UNIVERSITY UNDERGRADUATE RESEARCH & ARTS FORUM

APRIL 8, 2022

ACKNOWLEDGEMENTS

The 24th University Undergraduate Research and Arts Forum (UURAF) at Michigan State University will be held at the Jack Breslin Student Events Center from 8:30 AM – 5:00 PM and online at Symposium by ForagerOne on April 8, 2022. This program book recognizes the outstanding research and creative endeavors by over 750 undergraduate students. These students represent 17 different colleges and were mentored by more than 500 faculty, staff, post-doctoral fellows, graduate students, and industry partners.

UURAF is sponsored by the Office of the Associate Provost for Undergraduate Education and the Honors College.

Behind the Scenes

UURAF would not be possible without a team of dedicated individuals in the Undergraduate Research Office who coordinate logistics, respond to inquiries, and support students and mentors. Many thanks to...

- Our undergraduate and graduate staff: Anapaola Almaguer-Morales, Paul Billock, Maddie Cantrell, Amanda Flores, Marena Haidar, Anna Hoesley, Srikar Kesamneni, Ben Kessler, Annabel Leonova
- Casie Chunko, Administrative Assistant for Academic Initiatives
- Heather Dover, Coordinator for Undergraduate Research and lead UURAF organizer
- Mordecai Harvey, Assistant Director for Undergraduate Research
- Vanessa McCaffrey, Associate Director for Undergraduate Research
- Korine Wawrzynski, Assistant Dean, Academic Initiatives & Director, Undergraduate Research

We appreciate the work of numerous MSU assistant and associate deans for identifying faculty, staff, post-doctoral fellows, and graduate students to evaluate student presentations.

Finally, we thank the hundreds of dedicated mentors who guided the research projects and creative activities presented in this program book. We encourage you to learn about the impressive work of our next generation of scholars and researchers.

About the Cover

The cover art was designed by Danny Brandwein ‘21, a Graphic Design major in the Department of Art, Art History, and Design and member of the Design Center of MSU.

Undergraduate Research Ambassador Program

Our student ambassadors facilitate workshops about undergraduate research, provide guidance on programming and initiatives, and represent the office at campus events. They frequently are invited to present to classes and at student academic organization meetings. The 2021-22 Undergraduate Research Ambassadors include:

Maria Berry
Ky Chimrak
Marissa Cortright
Alyssa Fritz
Jessie Greatorex
Gabriel Gurule
Aneeqa Hasan
Issi John
Andrew Kearney
Erin Kramer
Lexi Nadolsky
Morgan Roegner
Jacob Rutkowski
Martina Yen

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Undergraduate Research
MICHIGAN STATE UNIVERSITY

Abstracts

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AGRICULTURE & ANIMAL SCIENCE
Poster Presentations

EVALUATING SITE-SPECIFIC EFFECTS OF PRECISION ZONAL MANAGEMENT (PZM) ON SOYBEAN PERFORMANCE AND NITROGEN AVAILABILITY

Presenter: Rachel Drobnak
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 101
Mentor: Sieglinde Snapp, KC Rabin

Precision Zonal Management (PZM) is a field crop production strategy with the potential to build soil productivity capacity in agriculture. This technique can rebuild and increase ecosystem services in soils, including plant-available nitrogen, weed control, and resistance to extreme precipitation. PZM includes the use of ridge tillage (RT), where raised beds are built using soil from between-row furrows each season. Along with ridge tillage, PZM can include the use of cover crops (CC) in furrows, which helps increase plant available nitrogen and promote soil microbial activity. This study analyzes results from a multi-year, multi-state trial conducted from 2011-2015 at four sites across Illinois, Michigan, Minnesota, and Pennsylvania to determine soil and crop effects of PZM on corn and soybean. At each site, four treatments were studied: RT and CC, RT without CC, conventional tillage (CT) and CC, and CT without CC. The objectives of this study are to (1) determine if soybean, compared to corn, is a better entry point when starting to utilize PZM, (2) determine if rye as a cover crop reduces soil nitrogen availability and corn yields, and (3) analyze long-term trends of implementing this system. Employing linear mixed effect models, it has been deduced that (1) cover crops improve soybean yields, (2) corn yields have no positive or negative tillage or cover effect, and (3) in some sites, the pool of available nitrogen is being built by using ridge tillage.

IRRIGATION WATER USE TRENDS IN MICHIGAN AND INDIANA

Presenter: Catherine Christenson
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 102
Additional Student Presenters: Ellie Gagner
Mentor: Younsuk Dong

Irrigation can reduce the effects of erratic precipitation, prolonged dryness, and resulting plant moisture stress. Because of this benefit, irrigation has been used to grow various crops such as corn, soybean, vegetables, and orchards. The more irrigated acres have been expected as Michigan has experienced the more erratic precipitation and warmer weather conditions. It is important to understand the irrigation water use trends in Michigan and Indiana, which will help to prepare and develop effective irrigation outreach program for future. From 2003 to 2008, the total amount of irrigated farms has nearly doubled in Michigan. Meanwhile in Indiana the amount has over doubled. Corn utilized for grain, for instance, now consists of over 378,000 acres of irrigated land, while in 2003 there was only around 185,700 acres. Center pivot (overhead) irrigation system contributes 87.46 % and 91.36% of irrigation methods in Michigan and Indiana. Drip irrigation system has been commonly used in vegetable and fruit farms. The most common methods to decide irrigation decision are condition of crop (42.82%) and feel of soils (31.56%). Many farmers also utilize outside sources for information on reducing irrigation costs and conserving water. The most utilized tools are Irrigation equipment dealers (76% for Michigan and 66% for Indiana) and extension agents or university specialists (49% for Michigan and 48% for Indiana). In conclusion, water management outreach programs for each crop type are needed. Promoting scientific data-based irrigation water management should be emphasized in the future.

ON-FARM IRRIGATION DEMONSTRATION STUDY TO IMPROVE IRRIGATION WATER USE EFFICIENCY

Presenter: Brenden Kelley
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 103
Mentor: Younsuk Dong

Irrigation water use efficiency has become one of today's top concerns in agriculture. It is imperative that enough water is applied to meet the needs of a given crop, however, exceeding the amount of water that the crop can make use of wastes one of our most valuable natural resources. Finding the balance between the crop's water requirements and irrigation applications is necessary to maximize water use efficiency. By estimating the soil moisture available to the plant and comparing that value to the water removal for that crop under present conditions, it is possible to calculate a theoretically optimal application. Since individual's irrigation practices vary, our goal is to compare producers' applications to a theoretically optimal application of 1 inch of irrigation applied when the soil moisture falls below 50%. Additionally, this study includes a reduced application (0.7 inch) with a lower soil moisture threshold at which water is applied (40%), and an excessive application (1 inch) with a higher threshold (70%). Soil moisture, leaf wetness and temperature/humidity sensors were placed on LOCOMOS (Low-Cost Sensor Monitoring) dataloggers for each treatment sector to monitor soil and environmental conditions. In 2021, our team found that irrigation water use efficiency can improve yields from 3.3 to 5.3 bu/acre/in in a corn field and 5.6 bu/acre/in to 12.4 bu/acre/in in a soybean field. We intend to use this data to help farmers improve their irrigation practices.

PUTTING YOUR BEST PAW FORWARD: INFLUENCE OF DESCRIPTORS AND SOCIAL MEDIA ON INTEREST IN ADOPTABLE DOGS

Presenter: Grace Werner
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 104
Additional Student Presenters: Jordan Gembarski, Caden Opsommer, Gwen Pratt, Brooke Seelenbinder, Taylor Stehouwer, Hannah Vanslembrouck, Natalia Velychko, Bailey Walker, Lily Wathen
Mentor: Jacquelyn Jacobs, Laura Reese

The American Society for the Prevention of Cruelty to Animals estimates 6.3 million companion animals enter U.S. shelters each year. To increase the likelihood of adoption, advertisement of these animals is crucial to alert potential owners to their presence and availability. Previous research suggests that the quality and context of the dog's photo as well as certain descriptors such as breed may influence perceived adoptability of an advertised dog; however, little attention has been given to differences in presentation, such as video compared to still image, as well as the impact of using different social media platforms. The aim of this research is to compare the quantity of interactions, through "likes", "shares" and "views" between varied presentations of the same dog shared through both Facebook and Tiktok. Presentation scenarios for the dog will include: 1) photo of the dog alone with short description, 2) photo of the dog with people (young child, female adult, male adult) with short description, 3) video of the dog alone with a voice and text description, 4) video of the dog interacting with people (young child, female adult, male adult) with a voice and text description, and 5) video of the dog providing their own description (through a talking dog app). We hypothesize photos and videos of the dog interacting with people will have more interactions than those without people. We further hypothesize that the talking dog will have greater interactions on Tiktok than on Facebook. Data collection for this project is ongoing.

THREE-DIMENSIONAL ANALYSIS OF DAIRY COW UDDERS BEFORE AND AFTER INTRAMAMMARY INFECTION

Presenter: Drake Haase
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 105
Mentor: Pamela Ruegg

Mastitis is the most common bacterial disease of dairy cows and results in reduced animal welfare and decreased farm productivity. The goal of this research is to compare changes in udder size of dairy cows before and after a single mammary gland quarter has been challenged with Streptococcus uberis. Three-dimensional mammary gland images of healthy cows (n = 25) were captured using a structure scanner attached to an iPad. Cows were enrolled in a separate study that included a mammary gland challenge with Strep uberis. By analyzing the images using a 3-Matic, a 3-D imaging software udder size and surface area can be compared prior to infection (day 0), and after infection (2 and 5 days post-infection). This research will help us

determine how inflammation affects udder dimensions in different anatomical locations and how overall surface area responds as a result of infection. This research will lead to a better understanding of udder inflammation and may aid future sensors to improve automated detection of naturally occurring mastitis.

HOST EVALUATION OF SELECTED OILSEED RADISHES AS COVER CROPS FOR BEET CYST NEMATODE

Presenter: Ellie Zebas
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 106
Mentor: Sita Thapa, Marisol Quintanilla Tornel

Beet cyst nematodes (BCN, Heterodera schachtii) negatively affect sugar beet production. According to a 2012 Michigan Sugar survey, BCN have been found in over 30% of sugar beet fields in Michigan. BCN infestations can cause the loss of 2 to 15 tons of crop per acre. These losses are caused by the fibrous roots that BCN creates. Female nematodes are called cysts and are visible to the naked eye; they are a main indicator of having a BCN infestation. Certain cover crops, such as oilseed radish, have been found to reduce plant-parasitic nematode populations (Brainard et al. 2016; Wang et al. 2009). When the eggs are exposed to oilseed radish root exudate, they are "tricked" into hatching without having a suitable host plant. This experiment tested six varieties of oilseed radish (Nitro, Defender, Ecotil, Control, Select, and Concorde) in order to determine which are most effective at modifying BCN reproduction rates. Control, Defender, and Ecotil allowed less BCN reproduction overall. Because fewer cysts and eggs were produced, the reproducing population decreased. Male populations were observed to be higher in Concorde and Select varieties; less eggs were produced. However, greater numbers of males may increase the genetic variation in BCN populations. It would be recommended that sugar beet farmers use Control, Defender, or Ecotil varieties of oilseed radish to reduce BCN populations in their fields.

DOG FOSTER CARE RESOURCES FOR VOLUNTEER RETENTION

Presenter: Hannah Vanslembrouck
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 107
Additional Student Presenters: Gwen Pratt, Grace Werner
Mentor: Laura Reese, Jacquelyn Jacobs

One of the most common challenges for animal shelters and rescues is recruiting and retaining volunteers that are able to provide foster care for animals in their homes. Foster care programs are critical because of the many benefits they provide: helping to address capacity issues for organizations that have shelters; obtaining additional information about behavioral traits of the animal particularly involving child, dog, and cat compatibility; allowing sick or injured animals time to heal; nurturing puppies and kittens too young to be adopted; and, providing needed shelter breaks to allow dogs to reduce stress levels. Using a national survey of over 800 animal shelter foster volunteers this project answers the following research questions in the context of

canine fostering: Why do foster volunteers stop fostering? What kinds of support do dog fosters want and need from their organizations? Do the types of support needed vary based on the type of dog fostered (medical, behavioral, puppies)? Answering these questions will provide critical information to animal shelters and rescues about the supports needed to retain foster volunteers.

ANALYSIS OF THE EFFECTS OF COMPOSTING POULTRY CARCASSES ON SOIL NUTRIENTS AND MICROBIAL POPULATION

Presenter: Ashton Jordon
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 111
Mentor: Jason Knott, Zachary Williams, Elizabeth Heath-Heckman

Poultry farmers have a difficult time figuring out how to discard massive amounts of birds. When they have to cull birds, it is usually hundreds and could even be thousands of birds at one time. Thinking of the best way of clearing out the carcasses is difficult, since burying them can be an issue with watersheds and incinerating can only discard so many birds. The objectives of this study were to 1) teach the members of the Michigan State University Animal Science Research Student Association lab and field research methods as well as help them gain experience in a discipline outside of direct contact with animals; 2) test the hypothesis that the effects of composting birds from mass euthanization will have no negative effects on soil two years after burying them. At the Michigan State University Kellogg Facility in Kalamazoo, MI, two rows of composting birds were started in 2019 in a large field. Two years later in the fall of 2021, ten soil samples were taken from randomly selected areas. There were two control samples, 2 samples from the bottom of the hill where the rows were, and 4 samples from within the rows. A portion of each sample was sent to the Michigan State University Soil Laboratory for nutrient analysis. The leftover portion of each sample was frozen until needed again in February 2022. These portions were used for microbial analysis using PCR and MOTHUR.

DOES WEANING STRESS IMPACT PIGS' BEHAVIORAL RESPONSE TO A FEAR STIMULUS?

Presenter: Courtney Bigelow
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 112
Mentor: Janice Siegford

Fear and stress are the most common emotions researched in domesticated animals, including livestock such as pigs. There are various concerns about animal welfare, due to the presumption that domesticated animals can undergo negative emotional states causing them to suffer. In the current research project, we are examining the impacts of stress on pigs' behavioral response after weaning, a major stressor occurring when pigs are still developing. The startle test was conducted when piglets were 7 weeks and housed in a nursery room (8 per/pen) at the MSU Swine Farm. Prior to the test day, each piglet was marked with a unique

number on its back to allow for easy individual identification. Ten minutes before the test, the experimenter quietly entered the nursery room and waited for piglets to resume normal behavior. The experimenter then sounded an air horn for 1 second, waited 10 minutes, and exited the room. Video of the piglets was recorded from 1 hour before to 1 hour after the test using ceiling-mounted cameras installed prior to the test day. We will decode video to observe the pigs' response to the startling stimulus, including whether pigs initially fight, flee, or freeze and their latency to resume normal behavior. Fear tests can be used as part of a welfare assessment. Utilizing these procedures as a tool, this study aims to determine whether there is a correlation between pigs' behavioral stress response and underlying physiology, which could improve our ability to provide optimal welfare for domesticated animals.

EVALUATION OF SLING RESTRAINT USE FOR PIGS

Presenter: Hannah Hammond
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 113
Mentor: Catherine Ernst, Nancy Raney, Andrea Luttman

Reducing stress is a key component of improving animal welfare in a research setting. For many research studies using pigs, sample collection through blood draw is required, and obtaining these samples requires restraint of the pigs. Common restraint methods used within the swine industry for older pigs, such as nose snaring, are not ideal for repetitive research practice as they can cause increased stress levels, especially if the pigs are not accustomed to the restraint method. Therefore, it is important to identify restraint methods that minimize stress. The objective of this study was to evaluate the use of hammock slings to restrain pigs in a calm manner. For this study, eight 6 week old pigs from two litters (housed in 4 pens, 2 littermates per pen) were used. Each pig was taken out of their pen and placed within a sling just outside of their pen. Once the pig remained calm for five seconds, it was released from the sling and placed back in its pen. A pig was determined to be calm when it was not making any loud noises apart from normal communication and not flailing or kicking its legs aggressively. In this presentation, I will cover the process of restraining pigs in a sling in order to minimize stress during handling.

A NOVEL LOW-COAST APPROACH TO REDUCE STRESS IN SHELTER CATS

Presenter: Grace Jaksen
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 114
Mentor: Alexandra Yaw, Hanne Hoffmann, Jacquelyn Jacobs

Animal shelters around the country are overflowing with abandoned and stray cats, yet many of them never get adopted. Cat temperament is a deciding factor for many families when looking to adopt, and most cats' behavior in stressful shelter kennels is not reflective of their behavior outside of the shelter environment. One environmental factor known to regulate stress and behavior is light composition, however it remains unknown how light composition impacts cat

stress and behavior. We hypothesize that dim and blue-depleted light will decrease stress behavior and increase locomotor activity in shelter cats. To understand the impact of light on feline stress, we evaluated cats at the Ingham County Animal Shelter under standard (bright white light), dim (white light) and blue-depleted light. The cats' stress was scored with the accredited Cat Stress Score behavioral approach test and locomotor activity was recorded continuously via smart collars. Our preliminary data show that dim and blue-depleted light allow female, and to a lesser degree male cats, to more rapidly reduce stress in response to the shelter environment. The activity data is currently being analyzed. We expect to find an increase in activity during the duration of shelter enrollment for all the cats, where cats on dim and blue-depleted light overall will have higher activity than cats on standard light. The preliminary data indicates that using blue-depleted and dim light reduces cat stress. This project might lead to a low cost, non-invasive method for improving cat welfare and successful feline adoptions in the shelter.

