Further, only Binding foundations were correlated with self-enhancement and religiosity. Binding may be more reactive to self-image threats than Individualizing moral foundations.

VIRTUAL SYMPOSIUM 141

Using RNAi Knockdown Strategies to Observe Loss of Function of RdgC in *Drosophila melanogaster*

Presenter: Olivia Roumaya

Mentor: Georgette Sass

The *Drosophila melanogaster* rdgC gene encodes a phosphatase protein that regulates the visual pigment, rhodopsin, by catalyzing calcium-dependent dephosphorylation. The human ortholog of this protein, PPEF, has an equivalent function. It is known that rdgC mutants in constant or 12-hour light cycles experience degeneration, but in complete darkness, the wildtype phenotype is expressed. RNAi knockdown strategies in *Drosophila* give an opportunity to study retinal degeneration more extensively by observing the role of rdgC in photoreceptor cell death. Light-induced degeneration occurs when rhodopsin is active, so expression will be driven in Rhodopsin 1 photoreceptors. The goal is to compare cell death rates of rdgC mutants and the knockdown genotype by using different light cycles, wavelengths, and diet controls from larval to adult stages. Photoreceptor cell death can

be assessed by the absence of the deep pseudopupil seen in the compound eye of *Drosophila* using standard microscopy.

VIRTUAL SYMPOSIUM 142

Correspondence Between Tree Architecture and Wood Properties for Twelve Tree Species in West Michigan

Presenter: Brendan May

Mentor: Gary Greer

Much is known about individual wood and leaf traits, however, study of how they integrate to determine a species' architecture and its ability to compete and tolerate stress is in its infancy. We investigated correspondence between anatomical and biophysical traits and the architectures of twelve species of trees occurring in West Michigan. Architectural data were collected from photographs and anatomical data were acquired from literature. Results from principle components analysis do not reveal correspondence between tree architecture and mechanical properties, however, the significant correlation between branch angle and architectural metrics provides a foundation for investigating the ability of these species to plastically respond to competition and biophysical stresses.

VIRTUAL SYMPOSIUM 143

Dynamics and Control of SARS-CoV-2 in the State of Michigan Population

Presenter: Cyrus Foster-Bey

Mentor: Norma Ortiz-Robinson

In this project we model the SARS-CoV-2 pandemic in the state of Michigan by using both SIR and SEIR models and the available data to fit parameters numerically. We evaluate two objective functions in the context of each of the aforementioned models: the first to hold the temporal peak of the infected to below some predetermined limits; the second to minimize the number of susceptible. Two controls are introduced to represent vaccination and treatment rates in order to analyze best strategies for the employment of those resources.

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Vinalay, Melissa	Student

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Wallace, Heather	Mentor
Wallar, Bradley	Mentor
Walters, Jacob	Student
Wampler, Peter	Mentor
Wassink, Jonathan	Student
Weber, Ava	Student
White, Karissa	Student
Wietrzykowski, Mallory	Student
Willett, Sarah	Student
Williams, Khileah	Student
Williams, Todd	Mentor
Wilson, Desiree	Student
Winkelstern, Ian	Mentor
Winslow, Kristie	Student
Winther, Jennifer	Mentor
Wolffe, Gregory	Mentor
Wood, Jeremy	Student
Wroblewski, Michael	Mentor

Wychers, Amber	Student
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X**Y**

Yokubonus, Jordan	Student
Young, Cian-Kyler	Student

Z

Zechmeister, Kayleigh	Student
Zurek, Joshua	Student

Online Schedule Builder

Updated Presentation Information in lieu of Printed Addendum

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

To access the Schedule Builder:

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

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

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