RELATING LEAF AREA INDEX TO SORGHUM CANOPY TRAITS

Presenter: Carolina Pratas Glycerio Defreitas
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 115
Mentor: Addie Thompson

In a world with growing population and scarcity of natural resources, efficiency is vital. Sorghum, a C4 grass native from East Africa, has potential to meet this modern world requirement. Sorghum is a plant well adapted to high temperatures and dry conditions. It is largely used as feed for cattle, both as silage and grain, as a source of nutrition for humans and more recently, as a source of biodiesel. Leaf Area Index is defined as the total leaf area per unit of ground area; for sorghum, a typical range was found to be between 3 and 5 in fully developed canopies. LAI is an important indicator of canopy architecture development and relates to light interception as higher LAI indicates greater capacity for light capture. This increased energy is then transformed into biomass and grain. The focus of this project was to relate LAI to detailed phenotypic data collected in 391 lines of the Sorghum Association Panel (SAP) during Summer 2020. This study seeks to understand how canopy phenotypic traits such as plant height, leaf number, leaf area, leaf size, stalk diameter, panicle number, and tiller number, etc. relate to LAI and biomass production in the diverse sorghum genotypes. Overall, we found that individual traits are not highly correlated with LAI directly but may be combined to model and predict LAI. This work will increase our understanding of the impact of component traits that contribute to overall canopy architecture and therefore light capture.

DETECTION OF SPARSE SPECIES OF SPECIAL CONCERN UTILIZING A MULTIPLEX eDNA APPROACH: REDSIDE DACE (CLINOSTOMUS ELONGATUS) AND BROOK TROUT (SALVELINUS FONTINALIS) IN THE OTTAWA NATIONAL FOREST

Presenter: Avery Tilley
Category: Agriculture & Animal Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 117
Mentor: Deahn Donnerwright*

The Redside dace (RSD) is a small minnow fish found throughout headwater streams in the Great Lakes and upper Mississippi River watersheds (Novinger & Coon, 2000). Status varies across its range, but the RSD is currently listed as an endangered species in the State of Michigan due to its limited abundance and high susceptibility to habitat alterations (Goforth, 2000). Historical survey methods, primarily electrofishing and seining, have proven challenging for obtaining accurate data of RSD presence within small creeks, streams, and tributaries throughout the Ottawa National Forest (ONF). Recently, eDNA has become a new standard in such scenarios due to its sampling versatility, however, it has yet to be assessed in the ONF. To develop the most practical tool for fisheries management in the ONF, this study sought to investigate the efficacy of eDNA sampling to detect RSD utilizing a multiplex qPCR assay targeting species of varying abundance. Samples were collected from 27 sites across 20 different waterways within the Presque Isle Watershed in the ONF during June 2021. RSD were confirmed via eDNA in 19 sites and 14 different waterways; RSD were detected for the first time in six new streams and creeks and in three new sites along streams where they have been previously detected. All negative controls yielded negative results, greatly reducing the possibility of cross contamination. From this data we can conclude that eDNA is highly effective for the detection of less abundant species, such as RSD, in a multiplex reaction with highly abundant species.

THE EFFECT OF WATER STRESS ON ROOT-KNOT NEMATODE DEVELOPMENT IN DROUGHT-TOLERANT DAYLILY

Presenter: Emma McCarthy
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 121
Mentor: Amanda Howland

Many species of nematodes have formed a parasitic relationship with plants, which has caused dire consequences to agricultural yield. The commercial field of agriculture loses $80-118 billion dollars each year due to the damages plant-parasitic nematodes inflict on crops. The root-knot nematode is particularly concerning as is can infect at least 3000 different host plant species and can be found in every temperate and tropical country, causing billions of profit losses. Many biotic and abiotic factors within agriculture are being considered in the control of plant-parasitic nematodes, one of which is water stress. Soil-borne nematodes have been found to be very sensitive to precipitation levels, and that soil facing a drought have lower nematode population

levels. This study applies the linkage between water shortages and nematode abundance, reproduction, and development to the northern root-knot nematode (Meloidogyne hapla) and their relationship with the ornamental plant daylily (Hemerocallis spp.), a known drought-tolerant plant. Once we received the plants, we inoculated each one with 9,000 northern root-knot nematode eggs. We then set four different watering treatments for the daylilies with six replications each: water daily, twice a week, once a week, and biweekly. The impact water stress had on nematode populations was measured. These findings could be critical in understanding how water deprivation in drought-tolerant plants could be used as a management strategy in controlling plant-parasitic nematodes in agriculture.

THE COVID ANIMAL FOSTERING BOOM: EPHEMERA OR CHIMERA?

Presenter: Jordan Gembarski
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 122
Additional Student Presenters: Bailey Walker, Caden Opsommer
Mentor: Jacquelyn Jacobs, Laura Reese

There has been a good deal of discussion in traditional and social media and among animal shelter administrators about an increase in the numbers of people willing to foster animals in their homes during the pandemic. However, there is a lack of empirical data on whether that increase was a temporary response to the stress of COVID or the ability to work from home, if it might have lasting effects, or indeed, whether an increase occurred at all. Using a national survey of over 800 animal shelter foster volunteers this project answers the following research questions in the context of canine fostering: Did the number of foster volunteers increase during the first year of the COVID pandemic? Do volunteers intend to keep fostering as the pandemic wanes? What types of volunteers are most likely to plan to continue fostering and what kinds of dogs do they foster (those with medical, behavioral, or socialization needs)? Answering these questions will provide critical information to animal shelters and rescues in planning for future trends in fostering, targeting recruitment efforts to various groups, and identifying the types of fosters that are most likely to be retained.

POLLINATION-SUITABLE WEATHER DURING BLUEBERRY BLOOM AND ITS INFLUENCE ON POLLINATION AND YIELD

Presenter: Fletcher Robbins
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 123
Mentor: Rufus Isaacs

During the period when crops are in flower, there are only so many hours in which bees and other pollinators are active for pollination. Years with high wind, low or high temperatures, or heavy precipitation will decrease the number of hours in which these insects can fly. Using data collected from the Michigan Agricultural Weather Network in regions of blueberry production, we can explore these variables and determine how many hours were suitable for pollination conditions. Using statewide information and individual farm data, we can determine whether the

number of suitable pollination hours is correlated with blueberry yields. This information is a first step to developing a tool that will employ current-year weather data to predict crop yield, and also to model the implications of future weather scenarios.

THE EMOTIONAL ASPECT OF DOG FOSTERING: BOTH ENDS OF THE LEASH

Presenter: Taylor Stehouwer
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 124
Additional Student Presenters: Brooke Seelenbinder, Natalia Velychko, Lily Wathen
Mentor: Jacquelyn Jacobs, Laura Reese

One of the most common challenges for animal shelters and rescues is recruiting and retaining volunteers that are able to provide foster care for animals in their homes. Foster care programs are critical because of the benefits they provide: addressing capacity issues for organizations that have shelters; obtaining information about behavioral traits; allowing sick or injured animals time to heal; nurturing puppies and kittens too young to be adopted; and, providing needed shelter breaks to reduce stress levels. But there are also impacts to the human on the other end of the leash. Using a national survey of over 800 animal shelter foster volunteers this project answers the following research questions in the context of canine fostering: Do strong emotional connections with foster dogs increase volunteer retention? What is the extent of stress caused by having a medical versus a behavioral foster dog? Is there a connection between frequency of fostering and burnout? What behaviors on the part of the dogs make volunteers less likely to foster in the future? Answering these questions will provide critical information to animal shelters and rescues about the supports needed to retain foster volunteers and allow them to target support based on the fostering history of the volunteer.

STATUS OF BOVINE LEUKEMIA VIRUS INFECTION IN FEMALE CALVES

Presenter: Kelsey Wickham
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 125
Mentor: Tasia Kendrick

Bovine Leukemia Virus (BLV) is a delta retrovirus that induces a chronic infection in cattle. Impacts on infected dairy cows include decreased milk production, decreased cow longevity, and increased production costs. While infection status at various ages of dairy cattle has been published, a longitudinal study sampling animals from birth to adulthood is lacking. Previous studies have shown calves may become infected during the birthing process and exhibit detectable levels of BLV provirus approximately 24 days post infection. Antibodies detected in neonates are indicative of the animal's passive immunity. Little is known about BLV antibody status and proviral levels in calves as their active immunity develops. This project aims to identify the timing of calf BLV infection and the influence BLV infection has on the animals' likelihood of entering the milking herd. Blood samples have been collected from neonates (2 to

8 days of age) and animals will be resampled at 6-months of age, 1 year of age, and each following year of lactation. Following the collection of neonates (n=254), we found 40.55% of the calves had BLV antibodies and 1.18% had detectable BLV provirus. The 6-months of age sampling will allow for identification of potential shifts in BLV antibody status and changes in proviral levels. Identification of the timing of BLV infection among dairy animals may provide insight on how BLV is spreading within a herd as well as aid in providing improved mitigation strategies to prevent BLV infections.

THE ROLE OF WEEP IN ARABIDOPSIS THALIANA ROOT STRUCTURE

Presenter: Joy Johnson
Category: Agriculture & Animal Science
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 126
Mentor: Courtney Hollender

Rooting and branch angles are agriculturally applicable traits that have potential for use in breeding programs of tree fruit. Genetics play a large role in determining rooting and branch angle. Peach trees with a mutation in the gene "WEEP" exhibit a weeping branch phenotype, but the root architecture has never been observed. WEEP is a gene that is present in all plants, but its molecular function is unknown. Additionally, mutations in WEEP in the model plant Arabidopsis thaliana do not have a weeping shoot phenotype, although tests have shown that the gene is expressed there. This project has investigated the root architecture in Arabidopsis seedlings grown on petri dishes. It was observed that plants with mutations in the WEEP gene have narrow root angles.

AGRICULTURE & ANIMAL SCIENCE
Oral Presentations

ENHANCING NET FOOD AVAILABILITY FOR PEOPLE BY FEEDING "LEFTOVER" MICHIGAN FEEDS TO DAIRY COWS

Presenter: Sydney Puda
Category: Agriculture & Animal Science
Time Slot: 1:00 PM
Room Location: Meeting Room B
Number: 131
Mentor: Michael VandeHaar

Animal agriculture is often considered inefficient. However, animals can eat foods humans don't want. Wheat straw, beet pulp, corn gluten feed, soybean hulls, and bakery waste are ecological leftovers from producing human food; these byproducts are human-inedible. We compared milk production and efficiency of 24 dairy cows fed a diet containing 70% Michigan byproducts (BYP) versus a standard control diet (CON). Half the cows were fed BYP for 28 days and then CON for 28 days; half the cows were fed diets in reverse order. Compared to cows fed CON, cows fed BYP produced less milk (41.5 vs 42.9 liters/day; P=0.01) and gained less weight (0.33 vs 0.59 kg/day; P=0.01) but ate the same amount of feed (28 kg/day). When considering efficiency based on all feeds, cows fed CON converted 38% of feed calories to milk and 29% of feed

protein to milk; cows fed BYP returned 46% of calories and 28% of protein. In our diets, only corn grain, soybean meal, the grain portion of corn silage, and the leaf portion of legume silage were human-edible. When considering only human-edible nutrients, cows fed CON returned 62% of calories and 74% of protein, whereas cows fed BYP returned 209% of calories and 170% of protein. Lysine is the most important amino acid in human nutrition; cows fed CON returned 116% and cows fed BYP returned 211% of human-edible lysine. Dairy cows increase net food production when fed ecological leftovers.

CAN CA STORAGE PROLONG THE QUALITY OF ASPARAGUS

Presenter: Alexa Kaanta
Category: Agriculture & Animal Science
Time Slot: 1:15 PM
Room Location: Meeting Room B
Number: 132
Mentor: Randolph Beaudry, Philip Engelgau

Michigan is the country's leading producer of asparagus. There is a growing concern however with the strain of asparagus, Guelph Millennium, used in Michigan. It has a very limited harvest window of 4-6 weeks that leads to an excess of supplies and decreasing prices, ultimately hurting the growers. To try and help fix this problem, asparagus spears will be stored in controlled atmosphere storages to ease the pressure of the surplus in asparagus. After the spears are stored in various conditions and time lengths, the visual quality, firmness, and sugar content will be analyzed to determine the quality of asparagus. These tests will hopefully help show if controlled atmosphere storage preserves the quality of asparagus. The visual quality and firmness test will help to evaluate asparagus in a superficial analysis. The sugar content analysis will help to understand the preservation of sugars in storage.

MONITORING FOREST VOLUME AND BIOMASS VIA TIMBUR

Presenter: Andrew Deleruyelle
Category: Agriculture & Animal Science
Time Slot: 1:30 PM
Room Location: Meeting Room B
Number: 133
Mentor: Andrew Finley

TimbuR is a wrapper package in R of the United States Forest Service's National Volume and Biomass Estimator Libraries. The libraries are already powerful tools partially built upon the ongoing Forest Inventory and Analysis (FIA) initiative. The libraries aim to make forest-wide estimations of forest volume by various log rules, as well as dry/green biomass figures across the U.S., Canada, and the Caribbean. TimbuR builds upon these Fortran libraries by adding new features like height-diameter and crown length-diameter allometric capabilities and reformatting the calculations for data science applications. As part of the NASA Forest Carbon Estimation (FoRCE) project, TimbuR can estimate the amount of sequestered carbon residing within a forest. The nature of the R language also caters toward the long-term monitoring of forested areas, a valuable aspect of quantifying climate change as it impacts our forests. The package also comes with helper functions that demystify the libraries' equation profile and species code systems. Aspects of data preparation necessary to use these libraries, such as selecting a species code and the appropriate volume/biomass profile are now much less time-consuming. Vignettes that outline the process of turning raw data into forest carbon estimations

are also found within the package. As an add-on to the R language, the TimbuR framework simultaneously publicizes and streamlines lengthy (and often expensive) processes in forest estimation. In the coming years, it is my goal to make TimbuR function over multiple continents to better monitor global forest carbon stocks.

BEHAVIORAL RESPONSE OF INVASIVE WILD PIGS TO CONTROL ACTIVITIES IN MICHIGAN, USA

Presenter: Lauren Emerick
Category: Agriculture & Animal Science
Time Slot: 1:45 PM
Room Location: Meeting Room B
Number: 134
Mentor: Gary Roloff

Animal movement models can be used to understand species behavior and assist with implementation of management activities. We explored behavioral state changes of an invasive wild pig (Sus scrofa) population in response to control activities. To quantify behavioral changes related to lethal wild pig management actions (Judas events), we used pre-established behavioral states (resting, exploratory, and relocating) identified using local convex hulls and movement trajectories. We then estimated proportions of each behavioral state before and after Judas events and correlated behavioral states with land cover type, landscape structure (i.e., edge and patch cohesion), and weather conditions. From 2014 to 2018 we collected data from 4 wild pigs occurring in 6 counties (Arenac, Bay, Gladwin, Midland, Ogemaw, and Roscommon) in the central Lower Peninsula of Michigan and one county (Marquette) in the Upper Peninsula of Michigan. Wild pigs experienced 7 Judas events and were monitored using global positioning system (GPS) collars (locations recorded every 30 min) before and after events to discern differences in movements and behaviors. Compared to average wild pig behaviors 2 weeks prior to a Judas event, we found that wild pigs spent more time exploring, less time resting, and the same amount of time relocating for at least 2 weeks after the Judas event. Our results may be used by managers to better understand behavioral implications of control strategies targeting wild pigs.

EFFECT OF ROOT-KNOT NEMATODE INFESTATIONS ON HOP PLANTS

Presenter: Abigail Palmisano
Category: Agriculture & Animal Science
Time Slot: 2:15 PM
Room Location: Meeting Room B
Number: 136
Mentor: Marisol Quintanilla Tornel, Ellie Darling

The hop industry is currently booming in the United States, as consumers and breweries alike are in high demand for fresh, bitter aromas in their beers. Hops have a longstanding agricultural history in Michigan and is one of the state's largest cash crops. With a system as large and complex as the Hop/Beer production industry; it is vulnerable to shocks at any level, such as the negative effects that could be caused by nematode infestations in soil. Root knot nematodes are common in Michigan soils, and thus pose a potential risk to hop growth. Therefore, within this experiment, our aim is to study the changes in bine height and root

development of hop plants that have been inoculated with root knot nematodes. We will be conducting a greenhouse trial by; comparing a control group of hop plants to an experimental group with inoculated soil, and tracking their bine height over the course of the experiment. Through a process of extracting the nematodes from the soil, as well as staining eggs left on the roots, we can determine infestation rates and compare this to the overall damage on the plants development. Additionally, mature female nematodes, eggs, and juveniles will be counted at the end of the experiment to determine the reproductive rate of Meloidogyne hapla on hops. Gaining this knowledge will help to better understand risks involved with growing hops and in time, how to combat these issues.

ANTHROPOLOGY & ARCHEOLOGY
Poster Presentations

AN OSTEOBIOGRAPHICAL ANALYSIS OF SKELETAL REMAINS AND BEADED ARTIFACT FROM CAESAREA MARITIMA

Presenter: Maegan Jankowski
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 201
Mentor: Gabriel Wrobel

The aim for this study was to conduct an osteobiography of the incomplete skeletal remains that are the subject matter for this presentation. Through the bioarchaeological research that was conducted within lab, as well as thorough analysis of the material artifact that were included with the skeletal remains, the purpose of this project was to use several bioarchaeological methods in order to create a biography of the deceased through the analysis of the remains. With the additional knowledge of the roughly-estimated time period, The Crusades, the geographical region, Caesarea Martima, Israel, as well as detailed research that went into the study of the grave good, the study conducted creates a hypothesis of who this individual might have been back hundreds of years ago.

BIOARCHAEOLOGICAL ANALYSIS OF HUMAN SKELETAL REMAINS

Presenter: Kaitlyn Eberhardt
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 202
Mentor: Gabriel Wrobel

The purpose of my study was to catalog and examine a set of human skeletal remains from the archaeological site of Caesarea Maritima, Palestine (in modern Israel) dating from the Crusader Era (AD 1100 - 1300). The research involved a partial reconstruction of the cranium and creation of a biological profile of the individual, including estimations of age, sex, and stature, as well as identification of pathologies in the bones and teeth. Assessment of the dental maxillary and mandibular inventory found differences in maturity and root formation on several bone fragments

and teeth, which belonged to two additional individuals who were misidentified during the collection process.

IMPROVING THE CONSERVATION OF HISTORIC LEATHER

Presenter: Sydney Spaulding
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 203
Mentor: Stacey Camp, Jeff Burnett

Artifact conservation is the process through which archaeological objects are protected from ongoing destructive processes and are returned to their original state as closely and accurately as possible. This discipline is informed by knowledge stemming from several fields, including chemistry, art history, and cultural anthropology. This body of knowledge allows for artifacts constructed from every material to be methodically cleaned, repaired, and stored while preserving their original context and attached identity. The conservation processes for some works- such as oil paintings and marble statues- were mastered long ago and have been improved to the point of optimization. However, this is not true for many other materials that have been used within the construction of artistic and cultural objects in the past, especially leather. Due to the delicate nature of materials that are derived from faunal soft tissues, artifacts containing them are often not preserved well enough to appear in the archaeological record. Despite this lack of opportunity for study, there have been decades of research and discussion invested into improving the conservation of old leather, which has led to the currently sufficient but incomplete body of knowledge. Presently, there is no consensus on the best method to utilize in leather conservation; instead, a handful of different options have been used interchangeably. In this project, Sydney Spaulding will perform these different treatment options on examples of historical leather that were found on MSU's campus to compare their efficacy and contribute to the determination of the ideal conservation treatment for historical leather.

THE BRITISH ARE COMING (TO YOUR TABLE)!

Presenter: Faith McGuire
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 204
Mentor: Jessica Yann, Emily Milton

For this project, I worked with artifacts from the 1815 historical Fort Drummond site, located on Drummond Island, Michigan, completing archival research and the analysis of floral and faunal remains, believed to be remnants of meals eaten by soldiers and the inhabitants of the fort. Through the analysis of these remnants, alongside the archival data and reconstruction of porcelain shards and glassware found at the site, we were able to deduce a number of meals consumed and compare them with the average diet of the time, painting a picture of what a meal would have looked like at historical Fort Drummond.

A BIODISTANCE ANALYSIS OF ANCIENT MAYA CRANIA FROM BELIZE USING MACROMORPHOSCOPIC TRAITS

Presenter: Alison Weber
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 205
Mentor: Gabriel Wrobel

Macromorphoscopic (MMS) Data is cranial non-metric data that can be used to anthropologically assess biological distance between humans at the population level. I collect MMS data by scoring specific morphological features on the human skull. By collecting MMS data, I can measure the similarities and dissimilarities between human populations. In a Modern context, this data can be used to estimate ancestry in individuals, an essential part of establishing the biological profile, and a key part in identifying individuals. However, in this project I will be applying this data collection techniques to ancient Maya individuals from Belize. I will be collecting MMS data from individuals who lived anywhere from 300 b.c. to 1500 a.d. and who were found at multiple different geographic locations in Belize. The goal of this project is to assess biological distance between individuals who are generally grouped together under the term "Mayan" and to explore the human variation present in the region. I will also be exploring the effects of cultural cranial modification on MMS traits and how this will affect the way study human variation in the region. Throughout this process I will not only be utilizing the physical collection available in the MSU Bioarcheology Laboratory, but I will also be using 3D models developed in the lab and attempting to collect MMS data from these models as well. By doing so I hope to increase my sample size to gain a more accurate representation of human variation in the region.

ASSESSING GENETIC VARIABILITY IN MAYA GROUPS USING DENTAL NONMETRIC DATA

Presenter: Siri Vangavolu
Category: Anthropology & Archeology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 206
Mentor: Gabriel Wrobel

Dental nonmetric data can help determine the nature of genetic variability in populations over time and space. Variations in dental morphology, such as the presence of caries and abcess, or traits like marginal ridges, roots, cusps, etc. that can be scored using the Arizona State University Dental Anthropology System comprise nonmetric data. This nonmetric data and trends within populations can then be analyzed in cultural or historical context to provide evidence of migration, interaction with other groups, and other aspects of population evolution. My project's objective is to explain the methodology behind dental nonmetric data and its applications in studies of genetic distance between populations, as well as use these methods to explore genetic variation in Maya groups from Central Belize. I looked at specimens from the Caves Branch rockshelter, some of which were determined to be distinct burials, and others which were commingled or partial burials. Using the ASUDAS, I scored them and determined the frequency of dental traits in the burials and commingled specimens. The data established for

the burials was used as a baseline to compare the data from the commingled samples in order to determine the genetic distance of the commingled samples.

ANALYSIS OF HUMAN REMAINS FROM THE CAESAREA MARITIMA ARCHAEOLOGICAL SITE

Presenter: Mariah Larr
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 211
Mentor: Gabriel Wrobel

This presentation is based upon the analysis of "Bone Concentration 33" from the Caesarea Maritima archaeological site, dating to the Islamic phase of the 7th to the 11th centuries. The biological profile data obtained includes sex, ancestry, age at death, and metric traits. The present findings specify the remains as those of a 27-35 year-old female of Eurasian ancestry. There was no signs of skeletal trauma, and she likely died a natural death. Secondly, she was buried with intent, based upon the body position and associated material culture. Also provided are graphs for metric traits, the skeletal catalog, and further details behind how I determined sex, ancestry, and the age at death. These data from a single individual not only can contribute towards a better understanding of the ancient Caesarea Maritima population but can also help reconstruct the woman's life experience. Therefore, I am working towards understanding who is behind this skeleton, what her life consisted of, and what story she still has left to tell.

POPULATION STUDY OF POSTCLASSIC MAYA AT CAYE COCO

Presenter: Mia Pardel
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 212
Mentor: Gabriel Wrobel

Caye Coco is a Maya site on a small island in the Freshwater Creek in northern Belize. In 1998, 33 skeletons were recovered dating to the Postclassic period. These skeletons are now housed in the MSU Bioarchaeology Lab where I was able to perform a population study of the individuals. My project has taken the form of cleaning, inventorying, and curating the research collection. My inventory also included recording the age, sex, and taphonomy of the skeletal remains. The curation of this collection opens up the possibility to answer questions about the people that lived near Caye Coco during the Postclassic period. What was life like after the decline of the Maya empire? How did gender dynamics change with shifting social norms? How did cultural practices like cranial modification vary during this time?

BURNED AND MELTED ARTIFACTS IN HISTORICAL ARCHAEOLOGY

Presenter: Isabella Wikle
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 213
Mentor: Stacey Camp, Jeff Burnett

My goal for this project is to present a public audience with an opportunity to learn more about the subfield of historical archaeology. Specifically, how materials affected by heat and fire have inherent value for their ability to create a greater breadth of knowledge to historical archaeology. I will define for a public audience the difference between archaeology and history, as well as how they come together to create the subfield of historic archaeology. I will also explain how fire can affect archaeological materials and how these materials inform archaeological knowledge. The artifacts that will be used to exemplify this come from a shovel test pit at the Beal Garden Gazebo were collected by the Campus Archaeology Program in April of 2021. These artifacts represent materials from a historical building named Beal Laboratory that burned down in 1890 on MSU's campus.

EDUCATION IN SPARTA

Presenter: Alex Hodder
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 214
Mentor: Noah Kaye

Relating Ancient Sparta’s education to MSU's mascot, the Spartan.

LITHIC RAW MATERIAL IDENTIFICATION FROM A LATE PLEISTOCENE AND EARLY HOLOCENE SITE IN THE PERUVIAN ANDES

Presenter: Reid Ellefson-Frank
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 215
Mentor: Kurt Rademaker

This poster presents results from lithics analysis conducted during the fall 2021 semester and spring 2022 semester. The Cuncaicha rock shelter is an early high-elevation Andean site in Peru. Information from this site can shed light on the behavioral patterns of some of the first inhabitants of South America. Patterns in the material culture (stuff) of this site can show us how these people availed themselves of natural resources and their mobility on the ancient landscape. I assigned raw material types to debitage, flakes of rock resulting from the creation and maintenance of stone tools. My research goal is to determine when certain low-elevation, sedimentary raw materials arrive at this high-elevation site. I also hope to determine any intra-

site spatial patterns such as clustering in specific layers or features of the site. For example, the presence of a material in association with a burial could indicate particular cultural significance being given to that material. The end result of these two research goals is to gain further insight into interaction between high and low elevation groups of hunter-gatherers during the early settlement of Peru, and to establish whether certain types of lithic raw material possessed social significance.

SKELETAL ANALYSIS OF A POSTCLASSIC MAYA INDIVIDUAL FROM CAYE COCO, BELIZE

Presenter: Anna Stolz
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 216
Mentor: Gabriel Wrobel

There is ample information that can be ascertained from human skeletons, even after centuries of burial and decay. In the case of this project, the focus of research was PR-03, a 50+ year-old Maya female from the Postclassic (AD 900 - 1500) site of Caye Coco, Belize. The burial of PR-03 and others in the area was documented in great detail during the excavation process, and the information recorded can help to determine the cultural and historical context of the burial. Visual analysis of the skeleton was conducted in order to determine age, sex, and potentially cause of death, as well as to locate any meaningful morphological anomalies. PR-03 was indeed anomalous, as the remains showed clear signs of a modified cranium. This was fairly common among Maya people of all sexes; the practice involved strapping boards, bands, and other confines to the heads of young infants in order to manipulate the skull shape. All information regarding this set of remains was ascertained from various techniques used in osteology, forensic anthropology, and bioarcheology. The use of these techniques, as well as the information they uncover, are crucial to understanding the story of this Maya individual. The aim of this research is to uncover details about this individual's life and death that would not otherwise be known, and to use these details to return a portion of her identity.

ALLOPARENTING CARE AVAILABILITY AND HEALTH OUTCOMES IN THE MOTHER- INFANT DYADS OF NORTHERN KENYA

Presenter: Amulya Vankayalapati
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 221
Mentor: Masako Fujita

After giving birth, mothers commonly rely on the aid of their support system. Alloparenting, the act of caring for an infant by individuals other than the mother, can be one form of support. With the presence of other caretakers, the mother's roles in taking care of herself and her child may change, impacting both individuals' health. Previous research is inconsistent regarding the association between alloparenting and altered infant feeding practices. Less is understood about the impact of alloparenting on the health outcomes of mothers and their infants. Our objective was to investigate the influence of alloparenting on infant feeding and health

outcomes in mother-infant dyads. We utilized interview data from breastfeeding mother-infant dyads of northern Kenya, surveyed during the 2006 Horn-of-Africa drought. We defined possible alloparents as adults living in the household, excluding the mother. We analyzed the association of alloparents with breastfeeding status or infection in mother-infant dyads, using logistic regression models adjusted for infant age. The presence of alloparents was associated with lower likelihood of complementary feeding (aOR=0.14; 95%CI: 0.03, 0.55; n=208). Although not significant, maternal infection and infant infection reported for a 10-day period (n=83) were associated with alloparents differently: mothers were less likely to have infection (aOR=0.81; 95%CI: 0.22, 2.94) while infants were more likely to have infection in alloparent presence (aOR=1.87; 95%CI: 0.47, 7.40). Given broad variation in number and role of alloparents in different populations, further research is needed to determine the effect of alloparenting on infant feeding practices and associated health outcomes.

MORPHOMETRIC ANALYSIS OF GROWTH AND DEVELOPMENT AMONG POSTCLASSIC MAYA INDIVIDUALS EXHIBITING CRANIAL MODIFICATION

Presenter: Collin Sauter
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 222
Mentor: Gabriel Wrobel

The goal of this research project was to use morphometric analysis techniques to examine how cranial modification practices among the Postclassic (AD 900 - 1500) Maya affected cranial growth and development. Forty-six crania were examined in this study, all of which are part of a collection that was recovered from Cenote Sagrado, a large water-filled sinkhole at the Maya Postclassic site of Chichen Itza, located in Mexico's northern Yucatan peninsula. This collection is well preserved and features twenty-five subadults, which offer a rare opportunity to study subadult morphology in the Maya area. Agisoft Metashape, a photogrammetry software, was used to create three-dimensional digital models of the crania being analyzed, then Stratovan Checkpoint was used to gather morphometric data from the models. The individuals were then seriated by age using tooth development, after which quantitative analysis techniques were used to examine the morphometric data.

GENETIC DISTANCE MAPPING OF CAESARIA MARITIMA USING NONMETRIC TRAITS OF THE HUMAN SKULL

Presenter: Jason Pasikowski
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 223
Mentor: Gabriel Wrobel

The human skull contains multiple different traits that occur with different frequencies over various cultures. These traits can be measured and compared to show genetic distance between distinct cultures. This poster will focus on a burial group from Caesarea Maritima, with the goal of showing how closely related the population of this burial is to other burial groups.

This can be done using the Mean Measure of divergence (MMD), a statistical formula used to measure trait frequencies to compare populations, by turning the data of the trait frequencies into a measurable number. Using this method, we can help map human relatedness between multiple diverse cultures, to have a better understanding of how closely cultures may be related to each other.

POSTMARITAL PHENOTYPIC ANALYSIS OF PAPUAN SKULLS

Presenter: James Waltermyer
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 224
Mentor: Gabriel Wrobel

Three dimensional models of forty skulls from the Tolai population of Papua New Guinea were evaluated for a variety of cranial nonmetric traits. Comparison of the results of these assessments allowed for conclusions to be drawn regarding the social structure of Papuan culture. This project acts as a biocultural cross-examination of known ethnographic data with research-based findings on the Tolai people of Papua New Guinea. By comparing the historical ethnographic information to the data collected in the lab, the way in which social patterns affect phenotypic variability within populations can be observed. The Tolai people are known to be a traditionally matrilocal society, where newlywed husbands go to live with the family of their spouse. This trend describes Papua New Guinea generally, and the Tolai people more specifically. Therefore, when conducting a qualitative phenotypic analysis of this population, higher variability would be expected in the men, which is common in matrilocal societies, as the husbands emigrate to live with their new family.

PALEOPATHOLOGY CASE STUDY OF SCURVY FROM THE MAYA POST-CLASSIC IN BELIZE

Presenter: Melanie Pitt
Category: Anthropology & Archeology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 225
Mentor: Gabriel Wrobel

This case study will examine and analyze a case of scurvy in a Post-Classic Maya juvenile individual. While appearances of scurvy in skeletal remains have gone largely undiagnosed for many years, especially in the Maya area, further research in recent decades has allowed for a greater understanding of the skeletal manifestations of the disease. The particular lesions on the skull of this individual demonstrate one way that scurvy manifests, especially on the skeletons of juveniles. Forming a greater awareness of how scurvy presents, the conditions under which it appears, and its presence in the Post-Classic Maya population will allow researchers to better understand how people were living at this point in time and provide valuable perspective for studying the rest of the individuals excavated alongside this juvenile.

ANTHROPOLOGY & ARCHEOLOGY
Oral Presentations

MSU AND THE JEWISH COMMUNITY: A STUDENT ETHNOGRAPHY IN UNCERTAIN TIMES

Presenter: Ian Donahue
Category: Anthropology & Archeology
Time Slot: 8:30 AM
Room Location: Meeting Room A
Number: 231
Mentor: Adan Quan

In fall of 2020, after taking a course through the Jewish Studies Department at Michigan State, I began pursuing a minor in Jewish Studies to accompany my degree. Through the Jewish Studies department, I participated in a summer study and research program in which I formed a series of friendships with students and faculty that are part of the Jewish community on MSU's campus. These friendships began to open my eyes to the lived reality of my peers. I began to see a strong culture of community, complex intersections of identity, and common experiences of antisemitism and prejudice. So, when it came time to pick a topic for my research project, I saw a fantastic opportunity to dive deeper into these conversations with my friends and acquaintances. This led me to ask the question: what has been the experience of the Jewish community on campus, and how do they see themselves as fitting into the broader campus community?

HISTORICAL ACCOUTREMENTS: A VISUAL AND CHEMICAL ANALYSIS OF FORT DRUMMOND ARTIFACTS

Presenter: Megan Wertz
Category: Anthropology & Archeology
Time Slot: 8:45 AM
Room Location: Meeting Room A
Number: 232
Mentor: Emily Milton, Jessica Yann

Fort Drummond, located on Drummond Island in northern Michigan, was a British fort constructed in 1815. The island was the last British outpost on U.S. soil after the Treaty of Ghent was signed in 1814. Historic artifacts found at Fort Drummond include ceramics, glass, bone, and metal. Additionally, accouterments from the island include metal clothing decoration and ceramic figures. These artifacts allow for the opportunity to explore the make and origin of metals used in decorative fashions from this time and location. Using Portable X-Ray Fluorescence (PXRF), a technique to determine chemical composition of a sample, metal types will be identified among the objects found at Fort Drummond.

AN OSTRIFICATION OF ART

Presenter: Faith McGuire
Category: Anthropology & Archeology
Time Slot: 9:00 AM
Room Location: Meeting Room A
Number: 233
Mentor: Camelia Suleiman

In this report, we will be discussing the dangers of a single story and their negative effect on people of middle eastern descent. Interviews from Conversations Unbound were used in the process of my research on the language. American society ostracizes the Arabic language, and thus its people, with labels of terrorism and movie portrayals of mobs and murders. Arabic, in reality, is a beautiful and poetic language full of love and culture. Its people are drastically misunderstood and subjected to living lesser lives simply because of the languages they speak and the places they came from. This is why that is wrong.

BIOCHEMISTRY & MOLECULAR BIOLOGY
Poster Presentations

MOLECULAR BASIS OF NEURODEGENERATIVE DISEASES

Presenter: Gary Zhang
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 301
Mentor: Min Kuo

Tauopathies are neurodegenerative disorders caused by the hyperphosphorylation of microtubule binding protein tau. Hyperphosphorylation causes tau to aggregate and form neurofibrillary tangles which is correlated with symptoms of cognitive impairment in diseases such as Alzheimer's Disease and Frontotemporal dementia; further studies have also shown that the hyperphosphorylation of tau makes it prone to cause cell death. Unmodified tau requires an inducer for aggregates to be observed, however, recombinant tau phosphorylated by kinase in vitro can produce inducer-free aggregation. We hypothesize that disease specific tau can be studied to reveal key differences in molecular interactions, characteristics, and disease pathology. We created hyperphosphorylated recombinant tau (p-tau) and introduced a missense mutation (P301L) that is known to cause Frontotemporal dementia. To compare the mutant P301L p-tau to wild-type p-tau, we assayed aggregation behavior/kinetics in pure form and in the presence of compounds found to inhibit or induce aggregation. Furthermore, we treated a neuroblastoma cell line with mutant and wild-type p-tau to evaluate differences in cytotoxic properties. By clearly establishing the variations in aggregation and cytotoxicity caused by the P301L mutation in p-tau, we can reveal the relevancy that studying mutant forms of tau has in drug screening and therapeutic efforts.

COMPARING RB PARALOGS AND THEIR CONTEXT-SPECIFIC GENE REGULATION IN DROSOPHILA

Presenter: Patricia Castanheira
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 302
Mentor: David Arnosti, Ana-Maria Raicu

The Retinoblastoma tumor suppressor protein plays a critical role in cell cycle regulation in eukaryotes. Humans encode three Rb paralogs, while Drosophila have two, Rbf1 and Rbf2. We are studying the roles of multiple Rb proteins, including possible context-dependent regulation. To test their action in vivo, we fused Rbf1 and Rbf2 to a nuclease-dead Cas9 (dCas9) to direct them to specific promoters of interest. We directed to the E2F2 and Mpp6 genes in the developing fly wing. Our wing phenotype analysis indicates that Rbf2 represses the Mpp6 gene when binding near the start of transcription (TSS), associated with severe morphological wing defects. Targeting Rbf1 to the same site only resulted in mild phenotypes, indicating that the two paralogs differ in the ways they regulate Mpp6's expression. In order to test the distance from which the Rb proteins regulate gene expression, we are making use of a luciferase reporter transfected in S2 cells. We cloned the E2F2/Mpp6 promoter upstream of the luciferase gene and will next transfect this plasmid with dCas9-Rbf1 and gRNAs targeting different parts of the promoter. Luciferase activity will reveal possible distance effects of Rb action. We expect to see more repression using gRNAs closer to the Mpp6 TSS, consistent with the wing results. This project will help us better understand the transcriptional effects of each Rb protein, their unique contributions to cell cycle regulation, and their potential cancer suppressing roles.

STRUCTURAL COMPARISON BETWEEN SMALL MULTIDRUG RESISTANCE (SMR) TRANSPORTER FAMILY MEMBERS THROUGH MOLECULAR DYNAMICS SIMULATIONS

Presenter: Jessica Egleston
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 303
Mentor: Josh Vermaas

Antibiotics have significantly improved human health around the globe. However, evolution has increased antibiotic resistance among bacteria, creating a critical public health concern. Members of the small multidrug resistance (SMR) protein family confer resistance to antibiotics by leveraging an established proton gradient, which couples to glutamate residues within the interior of the transporter. SMR proteins are small homodimers and are broadly classified into Qac and Gdx sub-families based on selective substrate transport across the membrane. Using molecular dynamics (MD) simulations, we compare EmrE against Gdx-Clo from the Qac and Gdx sub-families respectively to evaluate the similarities and differences at the molecular scale. To evaluate the impact for glutamate protonation, we compared the four possible protonation states for both EmrE and Gdx-Clo to measure structural and potentially functional changes. Root-mean square deviation analysis indicates that Gdx-Clo has lower root-mean square deviation compared to EmrE for all different protonation states by approximately 2 Å. We also find that even in the absence of substrate, the number of water molecules within the

lumen is greater for EmrE than it is for Gdx-Clo. The larger EmrE lumen with greater flexibility is consistent with EmrE accepting large cationic substrates such as tetraphenylphosphonium (TPP+), while the more rigid Gdx-Clo favors smaller cations such as guanidinium (Gdm+). These results help establish the mechanism of selective substrate transport between the two SMR transporter sub-families.

INVESTIGATING SUBNUCLEAR TERT LOCALIZATION IN HUMAN CANCER AND PRIMARY CELL LINES

Presenter: Kate Adams-Boone
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 304
Mentor: Jens Schmidt

Telomerase is a ribonucleoprotein (RNP) composed of a telomerase reverse transcriptase (TERT) and the telomerase RNA (TR) that synthesizes telomeric repeats in order to maintain telomere length. Telomerase is found in most eukaryotic organisms and is necessary to avert cell senescence due to short telomeres in proliferative cell types such as germ cells and certain stem cells. This function is frequently abused by cancer cells in order to bypass cell cycle checkpoints: over 85% of human cancer cell types exhibit upregulated telomerase expression. Telomerase function is extensively studied, however, the assembly of TERT with TR is poorly understood. Our group has observed that the auxiliary protein TCAB1 appears to promote the association of TR with TERT in HeLa cells (a human cervical cancer cell line). Through immunofluorescence microscopy, we assess subnuclear localization of TERT in multiple human cell lines. We also plan to use immunofluorescence microscopy to evaluate TERT, TCAB1, and TR localization in parental and TCAB1 knockout cell lines. Based on these experiments and our previously described results, we propose that TCAB1 extracts TR from the phase-separated nucleolus and enables it to assemble with TERT in the nucleoplasm.

UNDERSTANDING THE MOLECULAR BASIS OF ALZHEIMER'S DISEASE

Presenter: Nic Lewis
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 305
Mentor: Stacy Hovde, Min Kuo

Alzheimer's disease (AD) is a neurodegenerative disorder that currently has no cure. Historically, the popular pathology for AD's development was based in the accumulation of beta-amyloid plaques between neurons in the brain. As more data is accrued, another proposed pathology has begun to gain momentum. Tau is a protein that is necessary for the signaling between neurons. Hyperphosphorylation of tau (ptau) is associated with the development of neurofibrillary tangles (NFTs) that are deleterious for cells. The density of these NFTs are correlated with the cognitive progression of AD. The 2 human ptau constructs in our study were overexpressed in bacteria and were purified. The constructs were then fractionated on a SP column. The unfractionated constructs, as well as their respective fractions, were then used in

an aggregation assay mimicking their development into NFTs. Furthermore, the constructs were tested for cytotoxicity with SH-SY-5Y cells. Our results demonstrate that the human ptau constructs 2N4R and 0N3R both aggregate and demonstrate cytotoxicity.

CONTROLLED RELEASE OF GLYCOLYTIC INHIBITORS FROM POLYLACTIDE (PLA) TO MODULATE IMMUNE RESPONSES IN SYNTHETIC IMPLANTS

Presenter: Max Kuhnert
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 306
Mentor: Chima Maduka

Polylactide (PLA) is a class of polymeric biomaterial used in a variety of biomedical applications. When PLA degrades, it produces oligomers and monomers of lactic acid that are associated with adverse immune responses within the body, including excessive fibrosis and prolonged inflammation. Metabolic reprogramming refers to altered levels of glycolysis and oxidative phosphorylation, well known pathways upon which cells depend for energy needs. Although previously thought to be due to acidic pH, metabolic reprogramming and altered bioenergetics have been shown to drive host inflammatory responses to PLA degradation products in macrophages and fibroblasts, key immune cellular players in this pathology. Furthermore, glycolytic inhibitors have been demonstrated to control altered bioenergetics and metabolic reprogramming resulting from exposure to PLA degradation products. Here, we demonstrate loading and distribution of a3 glycolytic Inhibitor (aminooxyacetic acid)s into both amorphous and crystalline PLA using melt-blending, scanning electron microscopy (SEM) and SEM combined with energy-dispersive X-Ray (SEM-EDX), and effects of such formulations on immune cellular bioenergetics and metabolic reprogramming. Altering glycolytic inhibitor to PLA ratio changes the pharmacologic effects of these small molecules embedded in PLA formulations, likely by controlled release. By using cryo-milled PLA to increase powder amounts, we show that aminooxyacetic acid powder is loaded and uniformly distributed in extruded PLA filaments We show uniformly loaded glycolytic inhibitors in PLA through scanning electron microscopy (SEM) and SEM combined with energy-dispersive X-Ray (SEM-EDX).

INVESTIGATION OF THE ROLE OF CYTOSOLIC G6PDH ENZYMES IN MITIGATING OXIDATIVE STRESS IN ARABIDOPSIS THALIANA EXPOSED TO HEAT STRESS

Presenter: Caleb Fisher
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 311
Mentor: Thomas Sharkey, James Patrick Santiago

High temperature stress is detrimental for pollen production in plants and can be traced back to heat-induced premature degradation of anther tapetum cells. A key enzyme in preventing the damage from high temperature heat stress is glucose-6-phosphate dehydrogenase (G6PDH) that is part of the pentose phosphate pathway. G6PDH is found in different cellular

compartments, but we hypothesize that the cytosolic G6PDHs play an important role in replenishing coenzymes (NADPH) that are used by antioxidant enzymes to protect the cell from oxidative stress. To investigate this, cytosolic G6PDH single knockout lines of Arabidopsis thaliana (g6pdh5 and g6pdh6) were grown. The activities of cytosolic G6PDHs and several antioxidant enzymes including glutathione reductase (GR), glutathione peroxidase (GPX), ascorbate peroxidase (APX), dehydroascorbate peroxidase (DHAR), monodehydroascorbate peroxidase (MDHAR), and catalase (CAT) enzymes were measured in leaves. G6PDH activity in general was reduced by high temperature (HT) in wild-type and both single mutants versus control temperature (CT). At CT, the absence of G6PDH6 reduced overall G6PDH activity more than G6PDH5, but at HT the absence of G6PDH5 reduced overall G6PDH activity more than G6PDH6. Further, enzyme activity of most antioxidant enzymes (APX, CAT, DHAR, and GR) were reduced at HT vs CT regardless of genotype. However, between genotypes in each temperature treatment, the single mutants did not have significant changes in antioxidant enzyme activities versus wild-type.

ANALYSIS OF MOLD USING A SCANNING ELECTRON MICROSCOPE

Presenter: Alex Popovic
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 312
Mentor: Per Askeland, Carl Boehlert

I am certain that each and every one of us has left a loaf of bread out for too long without eating it. Some would eat the bread and while eating it notice that mold has formed on it, while others would notice immediately. For those who have accidentally eaten it, I will now show you how mold, the organism you ingested, looks up close. Bread mold is a member of the fungi family. It reproduces by releasing spores into the air, and when those spores land on an object with the correct environmental conditions such as light, heat, water, and nutrition, they will grow, mature, and then release spores of their own. I plan on using a JOEL or EVO SEM scanning electron microscope in order to analyze the mold sample. Furthermore, I seek to determine why mold acts differently in various temperatures as well as to measure the size of mold spores.

THE ROLE OF ARYL HYDROCARBON RECEPTOR POLYMORPHISMS IN 2,3,7,8- TETRACHLORODIBENZO-P-DIOXIN (TCDD)-INDUCED HMGCR EXPRESSION

Presenter: Zach Dhaem
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 313
Mentor: John LaPres

Hypercholesterolemia, obesity, and non-alcoholic fatty liver disease (NAFLD) have increased in the US population to epidemic proportions. NAFLD increases the risk for cardiovascular disease, type II diabetes, and hepatocellular carcinoma. Epidemiological and rodent studies have linked NAFLD progression and cholesterol dysregulation with exposure to environmental

pollutants such as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). TCDD is the most potent ligand for the aryl hydrocarbon receptor (AHR). The AHR is a ligand-activated transcription factor that regulates many genes including 3-hydroxy-3-methlglutaryl coenzyme A reductase (HMGCR), which encodes the rate-limiting enzyme of cholesterol synthesis. Data from genome-wide association studies (GWAS) suggest there is a relationship between the AHR and cholesterol levels. Human and mouse GWAS have linked cholesterol homeostasis to the AHR. Importantly, human GWAS identified polymorphisms in the AHR locus that were correlated with elevated cholesterol levels, including two coding single nucleotide polymorphisms (cSNPS, R554L and P275L). The goal of this project is to test the hypothesis that these two cSNPs impact AHR-mediated HMGCR expression. To address this goal, these mutations have been introduced into a human AHR expression plasmid via site-directed mutagenesis. Once created, these expression plasmids will be stably inserted into a murine hepatoma cell line that was engineered to be AHR null. These cell strains will be exposed to TCDD and HMGCR expression will be assessed by quantitative real time polymerase chain reaction.

ANALYSIS OF PLANT MATTER LIKE BARK, ROOTS, LEAVES AND COIR

Presenter: Shubh Sharma
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 314
Mentor: Carl Boehlert, Per Askeland

The bark is the outermost layer of stems and roots of plants that are usually able to provide wood. The bark does a very important function of protecting the softer layers of plant tissue necessary for the plant's survival. I also intend to examine other plant materials like roots and leaves to show the different types of cells that a plant matter is comprised of. I also hope to examine coir to examine what its uses are in the current world and hopefully, get a look into what makes it so unique I intend to examine the cross-section of the bark, so hopefully, we can see the transition from dead cells on the outside to actual living cells inside. I intend to do this for different species and compare the results obtained. The barks of different trees have been used over generations to make clothes, ropes, and maps. I hope to find a reason in their structure as to what makes the bark such a flexible and strong material to use. I thus seek to determine what makes bark so strong and useful in the modern world.

GENERATING A BIDIRECTIONAL COMMUNICATION PATHWAY BETWEEN E. COLI AND CYANOBACTERIA

Presenter: Jaylynn Jones
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 315
Mentor: Rees Rillema, Daniel Ducat

Rationally designed microbial communities with more than one species are of increasing interest for both fundamental and bioindustrial purposes. Here, we focus on a synthetic community containing Escherichia coli (EC: a heterotrophic species widely used to produce

proteins and small molecules such as biofuel) and Synechococcus elongatus PCC 7942 (SE: an autotrophic cyanobacteria that can fix inorganic carbon dioxide via photosynthesis). Previously, our lab has shown engineered SE can export and accumulate sucrose in the media and that by pairing SE and EC together in a synthetic microbial community the carbon fixing and small molecule generating skills of each member can be realized. This project focuses on repurposing quorum sensing pathways naturally used to communicate between bacterial cells into EC and SE to better coordinate activities across species. By integrating members of the LuxI family of enzymes into EC, we demonstrate that they can generate diffusible acyl-homoserine lactone (AHL) molecules that are secreted into the medium. Conversely, by expressing LuxR family transcriptional regulators in SE, we show that the cyanobacteria can become responsive to AHL molecules. Together, our project demonstrates that engineered quorum sensing pathways can be used to allow EC to control the expression of different genes in SE, including a reporter protein and genes related to sucrose secretion. More broadly, our work contributes one step towards enabling more advanced microbial consortia that can be rationally designed for complex, higher-order behaviors.

PURIFICATION AND CHARACTERIZATION OF ENZYMES FOR THE CONVERSION OF ACETYLENECARBOXYLIC ACID TO 3-HYDROXYPROPIONIC ACID

Presenter: Esther Lee
Category: Biochemistry & Molecular Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 316
Mentor: Katie Kwiatkowski, Karen Draths

3-Hydroxypropionic acid (3-HP) is an important building block that can be transformed into multiple commodity chemicals, including acrylic acid, acrylonitrile, and acrylamide. The conversion of acetylenecarboxylic acid (ACA) to 3-HP with cofactor regeneration can be carried out using a 2-step, 3-enzyme system. Tautomerase Cg10062 catalyzes the hydration of ACA, forming acetaldehyde as the major product and malonic semialdehyde (MSA) as a minor product. Variant Cg10062(E114N) catalyzes formation of MSA as the sole product of ACA hydration, however. MSA is an intermediate that is reduced to 3-HP by NADH-dependent MmsB from P. putida. Using H2 as the substrate, O2-tolerant soluble NAD+-reducing hydrogenase (SH) from R. eutropha can be used to recycle NAD+ to NADH so that substoichiometric quantities of NAD+ can be used during the enzymatic synthesis of 3-HP. This work will describe purification and characterization of Cg10062(E114N), MmsB, and SH. To effectively increase the production of 3-HP, it is important to find the optimum buffer and pH conditions that are suitable for all three enzymes. Therefore, four buffer systems at varying pH values were tested.

OPTIMIZING THE PROTEIN SOLUBILITY AND YIELD OF CFACT1-6 AND CFACT1-8

Presenter: Jarrod Griffus
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 321
Mentor: Robert Last, Jaynee Hart

Forskolin is found within the root corks of the plant species Coleus forskohlii and is a therapeutic used to treat heart failure and glaucoma. Enzymes CfACT1-6 and CfACT1-8 are capable of acetylating deacetyl forskolin in the final step of forskolin synthesis. CfACT1-8 acetylates the C-7 hydroxyl to produce forskolin as a major product while CfACT1-6 acetylates several sites with forskolin being a minor product. These enzymes are found within the BAHD family and display these functionality differences despite sharing a high amino acid sequence identity. The objective of this research was to structurally characterize both enzymes using x-ray crystallography to better understand such functionality differences. This involved overexpression of the proteins in E. coli using a T7 promoter system and a thrombin-cleavable 6x His affinity tag. The proteins were purified from E. coli using nickel affinity and size exclusion chromatography. As a result of suboptimal solubility and yield of each protein, further research was conducted to eliminate both constraints. Solubility was improved by lowering the IPTG concentration used to induce expression from 0.5 mM to 0.005 mM. After identifying potential aggregation of CfACT1-6 during purification, arginine and 2-Mercaptoethanol were introduced into the protein purification buffer and appeared to decrease aggregation of protein. Switching to a TEV-cleavable 6x His tag improved affinity tag cleavage following inefficient thrombin-mediated cleavage of 6x His. The overall yield and purity of both proteins was improved, and research is being conducted to further improve yield as well as to characterize other enzymes in the BAHD family.

MOREL MASTERY

Presenter: Alassane Sow
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 322
Mentor: Gregory Bonito, Laurie Thorp

The purpose of this project is to develop a way to effectively cultivate morel mushrooms in unheated solar hoop houses in the Midwest. This can create new sources of revenue for farmers and reduce the amount of wild foraged mushrooms, potentially increasing product quality. The relatively low time commitment and high market value make morels an attractive product for farmers. One 70'X3' bed in MSU's Bailey Greenhouse and Urban Farm was allocated to grow three strains of morels from November to August. Two strains of M. rufobrunnea and one strain of M. sextelatta were buried in 4" furrows and each received two different feeding treatments after mycelium emerged from the soil. As the mushrooms begin to fruit in the spring I will observe the differences in each strain's productivity and if the feeding treatment has an effect on how many mushrooms make it to market.

REGULATORY ROLE OF DROSOPHILA INSULIN RECEPTOR FRAGMENT 2

Presenter: Will Suber
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 323
Mentor: David Arnosti

The Drosophila insulin receptor gene plays a vital role in regulation of the growth, development, and metabolism of the organism. This gene is a main subject of research in the Arnosti lab, as misregulation of the insulin pathway in humans is thought to be associated with diseases such as cancer, diabetes, and various neurodegenerative diseases. Using a bioinformatics approach, I identified transcription factor binding motifs within the InR gene that appeared to be conserved through multiple Drosophila species. The regulatory functions of these binding sites can then be deduced through targeted deletion mutations of these conserved regions and subsequent comparison to the wild-type gene. This presentation will focus on fragment 2 of the gene, which is thought to contain a 20-hydroxyecdysone receptor (EcR) along with other transcription factors with uncharacterized regulatory activity.

SCANNING ELECTRON MICROSCOPY OF SEASHELLS

Presenter: Maddie Bloch
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 324
Mentor: Carl Boehlert, Per Askeland

Seashells undergo a great amount of weathering due to the high salt concentration of the ocean as well as physical contact with other shells before they wash up on the shore. Additionally, ocean acidification is causing seashells to dissolve more quickly in ocean waters. In order to quantify these changes that occur as a shell begins to weather down, a scanning electron microscope (SEM) can be used to view the surface topography. In this experiment, I plan to use SEM to view differences in topography of three Florida fighting conch shells at different stages of weathering. This will help to better understand the changes that can occur in a shell's "life cycle" as it reaches the shore.

INFLUENCE OF CANNABIDIOL (CBD) ON GENE EXPRESSION IN HUMAN PERIPHERAL BLOOD MONONUCLEAR CELL'S (PBMC'S)

Presenter: Darla Martinez
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 325
Mentor: Norbert Kaminski

The focus of my research is to test the hypothesis that cannabidiol (CBD), a compound present in cannabis, alters the expression of genes that are important to the functions of peripheral

blood mononuclear cell's (PBMC's). Previous work in Dr. Kaminski's lab identified a number of genes that are sensitive to CBD by changing their level of expression in human hepatocytes. Interestingly, several of these genes have been described in literature to also play a role in immune function. My project will investigate if CBD can change the expression of one or more of these recently identified genes in human PBMC's and, if so, to determine what influence this has on human PBMC function.

LUNG INJURY FOLLOWING DERMAL PHOSGENE OXIME EXPOSURE IN SKH-1 HAIRLESS MICE

Presenter: Maddie Godziela
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 326
Mentor: Neera Tewari-Singh

Phosgene oxime (dichloroform oxime; CX) is a potential chemical threat agent. It is categorized with vesicating agents; however, its effects are more like a nettle agent or an urticant. Upon exposure CX has faster penetration compared to other vesicants, leading to rapid onset of severe and prolonged symptoms. CX exposure affects the eyes, skin, and lungs, causing immediate irritation, injury and systemic toxic effects. . Inhalation of CX or its systemic absorption through the skin could lead to pulmonary edema, accompanied by necrotizing bronchiolitis and thrombosis of pulmonary venules. We have shown that dermal CX exposure in SKH-1 mice causes pooling or RBCs in alveolar capillaries of the lungs. In this study, we further analyzed the effect of dermal CX exposure (CX exposure for 0.5 or 1.0 min using two 12 mm vapor caps on the dorsal skin at MRIGlobal) on toxic effects in lungs of SKH-1 hairless mice. Following CX exposure, the mice experienced acute skin lesions and reduction in physiological parameters such as breath rate and heart rate, and mortality at higher exposure duration. Histopathological analyses of the lung tissue showed acute hemorrhage and tissue loss that appeared to progress over time after CX exposure. Extensive coagulation and loss of parenchyma was observed in lung tissues from mice at 8h post 1.0 min CX exposure. CX induced inflammation in lungs was shown by qPCR analysis using the mRNA from the lungs that exhibited increased expression of proinflammatory cytokines TNF-α and IL-6. Studies are being carried out to further analyze the lung injury and inflammation from dermal CX exposure and to understand the mechanism of its toxicity. Together, these studies will assist in designing countermeasures to reduce the lung injury and possible mortality from CX exposure.

BIOCHEMISTRY & MOLECULAR BIOLOGY
Oral Presentations

DIRECTED EVOLUTION OF ANTI-TACA ANTIBODIES

Presenter: Nathaniel Pascual
Category: Biochemistry & Molecular Biology
Time Slot: 3:00 PM
Room Location: Meeting Room B
Number: 331
Mentor: Sam Schmidt, Daniel Woldring

Tumor-associated carbohydrate antigens (TACAs) are attractive targets for theragnostic applications, with the cell-surface displayed antigens aberrantly expressed in cancer pathologies. Due to the endogenous nature of these carbohydrate markers, TACAs present notoriously low immunogenicity, which necessitates the use of antigen carrier particles and other adjuvants to enhance monoclonal antibody (mAb) production. To further address the bottlenecks in the development of anti-TACA antibodies, we implemented a new workflow inspired by the growing body of literature and tools describing the rational design of antibodies with enhanced affinity and specificity (compared to antibodies typically produced by animal immunization). This presentation describes the current work in the Woldring Lab to develop enhanced (mAbs) against GD2, a glycolipid TACA, using rationally-guided direct evolution techniques. This work can be roughly divided into three interrelated efforts: (1) in silico affinity maturation of mAbs to improve binding affinity and specificity, (2) in silico mutagenesis to improve mAb stability and "humanness", and (3) experimental, high-throughput screening of mutants proposed in parts (1) and (2) by analyzing yeast surface display libraries with fluorescence-activated cell sorting, bead sorting, and whole cell panning. In addition to the workflow outlined above, the potential translation of this workflow will be discussed within the context of the future rapid development of nanomolar affinity mAbs against other TACAs.

USING A RNA-SEQ PIPELINE TO FORMULATE NEW HYPOTHESES ABOUT FUNCTION OF RB FAMILY PROTEINS

Presenter: Matthew Pang
Category: Biochemistry & Molecular Biology
Time Slot: 3:15 PM
Room Location: Meeting Room B
Number: 332
Mentor: David Arnosti, Stephanie Hickey

Retinoblastoma (RB) proteins are eukaryotic transcriptional factors that play a major role in the regulation of cell cycle genes. In human cancer, the retinoblastoma pathway is one that is commonly disrupted. Similar to the situation in vertebrates, where three paralogous RB genes have overlapping function, in Drosophila, two RB homologs, termed Rbf1 and Rbf2, control diverse genes. While the role of Rbf1 and Rbf2 in cell-cycle regulation is well studied, both of these factors also have potential influence and additional processes including cellular signaling and growth control. For example, ChIP-seq and RNA-seq experiments in Drosophila show that genes regulated by Rbf2 are related to cellular growth control and ovary development. Experimental data furthermore demonstrates a direct role for Rbf1 in regulation of conserved genes regulating cellular polarity. To further explore the functions of these proteins in a holistic manner, I am building a database that compiles the results of microarray, ChIP-seq, and RNA-seq experiments from diverse studies where the expression of RB family members has been manipulated in Drosophila. My study includes building an RNA-seq data analysis pipeline to reanalyze previously collected raw data in a standardized manner. By comprehensive and standardized analysis of Rbf1/Rbf2 related results, we hope to generate and test new hypotheses about the function of RB family proteins.

INVESTIGATING PHOSPHATIDIC ACID PHOSPHATASE ACTIVITY OF PROTEINS INVOLVED IN CHLOROPLAST LIPID METABOLISM

Presenter: Ilayda Korkmaz
Category: Biochemistry & Molecular Biology
Time Slot: 3:30 PM
Room Location: Meeting Room B
Number: 333
Mentor: Christoph Benning, Ron Cook

Monogalactosyldiacylglycerol (MGDG) makes up about half of the lipids in chloroplast membranes, and plastid phosphatidic acid (PA) is dephosphorylated to provide diacylglycerol (DAG) as substrate for MGDG production. The enzyme responsible for this PA phosphatase (PAP) function is still unknown, despite its significance in photosynthetic membrane biosynthesis. Phosphatase activity is being investigated for three enzymes predicted to be chloroplast lipid phosphate phosphatases: LPPg, LPPe1, and LPPe2. PAP activity is also being tested for the acyltransferase ATS1 and the predicted rhomboid protease RBL10, based on the following mutant observations: A mutant of ATS1 may have a further reduction in plastid PAP activity in addition to its primary phenotype, and the enzyme also has an N-terminal domain which is unique among proteins in its family. A knockout mutant of RBL10 is deficient in the conversion of plastid PA to MGDG. For this purpose, PAP activity assays are being carried out on heterologously produced proteins, and we expect to see enzymes with this role catalyze PA dephosphorylation and produce DAG.

LIPID SPECIFICITY OF THE DROUGHT STRESS SIGNALING PROTEIN PLAFP

Presenter: Dayna Olson
Category: Biochemistry & Molecular Biology
Time Slot: 3:45 PM
Room Location: Meeting Room B
Number: 334
Mentor: Josh Vermaas

As the world population keeps growing, it is important that the food supply keeps up. If we have a better understanding of plant's stress signal systems, we could genetically modify them to be able to grow them in harsher conditions and prevent harvest losses. Under drought stress conditions, protein PLAFP and lipid PA are coexpressed in the plasma membrane of arabidopsis thaliana. PLAFP is a potential long range transporter protein that transmits stress signals to other parts of the plants. However, the exact mechanisms for PLAFP substrate specificity, lipid binding, and membrane dissociation are still unknown. Here we show with molecular dynamics simulations that PA more favorably binds to PLAFP than lipid headgroup PC and demonstrate that PA can enter PLAFP, which is a necessary step in signal transduction. During constrained equilibrium simulations PA slides headfirst into a binding pocket formed by two β-sheets. It then rotates in the pocket, forming hydrophobic interactions between the lipid tails and the amino acids in the protein core. The lipid head group then sticks out of the binding pocket, allowing for it to bind to receptor proteins, transmitting the drought stress signal. The free energy perturbation simulations demonstrate that PA has a higher binding affinity to PLAFP than other plasma membrane lipids. Our study helps in understanding

the functioning of long-range transporter proteins that may be introduced in other plant systems to increase drought stress tolerance.

INVESTIGATING DEEP SUBSURFACE MICROBIAL COMMUNITIES IN GAS-RICH ROCK-HOSTED AQUIFERS: RELATIONSHIP BETWEEN MICROBIAL BIOMASS AND DEPTH

Presenter: Nicole Smith
Category: Biochemistry & Molecular Biology
Time Slot: 4:00 PM
Room Location: Meeting Room B
Number: 335
Mentor: Matthew Schrenk

The deep subsurface biosphere is sometimes referred to as the "Dark Energy Biosphere", due to dependence of microbial communities on chemical energy to fuel their growth and not light. High pressures and temperatures combined with low permeability and nutrient availability challenge subsurface microbes with extreme conditions deep within the Earth's crust, leading to questions concerning how deeply these organisms permeate into subsurface environments (Sahu 2021). In this study, drill cuttings from a hydrogen exploration well drilled to 11,000 feet depth in Nebraska were utilized to uncover the relationship between depth, geochemistry, and the abundance and biodiversity of microbial communities. Total genomic DNA was extracted and purified from 0.25 g of the samples; the DNA extracts were quantified fluorometrically before being tested by PCR amplification using bacterial specific primers. Through the quantified DNA (ng of DNA per gram of sample), it was shown that as depth increases, there is a decrease in the abundance of biomass and microorganisms. Due to low yields overall, a larger scale extraction kit is being tested to extract DNA from 10 g samples. These larger scale kits will extract DNA from higher numbers of microbes, allowing for increased detection by PCR and subsequent DNA sequencing to identify key taxa in the samples. These data are being used to identify correlations between the geological composition of the subsurface and microbial diversity and cell density. These data will help to understand nutrient and gas utilization by subsurface microbes within the deepest levels of the biosphere.

BACTERIAL MICROCOMPARTMENT PRODUCTION IN ARABIDOPSIS THALIANA: A SYNTHETIC APPROACH

Presenter: Drew Mitchell
Category: Biochemistry & Molecular Biology
Time Slot: 4:15 PM
Room Location: Meeting Room B
Number: 336
Mentor: Christoph Benning, John Froehlich

Bacterial Microcompartments (BMCs) are widely conserved bacterial "organelles" composed of large, selectively-permeable protein shells enclosing enzymatic cores of varied activity. Cyanobacteria leverage specific anabolic BMC systems to optimize carbon fixation by concentrating CO2 at the site of the rubisco complex in a specialized DMC, the carboxysome, while simultaneously excluding oxygen, eliminating photorespiratory energy loss. These carboxysome shells have been shown to consist of two primary structural protein elements, a hexamer, a trimer, and a secondary pentamer element. Together, these proteins self-assemble to encapsulate carbonic anhydrase and rubisco enzymes within carboxysomes. This system,

however, is not observed in plants, though its introduction is considered a potentially viable strategy for the improvement of rubisco function within C3 plants without resorting to the historically difficult task of physically re-engineering the rubisco enzyme complex itself. Our research, therefore, has hypothesized that the transgenic production of BMC protein elements within Arabidopsis thaliana will result in the spontaneous formation of stable, observable, BMC shell protein structures in-vivo. The primary research strategies leveraged involved the transformation of individual lines of A.thaliana with various Hexamer and Trimer transgene coding inserts prior to protein production verification by Western Blot and visual confirmation by TEM.

A PYTHON-BASED APPROACH TO TEACHING METABOLIC FLUX ANALYSIS

Presenter: Antwan Green
Category: Biochemistry & Molecular Biology
Time Slot: 4:30 PM
Room Location: Meeting Room B
Number: 337
Mentor: Yair Shachar-Hill, Joshua Kaste

Metabolic flux is defined as the rate at which metabolic reactions proceed. The analysis of these fluxes is done through the lens of Metabolic Flux Analysis (MFA), where reaction kinetics are represented mathematically to describe flux over time for a set of metabolites in a pathway or network. Ultimately, the aim of MFA is the complete understanding of biological flux through metabolic networks under physiologic conditions. Concepts as complex as MFA must be broken down into understandable pieces before they can be understood, which has not (to our knowledge) been implemented in a structured, accessible, and hands-on way previously. To teach students about this process, we take advantage of the coding language Python. This gives students a chance to observe the kinetics used in the study of metabolic flux and actively observe how different kinetics equations can be applied, and their real-life consequences. We have selected Python as a teaching tool because it has been implemented before in many schools and institutions, mostly due to its beginner-friendly language allowing "common-sense" code strings that are easily readable. Using Python, I developed interactive simulations of metabolic activity that allow students to learn various concepts related to metabolism, including the impact of different assumed kinetics and how isotopic labels can move through a metabolic pathway.

BUSINESS
Poster Presentations

WALL STREET AND PENNSYLVANIA AVENUE

Presenter: Shane Carr
Category: Business
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 401
Additional Student Presenters: Shane Carr
Mentor: Antoinette Tessmer

Insider trading on wall street by government officials is a major topic discussed today in the United States and although many citizens on both sides of the political spectrum agree it shouldn't be allowed, legislation ultimately votes on the topic. This is a problem because why would legislation pass a law that lessens their power to trade the stock market. If they cannot utilize their insider knowledge on how certain companies will perform, they will be forced to trade like everyone else. We choose to follow Nancy Pelosi and her portfolio to see how well someone who knows as much about the internal workings of this country would outperform others. Nancy Pelosi is one of the most progressive people in the United States government today, therefore by choosing her we wanted to show the portfolio of someone who would believe heavily in DEI on wall street. To conduct this research, we followed Nancy Pelosi's exact portfolio, which is public information because Nancy is a government official, on a website called StockTrax. Using $1 million, we divided the amount according to the same percentage as her actual portfolio, which we found on an app called Iris. We then compared Nancy Pelosi's stock portfolio to the S&P 500 as the benchmark over the course of several months to try and come to a conclusion on Nancy Pelosi and whether her position in government has any effect on her performance in the stock market.

PROFITABILITY OF S&P500 COMPANIES WITH MEANINGFUL LATINO REPRESENTATION ON THEIR BOARD OF DIRECTORS

Presenter: Samuel Fandino Bogoya
Category: Business
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 402
Mentor: Antoinette Tessmer, Kirt Butler

This project's focus is to closely observe the performance of S&P500 companies that have a Latino representation of 14% or more on their Board of Directors. Its importance relies on demonstrating the qualifications and performance that the Latino community-an often-overlooked group-show when given a significant opportunity. Main statistics were gathered regarding the number of Latino members in S&P500 companies. A specific threshold was then established to allow effective and realistic filtering. Having selected a considerable group of companies, the platform Stocktrack was used to create a portfolio with a series of investments at the author's discretion. Data was collected over a period of about six months during which

the stocks could signal substantial growth, decline, or stability. What proceeded was comparing daily and average returns between the portfolio and S&P500 in general, as well as reward/risk values. In essence, the development of a portfolio with a set of specific characteristics allows the analysis of specific aspects of DEI (Diversity, Equity, and Inclusion) from a financial point of view. In this case, it was feasible to analyze the Latino impact in S&P500 companies based on their level of representation.

GETTING MICHIGAN COMPANIES INTO INTERNATIONAL MARKETS: THE MEGP PROGRAM

Presenter: Melissa Kreger
Category: Business
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 403
Additional Student Presenters: Courtney Palkowski, Emma Catalina
Mentor: Erkan Kocas

The Michigan Export Growth Program (MEGP) is a pro-bono service that provides customized international market research to Michigan businesses. Developed by the International Business Center (IBC) at the Broad College of Business, MEGP is entirely operated by undergraduate students. Since 2009, MEGP has served over 200 companies helping them make their businesses either ready to export or become more competitive in any international market. Working at the MEGP, students gain crucial business skills and prepare for their business careers. Our presentation will explain the process of conducting international market research for a company from start to end. Our daily tasks include communicating with business professionals, asking the right questions to understand their products and customers, investigating international markets to find the ones with the highest potential, and identifying opportunities in these markets for the MI companies. Compiling professional and consistent business reports and coordinating project teams are everyday activities students conduct. Additionally, we will explain how this research aids our clients in their exporting endeavors and how we significantly impact the MI business community.

DO SOCIALLY AND ENVIRONMENTALLY FRIENDLY COMPANIES HAVE VALUE ON THE STOCK MARKET?

Presenter: Kory Knickerbocker
Category: Business
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 405
Additional Student Presenters: Zachary Jones
Mentor: Kirt Butler, Antoinette Tessmer

Respecting the environment is a goal that will help everyone in the present and in the future. We wanted to see if that mindset was prevalent on the stock market and if it made any difference in the performance of a company. Environmentally friendly companies or B-Corporations are our main focus since they consist of companies striving for a cleaner future. Given that B-corporations "meet the highest standards for environmental performance," we hypothesize that B-corporations will outperform their non-B-corporation counter parts, on the

stock market. To support our hypothesis, one-million dollars was equally invested in shares of 11 B-corporations and shares of 11 similar non-B-corporation companies. This was done via the website StockTrak, which tracked daily investment data, and allowed us to interpret and compare the risks and returns of our two sample groups. Using Microsoft Excel, we will analyze our results and determine if environmentally friendly companies do in fact outperform companies that are not B-corporation certified.

DIVERSE WORKPLACES INCREASE LIKELIHOOD OF OUTPERFORMING STOCK

Presenter: Shane McGuire
Category: Business
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 406
Mentor: Antoinette Tessmer, Kirt Butler

It is important to emphasize how much a diverse workplace can mean to a company. It allows for multiple points of view and different sets of skills that are likely to increase productivity. One way to define a company's success is via the stock market. With the use of StockTrak, we were able to compare the USA's top twenty highest rated companies based on their D&I score to the S&P 500. These companies were rated by Refinitiv based on D&I methodology with the four main ideas being: diversity, inclusion, workers' development, and news/controversies about that company. Our analysis highlights stock market differences between diverse workplaces and non-diverse workplaces and identifies which performed better in terms of risk and return. However, in reality, success cannot always be shown quantitatively, and qualitative analysis may be as relevant. We will present the breakdown of how the two sides compared on the stock market while also going into more details about how a diverse workplace performs and why it is so successful.

MAN VERSUS WOMAN: WHO MAKES THE BETTER CEO?

Presenter: Paul Adam
Category: Business
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 411
Mentor: Antoinette Tessmer, Kirt Butler

The focus of this research was to uncover how Diversity, Equity, and Inclusion played a role in the stock market. We decided to specifically focus the research on Diversity and Equity, trying to discover if there was any correlation between a company's CEO's gender and its stock performance. A portfolio invested in a total of sixteen companies was built, covering eight different industries, such as automotive, insurance, technology, cellular, microchip, beverage, energy, and technology services. For each industry, we invested in a company with a female CEO and in a company with a male CEO. The S&P 500 was selected as a comparison market index because currently it includes only thirty companies that are led by a female CEO, i.e., only 6% of the index. Thus, the S&P500 will be considered as male led. Our analysis uncovered if there is any correlation between gender and stock performance. It may also have possibly discovered if one gender had an upper hand.

DOES WALL STREET VALUE CLEAN ENERGY?

Presenter: Erin Johnson
Category: Business
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 412
Mentor: Antoinette Tessmer, Kirt Butler

It is typically overlooked just how much the financial world can help us make a more sustainable society. With banks on wall street being some of the largest investors in major polluters, it is important that we draw attention to how funding these businesses and industries directly impacts the health of our environment. We hypothesized that not only would investing in clean energy companies benefit the environment, but it would also lead to significant returns for investors. To verify our hypothesis, we created a diversified portfolio of companies creating clean energy: including solar, wind, hydropower, and geothermal. We used the website StockTrack, a stock market simulator, to 'invest' a million dollars and be able to track the performance of each investment. We chose the companies by researching various producers of clean energy, specific uses such as solar panels or charging companies for electric cars, as well as companies who were going to be involved in the government's infrastructure plan. To see how the portfolio compared to unsustainable fossil fuel companies, we compared the outcomes to those of the S&P 500 as a baseline over the span of several months. In this presentation, we will outline how the data from the clean energy portfolio compare to the performance of the S&P 500 and the potential real-world implications of this research.

DEI ON WALL STREET: DOES THE PRESENCE OF A CHIEF DIVERSITY OFFICER (CDO) YIELD GREATER STOCK RETURNS?

Presenter: Jacob Surbrook
Category: Business
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 413
Mentor: Antoinette Tessmer, Kirt Butler

Gaining knowledge regarding recent advancements in diversity, equity, and inclusion on Wall Street is critical for emerging interdisciplinary research in finance, accounting, and business. It is an important area of research because we are able to use advanced metrics to track whether or not DEI implementations are effective. Our project's aim was to track and compare the performance of fifteen companies with a Chief Diversity Officer (CDO) position to the NASDAQ index. To collect data, we enrolled in a simulation called Stocktrak, a platform that allows the user to invest one million simulated US dollars into many stocks. Stocktrak automatically generates graphs and data on a daily basis, as well as real time. Furthermore, to gather data on an index of our choosing, we used Yahoo Finance. Similar to Stocktrak, we used Yahoo Finance to gather their generated data of the NASDAQ index. After gathering this data, Excel was used to complete various calculations to determine if our research question was correct. This research aims to uncover whether companies with a CDO position will outperform companies that do not have the position.

EMPOWERING WALL STREET: THE ROLE OF WOMEN AND MINORITIES

Presenter: Alaina Bennett
Category: Business
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 414
Additional Student Presenters: Manasvi Jain
Mentor: Antoinette Tessmer, Kirt Butler

Women and minorities are an important part of our society and have helped the world advance thanks to their innovation and hard work. Consequently, these groups are an important part in the business world and have played a significant role in the enormous success of companies like Meta, Google, and General Motors. Most of these companies have changed the world we live in. Over the course of recent years there has been a focus on eliminating the oppression of women and minorities not only in the USA, but around the world. This spread of awareness would suggest that business world participants not only prioritize the participation of women in key decisions, but also encourage women and minorities to hold important positions in the company. However, only 20% of companies in the S&P 500 have women in leadership positions. Hence, in respect to this fact, we decided to research the correlation between women and minorities in leadership positions and the company's stock performance. For our research, we invested 2 million dollars evenly across 32 companies nationally and internationally. Over the past year, we have consistently collected data to reflect the trend of these companies' stock performance. Our poster will consist of an overall analysis of the data, and the conclusion we derived from our research. We expect our selected companies to have a positive correlation with having women and minorities in key leadership positions, and also think that these companies will outperform their male-led competitors.

GLOBALEDGE: LEADING THE INTERNATIONAL BUSINESS COMMUNITY WITH A WEBSITE

Presenter: Valerie McNamara
Category: Business
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 415
Additional Student Presenters: Cade Ahlijian, Clare Hampel, Kaleb Davis
Mentor: Erkan Kocas

globalEDGE is an online business website with over 1.5 million users and 5 million page views annually. The website is hosted at the International Business Center at the Broad College of Business and operated by undergraduate students by balancing market research, data analysis, writing, and website design. The site is used and created for students, instructors, policymakers, and business professionals. Throughout the experience, students work together to learn fundamental business skills combined with their studies and research. As the student researchers, we will be presenting how we manage a website and keep it up to date. In addition, we will discuss challenges and best practices for running such a website and walk the audience through our day-to-day activities such as writing international business blogs, researching, collecting and analyzing data, and coordinating project teams.

CELL BIOLOGY, GENETICS, & GENOMICS
Poster Presentations

MASK ECOSYSTEM

Presenter: Chaitanya Vadlamudi
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 501
Mentor: Carl Boehlert, Per Askeland

The current social health climate has drastically changed due to the ongoing Epidemic of Covid-19 and the use of a protective masks have become a common practice of lots of Americans. A dominant echo of many health officials is that masks should not be reused, and the ideal is that everyone should use a new mask every time especially in a healthcare setting. I am using a scanning electron microscope to identify the bacterial load in masks after x amount of uses. Understanding how much bacteria is really in each mask allows for a person to understand what is actually in the mask that they are putting on their faces.

EFFECTS OF PALMITATE-ACTIVATED IRE1 ON CHEM-RESISTANCE IN COLON AND BREAST CANCER

Presenter: Sean Foster
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 502
Mentor: Kevin Chen, Christina Chan

Obesity is a risk factor for many diseases, including colorectal cancer and breast cancer. Over 40% of adults in the United States are obese which puts a large proportion of Americans at higher risk of developing colorectal cancer or breast cancer. For obese individuals that do develop cancer, they will likely have a worse prognosis than those who are not obese. Obese individuals have a higher level of circulating free fatty acids (FFAs). In addition to obtaining PA from the blood stream, cancer cells can also produce palmitate with a process called de novo lipogenesis. This process is regulated by fatty acid synthase (FASN), which has been shown to be upregulated in both colorectal cancer and breast cancer cells. Elevated levels of PA activate IRE1, a branch of the endoplasmic reticulum (ER) stress pathway. Increased expression of this protein has been associated with poorer prognoses in cancer patients. A common treatment for cancer is etoposide, which causes double stranded DNA breaks by inhibiting DNA synthesis and forming a complex with topoisomerase II and DNA. We propose that PA-mediated activation of IRE1 plays a role in chemoresistance through DNA repair mechanisms. To test this, we treated both colorectal cancer cells (HCT116 WT and HCT116 IRE1 KO) and breast cancer cells (MDA- MB-231 WT and MDA-MB-231 IRE1 KO) with PA, etoposide, and a cotreatment of PA and etoposide. To investigate DNA repair, we measured the phosphorylation of H2AX (yH2AX), the first step to recruiting and localizing DNA repair proteins

CAN YOU GO HOME AGAIN?

Presenter: Maximo Clark
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 503
Mentor: Zachary Blount

The Long-Term Evolution Experiment with Escherichia coli (LTEE) has studied the evolution of 12, initially identical populations under serial batch culture conditions in a minimal glucose medium, which also contains citrate, since 1988. Though E. coli is partly defined as a species by the inability to grow aerobically on citrate, a weak capacity to do so evolved in one LTEE population after 31,000 generations. The Cit+ lineage evolved a much stronger citrate growth phenotype through the accumulation of refining mutations over ensuing generations. This refinement of growth on citrate has come at the price of progressively lower fitness on the ancestral glucose resource. This ecological divergence is indicative of incipient speciation, but it is unclear if adaptation to growth on citrate at some point precludes re-adaptation to growth on glucose. In short, is there a point after which the Cit+ lineage can't go home again? We addressed this question here. We founded new populations with Cit− revertants that we isolated from Cit+ clones from successively later generations. We then evolved these populations in an effectively glucose-only environment and assayed fitness changes on glucose by competing them against the LTEE ancestral genotype.

DISRUPTION OF A PUTATIVE CASPASE SITE WITHIN DNA-PKCS RESULTS IN INCREASED RESISTANCE TO DNA DAMAGING AGENTS

Presenter: Carolyn Stults
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 504
Mentor: Katheryn Meek, Christopher Buehl

Mammalian cells have many pathways for detecting and repairing DNA damage including Non- Homologous End Joining (NHEJ) and Homologous Recombination (HR). However, when faced with overwhelming DNA damage, instead of repairing themselves, cells undergo programmed cell death, or apoptosis. During apoptosis, the cell's DNA is cleaved into small fragments which facilitates cell death. In addition to these nucleases, a specialized class of proteases called caspases are also activated during apoptosis that function to cleave certain cellular proteins. One such caspase target is DNA-PKcs a large protein kinase that is essential for the NHEJ DNA repair pathway. Cleavage of DNA-PKcs blocks NHEJ thereby accelerating apoptosis by allowing for persistent DNA breaks which continue to provide positive feedback into pro-apoptotic pathways. It is known that the putative caspase site on DNA-PKcs (the amino acid sequence DEVD) is highly conserved across homologues of DNA-PKcs in vertebrates. Our lab has created a hamster cell line that only expresses a mutant DNA-PKcs that harbors a single amino acid substitution that ablates the caspase cleavage site. Thus, we predict that DNA-PKcs in this mutant cell line cannot be cleaved by caspase. Preliminary results from our laboratory shows that blocking cleavage of DNA-PKcs partially protects cells

from drugs that induce DNA damage and potentially blocking apoptosis. We are currently examining DNA-PKcs from normal and DNA-PKcs mutant cells to confirm that disruption of the DEVD motif blocks cleavage of DNA- PKcs, providing an explanation for the increased survival of cells after exposure to DNA damaging agents.

OXYTOCIN SIGNALING IS NECESSARY FOR HUMAN EPICARDIAL STEM CELL ACTIVATION

Presenter: Mckenna Dooley
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 505
Mentor: Aaron Wasserman

Cardiac injury following myocardial infarction leads to massive loss of contractile cardiomyocytes (CMs) and compromises cardiac function. Unlike other organs, the heart has little innate regenerative capacity. Stem cells within the epicardium, the outermost mesothelial layer of the heart, mobilize in response to injury, and these epicardial-derived progenitor cells (EpiPCs) can replenish cardiomyocytes. However, EpiPCs are insufficient in number for functional restoration. Our lab has found that oxytocin (OXT), a neuropeptide hormone produced primarily in the brain, can activate EpiPCs, inducing expansion and increasing efficiency of the heart regenerative response. To gain insight into how OXT induces epicardial activation, we determined whether the oxytocin receptor (OXTR) is a key component of this process. We utilized a lentivirus containing an shRNA against OXTR (shOXTR) to create a stable knockdown human induced pluripotent stem cell (hiPSC) line, and differentiated control and OXTR knockdown hiPSCs into epicardial cells. We used cellular proliferation assays to determine the effects on EpiPC activation. Whereas control cells responded to OXT with an increase in cellular proliferation and epicardial activation, we observed no effects in the knockdown line. Gene expression analyses by RT-PCR revealed an upregulation of WT1, TCF21, and SNAI1 in control cells, but this response was absent in knockdown EpiPCs, suggesting that OXTR is necessary for regenerative effects to take place. Our results indicate oxytocin signaling plays a crucial role in epicardial activation and cardiac regeneration, providing a potential pathway to replace lost CMs after cardiac injury. These findings could have significant applications when treating cardiac injuries.

INVESTIGATING THE POSSIBLE ASSOCIATION BETWEEN VASCULAR DISRUPTION EVENTS AND CLEFT PALATE

Presenter: Ali Naji
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 506
Mentor: Brian Schutte

Cleft palate is a genetic condition characterized by an abnormal opening in the roof of the mouth and arises from the inability of tissue in the palate to fuse properly. We have been studying a large family of dogs where a high frequency of offspring are born with cleft palate. In addition, some affected offspring are born with a specific form of limb defect called terminal

transverse limb deficiency (TLD). Previous studies showed that TLD is associated with vascular disruption events. Given the association of these two morphogenetic defects, we hypothesized that cleft palate may also arise from vascular defects. To test this hypothesis, we performed immunofluorescence on palate sections obtained from pups with and without cleft palate. We used four antibodies known to target the endothelial cell layer of blood vessels in the palate: LAMB2 (D5 Laminin Beta 2), LAMC1 (2E8 laminin gamma), 1E12 (alpha-actinin), and PECAM1 (CD31). We hypothesized that healthy palate sections would display stronger signaling of these antibodies due to regular angiogenesis and tissue expansion during development. However, we observed the same signal in both healthy and mutant samples. Moreover, the signal resembled that of control samples with no primary antibody applied to them, suggesting a problem with the antibodies, the tissues and/or our staining procedures. Currently, we are addressing each of these variables in order to compare the vasculature in our canine samples.

CRISPR EDITING APPROACH TO STUDY GENE FUNCTION IN BREAST CANCER

Presenter: Jacob Willis
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 512
Mentor: Lorenzo Sempere

The main goal of my research project is to optimize in vitro conditions to genetically edit mouse and human breast (mammary epithelial cells) and assist in the testing of these conditions in mouse models in vivo. Because different cell lines and the genes express on those cells may have different optimal condition for maximal CRISPR editing, I will test different cell lines including EpH4 (non-malignant), 4T1 (cancer) and human cell lines: MCF10A (non-malignant), MCF7 (ER+), MDA-MB-231(ER-), 293T (non-breast cell line, transfect well, good control). The idea of using mouse cell line is that I can use same reagents in the mouse mammary gland to edit genes in vivo. The idea of using human cell lines is to see if mouse findings could be translated to humans eventually. I will also test different transfection conditions, including different transfection reagents formulated to transfect only RNA component (i.e., guide RNA and Cas9 mRNA) and RNA/protein components (i.e., guide RNA and CAS9 protein).

DEVELOPMENT AND CHARACTERIZATION OF A NOVEL RNF216 CONDITIONAL KNOCKOUT MODEL IN MOUSE TESTES

Presenter: Aya Latif
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 513
Mentor: Jeffrey Mann

Infertility is a condition that affects roughly 10% of reproductive-aged couples, with half of all causes in males. Male infertility is attributed to arrests in spermatogenesis, which may lead to abnormal, immobile, or the absence of sperm, likely caused by interruptions in gene expression. Spermatogenesis is a process in seminiferous tubules of testes, which contain male germ cells

that undergo mitotic and meiotic divisions and morphogenic changes to produce mature spermatozoa. A similar phenotype is seen in patients with Gordon Holmes Syndrome, a neurodegenerative disorder that affects the male reproductive tract due to mutations in RNF216, an E3 ligase involved in protein degradation. RNF216 has been shown to play a crucial role in spermatogenesis and male fertility demonstrated by previous global knockout mouse models. While this knockout investigated the influence of RNF216 in all tissues, it left insufficient knowledge on how RNF216 acts in the testis specifically. To understand RNF216 function in germ cells, we developed a novel conditional RNF216 knockout (cKO) mouse line. Histological results display a progressive degenerative phenotype of germ cell populations. Additionally, caudal sperm analysis demonstrates absence of mature sperm, resulting in infertility. There is also a reduction in testis size and weight, which further illustrates the impact of RNF216 in this setting. In conclusion, the development of this RNF216 cKO model showed degeneration of germ cells and demonstrates RNF216 has a prominent and crucial role. Further research can focus on the molecular mechanisms that surround RNF216 to provide better understanding of male infertility.

CRASH COURSE: DENSITY-DEPENDENT PHAGE INFECTION IN VIBRIO CHOLERAE

Presenter: Drew Beckman
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 514
Mentor: Christopher Waters

In its natural aquatic environment, the bacterial pathogen Vibrio cholerae, the causative agent of the enteric disease cholera, is in constant competition with bacterial viruses known as phages, which drive its evolution and ecology. My research investigated the density-dependent manner in which the El Tor biotype of V. cholerae resists infection by ICP-3 phage. To test this, back-diluted overnight cultures of wild type cells were grown to numerous optical densities, where they were then challenged with ICP-3 phage and allowed to incubate for a set period. OD600 values were then remeasured to determine if the phage infection was successful at lysing cells. In rich LB media, cells demonstrated an abrupt shift in ability to withstand phage infections, with liquid cultures at low optical densities being eradicated and those with high ones persisting. I found that minor differences in density can determine that culture's fate. Further, crashed cultures were allowed to grow overnight and spontaneously recovered, suggesting the emergence of resistant escape mutants, which was confirmed by a plaque assay. To characterize the mechanism for this dichotic shift, I plan to employ a systems biology approach that utilizes transposon mutagenesis with random genetic barcodes (Bar-Seq). Hundreds of thousands of V. cholerae transposon mutants, each identified by 20 base pair unique barcode sequences, were constructed, creating a system that tracks relative mutant abundance under selective conditions. I will use this mutant library to elucidate the genes necessary for density dependent phage infection in V. cholerae.

DEVELOPING A CODEBASE TO CHARACTERIZE EFFECTOR-METAEFFECTOR PAIRS IN LEGIONELLA PNEUMOPHILA

Presenter: Ethan Wolfe
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 515
Mentor: Janani Ravi

Effector proteins are known to contribute to bacterial virulence in host-pathogen interactions. Metaeffectors, proteins that regulate the activity of effectors, were recently discovered in Legionella pneumophila (Lp), the causative agent of Legionnaires' Disease; they have not yet been identified in any other bacterial species. In this project, we will focus on two effector-metaeffector (EM) pairs found in Lp: SidI/MesI and SidL/LegA11. Because there is still much to be understood from the newly discovered metaeffectors, one short-term goal of this research is to characterize these proteins and study their sequence-structural features, including domain architectures. Next, we will investigate not only the evolution of these proteins as individual molecules but also the coevolution of the EM pairs. This will allow for the identification of similar proteins, as well as other EM pairs, in other lineages across the tree of life. We will develop a codebase to streamline these analyses in a reproducible manner. The long-term goal of this research is to characterize multiple EM pairs and generate a comprehensive EM feature repository that can be used to identify potential metaeffector candidates not only in Lp but also in understudied and emerging pathogens.

DEVELOPMENTAL ROLE OF MAST CELLS IN SYSTEMIC THERMOREGULATORY AND NEUROINFLAMMATORY RESPONSES TO LIPOPOLYSACCHARIDE ADMINISTRATION

Presenter: Vidhula Srinivasan
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 516
Mentor: Natalia Duque-Wilckens, Alfred Robison, Adam Moeser

Sepsis-associated encephalopathy (SAE), the most frequent type of encephalopathy in the ICU, is associated with long-term psychiatric disturbances and higher sepsis-induced mortality. The pathophysiology of SAE involves changes in neurotransmitter levels as well as increased neuroinflammation, but how peripheral inflammation triggers these responses in the central nervous system remains unknown. Mast cells, the effector cells of the innate immune system, are uniquely positioned to play a key role in linking peripheral to central inflammatory responses: they are distributed throughout the body, including the brain; they can rapidly respond to bacterial endotoxins; and they can release a plethora of mediators that can initiate and amplify inflammation as well as alter neuronal and glial function. Here we crossed the Mcpt5-Cre mouse line with the Cre-dependent B6-iDTR (Jax®) mice to render mast cells susceptible to diphtheria toxin (DTX) ablation to determine both the acute and developmental roles of mast cells in hypothermia and neuroinflammation induced by peripheral administration of Escherichia coli lipopolysaccharide (LPS). We injected the F1 litters with 30ng/g DTX every 7 days starting at different developmental stages until adulthood, when animals were

challenged with an intraperitoneal injection of 1mg/kg of LPS. We found that animals in which mast cells were ablated starting before postnatal day 14, but not later, showed a more severe hypothermic response as well as increased levels of the inflammatory cytokine TNFα in the periaqueductal gray, suggesting an early developmental role for mast cells in neuroimmune networks underlying sepsis-induced hypothermia and neuroinflammation.

TOWARD A GENE EXPRESSION PROFILE FOR PALATE PERIDERM

Presenter: Josie Kleve
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 521
Mentor: Brian Schutte, Jason Lin

The periderm is a flat, squamous layer of epithelial cells found only on the surface of a fetus during development. Periderm is a transient tissue and is shed by 20-24 weeks gestation in humans. A key function of periderm is to prevent adhesions between the immature epithelial layers prior to stratification. Then, programmed cell death (apoptosis) of periderm cells facilitates the adhesion of underlying basal epithelial cells to promote tissue fusion specifically between the medial edges of the palatal shelves in the oral cavity. The significance of periderm function is highlighted by the fact that mutations in genes required for periderm development and dissolution cause cleft lip and/or cleft palate, two of the most common birth defects. We are interested in isolating periderm cells for RNA sequencing in order to create a gene expression profile. To do this, I used a mouse model where a transgene drives GFP expression specifically in cells of the periderm. I isolated the palatal shelves of these embryos using microdissection. I then lightly treated the tissues with trypsin to dissociate and disperse the superficial layer of periderm cells. I then performed fluorescence-activated cell sorting (FACs) to isolate the GFP-expressing periderm cells. Our goal is to obtain a sample of purely periderm cells for RNA sequencing. By generating a gene expression profile for periderm, we will be able to identify genes involved in palate formation.

OXYBENZONE EXPOSURE AFFECTS NORMAL MAMMARY GLAND DEVELOPMENT IN BALB/C MICE.

Presenter: Calista Busch
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 522
Mentor: Richard Schwartz, Olena Morozova

Oxybenzone (benzophenone-3; BP-3) is a putative endocrine disrupting chemical that is a common ingredient in sunscreen and many personal care products. As an endocrine disruptor, BP-3 has the potential to interfere with the normal action of reproductive hormones. Previous studies in the lab have also shown that a high-fat diet can promote breast cancer. Based on this, we are investigating the effects of BP-3 and dietary fat on the ductal development of murine mammary glands. Preliminary work indicated an effect of BP-3 on mammary gland development, finding that withdrawal of BP-3 treatment resulted in a regression of ductal development. Results presented here show data demonstrating that high fat in early adulthood

and BP-3 restricted to puberty on a low-fat diet yield similar phenotypic effects. By examining the various treatment groups for the expression of cytokines known to be critical for mammary development, as well as cytokines that will indicate whether the immune microenvironment is permissive for mammary development, we hope to develop testable hypotheses for the observed ductal regression upon BP-3 withdrawal and the lack of ductal development with pubertal BP-3 exposure. The results of these studies may identify toxicological hazards of BP-3 to female reproductive health.

EFFECTS OF OXYBENZONE ON THE T CELL MICROENVIRONMENT OF THE PRE- TUMOR TRP53-KNOCKOUT MAMMARY GLAND

Presenter: Kloma Cardoza
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 523
Mentor: Richard Schwartz, Olena Morozova, Anastasia Kariagina

The aim of this investigation is to determine the relationship between oxybenzone (BP-3), diet, and anti-tumor immune responses prior to the development of mammary tumors. Two sets of BALB/c mice underwent transplantation of p53-knockout mammary tissue into their cleared fat pads. They eventually develop into adult mammary glands that are susceptible to mammary tumorigenesis. One group of mice was fed a low-fat diet (LFD - 10% kcal fat) their entire life and a second group was initially fed LFD and switched to a high-fat diet (LFD-HFD - 60% kcal fat) after puberty. These two groups were also treated with or without BP-3. The mice were examined at 26 weeks of age, 2 weeks prior to the average initial development of tumors. At this pretumor stage, only preneoplastic lesions are present. We previously found that for mice fed LFD, there was a protective effect of BP-3, and for mice fed LFD-HFD, there was a tumor-promoting effect of BP-3. We examined the expression of immune cytokines through real-time quantitative RT-PCR to assess the mode of T-cell activation in these mammary glands. We found elevated levels of IL-4, IL-13, and IL-21 in LFD+BP3 versus LFD mice, which suggests Th2 polarization. We also found reduced levels of IL-10 and unchanged levels of the other cytokines in LFD-HFD+BP3 versus LFD-HFD mice, consistent with reduced cytotoxic T cell activity. We will discuss how these changes in cytokine expression correlate with changes in immune cell populations and thus may impact tumorigenicity through alteration of immune function.

SURFACE COATED PRUSSIAN BLUE NANOPARTICLES AND THEIR PHOTOTHERANOSTIC EFFECTS FOR GLIOBLASTOMA TREATMENT

Presenter: Rachna Parikh
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 524
Mentor: Meghan Hill, Taeho Kim

Prussian blue nanoparticles (PBNP) can be used for a variety of applications compared to nanoparticles alone. These prussian blue nanoparticles have been found to absorb high levels of near-infrared light that can strengthen photoacoustic signaling and cytotoxic phototherapy. The

problem that comes with these nanoparticles is their inability to circulate within the bloodstream for long periods of time. As a result, we have discovered a highly advanced nanostructure that consists of coating PBNPs with different types of PEG, liposomes, and U-87 derived exosomes. They are synthesized using FeCl3, citric acid and K4 [Fe(CN)6] in a co-precipitation reaction. Vesicles for this experiment were taken from the U-87 cell line through the centrifugation process. With coating, previous PEGylated studies show 200nm size using DLS and liposome coated particles were measured to 120 nm using NTA. Transmission electron microscopy and nanoparticle tracking analyzer were both conducted to confirm the sizing of our nanostructure. To test the potential of this nanostructure, the Exo:PB particles were injected into the orthotopic brain of U-87 subcutaneous brain mouse models. Results confirmed that there was more nanoparticle accumulation with the prussian blue macrophage derived nanoparticle model in comparison to more common nanoparticle imaging agents. Further indicating that Exo:PB particles could be used for glioblastoma theranostics.

PARENTAL ORIGINS OF THE CULTIVATED TETRAPLOID SOUR CHERRY (PRUNUS CERASUS L.)

Presenter: Megan Steffes
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 526
Additional Student Presenters: Paulina Bies, Adare Cario, Lawrence Kado, Vanessa Kilian, Vibha Mahesha
Mentor: Patrick Edger, Kevin Bird, Mackenzie Jacobs

The progenitor species and the number of origins of the cultivated tetraploid sour cherry (Prunus cerasus L.) remains unresolved. Here, we performed phylogenetic analysis of plastid genomes and hundreds of nuclear genes from nine wild species and three historically important sour cherry cultivars. Our analyses identified Prunus fruticosa and Prunus avium as the closest extant relatives of the progenitors of sour cherry. Furthermore, our analyses revealed P. fruticosa as the likely maternal contributor. Multiple origins of P. cerasus remain a possibility. These findings and transcriptomic datasets should serve as valuable new resources to guide future breeding efforts in sour cherry.

TUMORIGENIC POTENTIAL OF TRICLOSAN, AN ANTIMICROBIAL INGREDIENT FOUND IN COMMON HOUSEHOLD PRODUCTS.

Presenter: Anna Heath
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 531
Mentor: Brad Upham

Triclosan is an antimicrobial agent that was a common ingredient in many household products such as antibacterial soaps, body washes, toothpastes and some cosmetic products. Recently triclosan has been implicated in adverse health effects such as immune suppression and liver cancer, and has been since banned by the Food and Drug Administration in 2016. However, it remains in a multitude of household items and is a tremendous public health concern. Considering that triclosan has been linked to liver cancer, there is a need to understand the

underlying mechanisms of action. Cancer cells have long been characterized as cells that lose their ability to regulate growth through contact inhibition and lack the ability to terminally differentiate, which implies a breakdown in one of the communicating mechanisms. In particular, the dysregulation of gap junctional intercellular communication (GJIC) is one hallmark characteristic of cancer. Thus, we determined the effects of triclosan on GJIC in a bipotent epithelial stem cell line derived from F344 rats. GJIC was measured using the scalpel load-dye transfer assay. Triclosan inhibited GJIC in a dose and time dependent manner implicating that triclosan can contribute to the cancer process by dysregulating GJIC. Preliminary data suggests triclosan does not work through a mitogen-activated protein kinase pathway, and may work partially through a phosphatidylcholine-specific phospholipase C pathway. Future experiments will determine if natural products, such as resveratrol and quebecol, can mitigate the adverse effects of triclosan on GJIC.

ALZHEIMER'S DISEASE IN CAENORHABDITIS ELEGANS

Presenter: Patrick McMillan
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 532
Mentor: Christoph Adami

It is commonly understood that there is a significant relationship between genetics and Alzheimers. However, much ground is still to be covered about the relationship between genetic variation and Alzheimer's disease. The relation of the peptides and proteins of amyloid beta and tau to Alzheimers have been tested and compared, to potentially produce significant data showing the that the two have significant implications on Alzheimer's disease.

THE ROLE OF PTPRH MUTATIONS IN MMTV-PYMT INDUCED MAMMARY TUMORIGENESIS

Presenter: Ashlee Perry
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 533
Mentor: Eran Andrechek

Previous research from our lab illustrated that mouse mammary tumor virus (MMTV)-polyomavirus middle T oncoprotein (PyMT) induced tumors in mouse models with knockouts of the E2F1, E2F2, or E2F3 transcription factors resulted in significant phenotypic differences. Recent whole genome sequencing of PyMT tumors have identified a highly conserved mutation in the protein tyrosine phosphatase receptor (Ptprh). More than 80% of PyMT tumors acquire an identical Ptprh mutation. We hypothesize that differences in Ptprh mutation status between E2F genotype variants is an explanation for the heterogeneity of MMTV-PyMT induced tumors. Here, we completed genomic sequencing of the Ptprh gene in MMTV-PyMT E2F knockout tumors, 21-day mammary tissue, and 35-day mammary tissue to identify mutation differences that may have led to such heterogeneity in tumor phenotype. Through these studies, we conclude that there is no difference in Ptprh mutation status for tumors in the

E2F knockout backgrounds with varying onset and metastasis. Therefore, we suggest that Ptprh mutations are essential for tumor formation in these models. This is reflected by the identification of Ptprh mutations in the mammary gland prior to tumor formation, suggesting that it is a very early event in the progression to a tumor.

PROMISING NOVEL DRUG TARGETS TO HALT PRETERM LABOR THROUGH DUAL TARGETING OF OXYTOCIN AND MELATONIN RECEPTORS

Presenter: Aneesh Cherukuri
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 534
Mentor: Hanne Hoffmann

Nearly one in every ten babies are born prematurely, leading to modest to severe impairments in the development of the child. Sadly, no current treatments efficiently halt preterm labor. Our goal is to identify receptor complexes which can be targeted to efficiently reduce uterine contractions. Oxytocin activation of its receptor, OXTR, strongly promotes uterine smooth muscle (myometrium) contractions. On the other hand, uterine contractions are transiently suppressed through light-induced reduction in the nocturnally released hormone, melatonin. Melatonin induces uterine contractions through activation of its receptor, MTR. To determine if we can increase and decrease activation of intracellular signaling pathways regulating myometrium contractions, we used human derived cell lines from the myometrium (PHM1-41 cells) and the kidney (HEK293 cells). To assess OXTR and MTR signaling interaction we focused on calcium mobilization, an ion required for myometrial contractions. We used two different approaches to study calcium mobilization, one evaluated free intracellular calcium (FURA2 assay), and the other indirectly evaluated free-calcium through transiently transfecting cells with a calcium responsive element-driving luciferase reporter. Using both assays, we found that oxytocin and melatonin alone promoted calcium release. Interestingly, co-application of oxytocin and melatonin reduced peak calcium signaling as compared to either agonist alone, this effect was dependent on OXTR and MTR receptor levels. This suggests the signaling pathways recruited by OXTR-MTR potentially are different from what is recruited by either receptor alone. In conclusion, our preliminary data suggests that the MTR-OXTR signaling complex is a novel promising drug target to reduce contractions during preterm labor.

GENOMIC COMPARISON OF COASTER AND RESIDENT BROOK TROUT FROM THE PILGRIM RIVER, MICHIGAN

Presenter: Allie Zhang
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 535
Mentor: Nadya Mamoozadeh, Mariah Meek

Brook trout (Salvelinus fontinalis) native to the Lake Superior basin exhibit resident and migratory life history forms, the latter of which is endemic to the region. Whereas resident

brook trout complete their life cycles in streams and rivers, the migratory coaster form spends significant portions of their life in Lake Superior. Nearly extirpated in the 1800s, only a small number of populations supporting the coaster life history remain, and these populations are increasingly threatened by anthropogenic stressors including climate change. Here, we surveyed genome-wide single nucleotide polymorphisms in fifty brook trout from the Pilgrim River in Michigan's Upper Peninsula. Brook trout in the Pilgrim River were recently found to exhibit both migratory and resident life histories. Our goal was to determine whether variation in life history strategy in Pilgrim River brook trout is accompanied by underlying genetic differences. We performed restriction site-associated DNA sequencing and analyzed the resulting data to determine whether migratory fish exhibit genetic differences from non-migrating fish. Migratory status was inferred using telemetry data collected in a previous study, offering a unique opportunity to compare the genomic data with independent information on migration. Results for Pilgrim River brook trout will be compared to brook trout from elsewhere across the Lake Superior basin to yield a better understanding of whether there is a genetic basis to life history variation and, if so, what genetic variation is necessary for the coaster life history to occur. Collectively, these findings will inform coaster conservation and restoration across the Lake Superior basin.

GENOME ASSEMBLY AND ANALYSES OF TWO EXTANT RELATIVES OF THE DIPLOID PROGENITORS OF CULTIVATED OCTOPLOID STRAWBERRY

Presenter: Allie Zhang
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 536
Additional Student Presenters: Emilee Bellant, Shreya Kankanalapalli, Ananya Rao
Mentor: Steven Safferman

Four wild diploid strawberry species hybridized (combined) to form the octoploid strawberry (Fragaria x ananassa) approximately one million years ago. We previously conducted a phylogenetic analysis that identified two previously unknown diploid progenitor species, F. viridis and F. nipponica, in addition to F. vesca and F. iinumae. Here we describe our course research project aimed to construct chromosome-scale genome assemblies of these two newly uncovered species.

CELL BIOLOGY, GENETICS & GENOMICS
Oral Presentations

RECONCILING AND INTEGRATING MULTIPLE CONNECTIVITY-BASED METHODS FOR DRUG REPURPOSING

Presenter: Kewalin Samart
Category: Cell Biology, Genetics, & Genomics
Time Slot: 1:45 PM
Room Location: Meeting Room C
Number: 541
Mentor: Arjun Krishnan, Janani Ravi

Drug repurposing has been a promising approach for drug discovery because it is more time- and cost-effective compared to traditional drug development. The basis of several recent methods for drug repurposing is the key principle that an efficacious drug will reverse the disease molecular 'signature' with minimal side effects. These methods quantify reversal relationships between disease- and drug-induced gene expression profiles using a disease-drug 'connectivity score.' Over the past 15 years, several studies have proposed variations in calculating connectivity scores towards improving accuracy and robustness in light of massive growth in reference drug profiles. Previously, we have developed a unified scheme for all the existing methods by reconciling them using inconsistent notation and terminology to enable the computational drug-development community to compare, investigate different approaches, and develop newer methods easily. Extending from the previous work, we are currently developing a computational drug repurposing workflow that integrates these multiple connectivity scores and applying the computational framework to repurpose drugs for infectious diseases starting with tuberculosis.

EFFECTS OF TNF-A ON CB1 EXPRESSION IN PANCREATIC-ß ISLET CELLS

Presenter: Ahmed Ahmed
Category: Cell Biology, Genetics, & Genomics
Time Slot: 2:00 PM
Room Location: Meeting Room C
Number: 542
Mentor: Omayma Alshaarawy, Morgan Sotzen

In the last few decades, the prevalence of obesity in the US population has soared. Diabetes has also taken a similar pattern. Obesity-mediated inflammation is a prominent mediator of diabetes development and progression. Previous studies have indicated that the pro-inflammatory cytokine TNF-α is often expressed at elevated levels in patients with metabolic disorders including obesity and diabetes. Studies also demonstrate that TNF-α causes a decrease in insulin secretion through modulation of intracellular Ca2+ levels in pancreatic beta cells. The expression of Cannabinoid-1 (CB1) receptor in pancreatic ß-cells is well-documented and its activation leads to reduced insulin secretion. In this present study, our lab will investigate if the pro-inflammatory cytokine TNF-α has the potential to modulate insulin secretion through a CB1-mediated pathway in B-cells. INS-1 β-cells are cultured in media and treated with and without TNF-α. We will measure CB1 mRNA expression in the cultured cells using RT-PCR. We will also measure glucose-stimulated insulin secretion.

SEX DIFFERENCES IN CANNABINOID REGULATION OF BODY WEIGHT

Presenter: Valerie Nguyen
Category: Cell Biology, Genetics, & Genomics
Time Slot: 2:15 PM
Room Location: Meeting Room C
Number: 543
Mentor: Omayma Alshaarawy

The legalization of medical and recreational marijuana in several U.S states has led to an increase in cannabis consumption among men and women, which has prompted the need for more cannabis-related research. Male mice have been the "gold standard" in previous cannabis- related experiments but those results may not extrapolate to female mice due to physiological and anatomical differences. Evidence shows that downregulation of CB1R was associated with leanness and resistance to diet-induced obesity (DIO) among male mice, however, it is unknown if CB1 receptors modulate energy balance in female mice. Given the physiological and anatomical differences in sexes, both male and female mice with either CB1 knockout or CB2 knockout were studied. All mice were on C57BL background because of their susceptibility to DIO. Seven-week-old wild-type (WT), CB1-KO and CB2-KO mice were fed ad libitum either with a high fat diet (HFD) or a low-fat diet (LFD) for 6 weeks. Food intake and body weight were recorded weekly. After 6 weeks, a subset of mice was fasted for 5 hours in the early morning and then glucose (2g/kg) was administered via intraperitoneal injection to assess glucose clearance. There were no robust differences in body weight gain between WT, CB1 knockout and CB2 knockout mice. This disagrees with previously studied CB1-KO male mice which were observed to have decreased weight gain compared to other genotypes. These results suggests that cannabinoids exert sex-dependent effects on metabolism. Future experiments aim to elucidate mechanisms responsible for these sex differences.

EFFECTS OF OVARIAN STIMULATION ON ADENOGENESIS AND ANGIOGENESIS DURING OVULATION AND THE WINDOW OF RECEPTIVITY

Presenter: May Shen
Category: Cell Biology, Genetics, & Genomics
Time Slot: 2:30 PM
Room Location: Meeting Room C
Number: 544
Mentor: Ripla Arora

Ovarian stimulation is one of the main steps in assisted reproduction techniques such as in vitro fertilization (IVF). Embryo transfer in the stimulation cycle results in less optimal pregnancy outcomes compared to when embryos are frozen and transferred later in a natural cycle (NC). We hypothesized that altered estradiol (E2) and progesterone (P4) levels from ovarian stimulation may alter glandular structure and angiogenesis during ovulation or the window of receptivity. To test this, endometrial functionalis biopsies were obtained from women in their ovulatory phase or receptive phase, both in the NC and during ovarian stimulation (OS). We observed an increase in E2 levels in OS samples compared to NC both during ovulatory and receptive phase. P4 levels increased during the ovulatory phase. Biopsies were stained with vascular marker CD31, and epithelial marker cytokeratin 8 (CK8). Confocal imaging and image analysis were used to create 3D reconstructions to determine the effects of high E2 and P4 levels on the 3D structure of vasculature and glandular epithelium. 3D imaging suggests an increase in gland volume density from NC to OS during ovulatory phase and in NC between ovulatory and receptive phase. Our data also suggests a trend towards decreasing vessel density in both NC and OS during the receptive phase compared to the ovulatory phase. Changes in glandular density are reflective of the effects of OS on uterine structure and could contribute to causes leading to failure of pregnancy after embryo transfer in the OS cycle.

ENGINEERING EXTRACELLULAR VESICLES AS IGF-1 GENE DELIVERY VEHICLES FOR TYPE 1 DIABETES

Presenter: Katherine Lauro
Category: Cell Biology, Genetics, & Genomics
Time Slot: 2:45 PM
Room Location: Meeting Room C
Number: 545
Mentor: Masako Harada

Type 1 diabetes (T1D) is an autoimmune condition in which the host's immune system selectively destroys pancreatic β cells, resulting in reduced insulin secretion and subsequent impaired glucose metabolism. The current standard of care for T1D is insulin-replacement therapy, which is only a symptomatic treatment option. A more curative treatment requires pancreatic β cell regeneration and prevention of further autoimmune destruction. Insulin-like growth factor 1 (IGF-1) is a 70 amino acid polypeptide hormone. This project aims to investigate IGF-1 treatment for β cells in T1D, based on previous studies demonstrating that IGF-1 stimulates β cell regeneration. However, targeted delivery of therapeutic molecules to pancreatic β cells has not yet been successful due to their inaccessible anatomical location, in addition to the challenges associated with gene delivery, including lack of stability in body fluids, negative charge, and inefficient cellular uptake. Extracellular vesicles (EVs) are a heterogeneous population of small, natural carrier molecules that potentially overcome the current issues in gene delivery associated with immunogenicity, toxicity and stability. This project focuses on generating a mouse insulin promoter (MIP)-driven gene construct to show cell-type-specific gene expression using a mouse pancreatic β cell line (NIT-1). We successfully generated and verified these constructs in the β cell line. Additionally, we demonstrated that engineered EVs could deliver these constructs in a cell culture system, illustrating their potential applications for the IGF-1 gene in T1D models.

THERAPEUTIC WINDOW EVALUATION BY DOING 3D CELL VIABILITY ASSAY

Presenter: Zach Miller
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:30 PM
Room Location: Meeting Room C
Number: 547
Mentor: Bryan Smith, Yapei Zhang

A therapeutic window is a dose range between minimum effective drug dose (MED) to the minimum toxic drug dose (MTD). Many commonly used cancer drugs, including chemotherapies such as Doxorubicin, are highly toxic to normal tissues and have narrow therapeutic windows. The drug concentration should constantly remain between the MED and MTD in order to produce risk-free therapeutic effects. In general, critically, administration of too much drug (above the therapeutic window) will cause serious side effects on normal human organs, leading to patient morbidity or even death. On the other hand, too little drug (below the therapeutic window) will result in lack of treatment efficacy and may induce cancer drug resistance, which is the most important reason for the failure of chemotherapy. Herein, we studied the viability of two cell lines, a dox sensitive cell line (BT459) and a non-dox sensitive

cell line (CAL 148), to estimate the therapeutic window of doxorubicin. We studied the cell viability to estimate the therapeutic window of DOX in vitro so as to guide the DOX dose in vivo.

MICROSATELLITE GENOTYPING OF LAKE HERRING

Presenter: Grant Bruninga
Category: Cell Biology, Genetics, & Genomics
Time Slot: 3:45 PM
Room Location: Meeting Room C
Number: 548
Mentor: Kim Scribner, Jeannette Kanefsky

Historic lake cisco populations have been found to originate from two main refugia, the Mississippian refugia from Missouri and Southern Illinois and the Atlantic refugia east of the Appalachian Mountains. Genetic data indicated individuals from both refugia have intermixed in Michigan after the recession of the glaciers in the area. However, historic stocking of cisco into the Great Lakes and surrounding inland lakes have raised concern over the interbreeding between stocked individuals and endemic cisco, potentially lessening the influence of unique genetic characteristics in endemic cisco, which can lower probabilities of population survival in changing environments. Microsatellite genotyping will be collected and used to identify the ancestral origins of 5 inland southern and eastern Michigan lake cisco populations. Data will be combined with previously collected data from 12 inland and Great Lakes lake cisco populations from northern and western Michigan. We hypothesize that genetic characteristics (levels of diversity and inter-population) of the inland lake cisco populations will indicate low historical gene flow with the Great Lakes populations, that would be consistent with limited effects of stocking. These results will demonstrate to managers how areas of endemic cisco genetic variability have been maintained, which is a subject of conservation concern. By identifying genetically unique inland lake cisco populations, the genetic diversity in endemic and Great Lakes cisco can be appropriately targeted for species recovery.

EVALUATING THE EXPRESSION OF OCT4 IN EXTRAEMBRYONIC ENDODERM (XEN) CELLS

Presenter: Srishti Goswami
Category: Cell Biology, Genetics, & Genomics
Time Slot: 4:00 PM
Room Location: Meeting Room C
Number: 549
Mentor: Amy Ralston

My current research is focused on evaluating the expression of the transcription factor Oct4/Pouf51 in extraembryonic endoderm (XEN) cells. During embryonic development, the inner cell mass of the blastocyst develops into the epiblast (EPI) and the primitive endoderm (PE). Oct4 is essential in establishing the EPI and PE. As development continues, Oct4 becomes restricted to the EPI to maintain pluripotency. The field has been able to establish a stem cell from the PE termed XEN cells in which it is thought that Oct4 is no longer expressed. However, Zhong et al. 2018 demonstrated that a novel cell line named primitive XEN (pXEN) cells, could be derived from the PE that better models early PE, in which Oct4 is still expressed. Moreover, unpublished work from our lab shows that a natural Oct4 expressing population

exists at low proportions within normal XEN lines. To investigate these findings further, I want to determine whether Oct4 expression in XEN cells can be enhanced and determine if this is a pXEN population. My experiments focus on subjecting XEN cells to different conditions to try to enhance these naturally occurring Oct4 populations with the use of signaling molecules and Oct4 overexpression using a lentivirus delivery system. In order to test for the presence of Oct4 expression, techniques such as immunofluorescence, flow cytometry and qPCR will be utilized. In addition, the functionality of pXEN will be tested using differentiation assays and read outs of morphology and marker expression via qPCR.

OPTIMIZATION OF EX VIVO APPROACHES TO DISSECT NEUTROPHIL FUNCTIONS

Presenter: Olivia Beckman
Category: Cell Biology, Genetics, & Genomics
Time Slot: 4:15 PM
Room Location: Meeting Room C
Number: 550
Mentor: Andrew Olive, Haleigh Gilliland

Neutrophils are innate immune cells that drive early immune responses during infection. Dysregulation of neutrophils results in susceptibility to infections and contributes to chronic diseases like cystic fibrosis. However, neutrophils are challenging to isolate and short-lived resulting in gaps in our understanding of how neutrophils regulate their responses. Developing an ex vivo approach to generate mature neutrophils will enable a better understanding of neutrophil regulation and function. I hypothesize that conditionally-immortalized progenitor cells from the bone marrow of mice can be used to generate large numbers of neutrophils ex vivo which can be leveraged to dissect host-pathogen interactions. To test this hypothesis, I am optimizing neutrophil generation ex vivo using cells that conditionally express the developmental factor HoxB8 and examining the interaction of these neutrophils with Mycobacterium abscessus a key pathogen in cystic fibrosis patients. Conditionally-immortalized progenitors grown with estradiol, which drives the expression of HoxB8, and stem-cell factor (SCF) do not express surface markers of mature neutrophils such as CD11b or GR-1. I examined the kinetics of neutrophil maturation over two weeks by using flow cytometry to quantify the surface expression of progenitor and neutrophil markers after estradiol removal, which stops HoxB8 expression. My results indicate ex vivo neutrophils are longer-lived and induce neutrophil maturation markers. However, I did not observe robust expression of the progenitor marker CD117 in the presence or absence of estradiol suggesting the progenitors are partially differentiated. Future studies will further optimize differentiation and begin to characterize the interactions between neutrophils and Mycobacterium abscessus.

THE PHOTORESPIRATORY PATHWAY UNDER DYNAMIC STRESS

Presenter: Linnea Hartz
Category: Cell Biology, Genetics, & Genomics
Time Slot: 4:30 PM
Room Location: Meeting Room C
Number: 551
Mentor: Jianping Hu, Xiaotong Jiang

This project attempts to dissect the role of the photorespiratory pathway in plant response to biotic and abiotic stress conditions, using five Arabidopsis thaliana mutants. The mutants will be stressed biotically using the bacterial strain Pseudomonas syringae pv. tomato DC3000 and abiotically using high light and cold treatments. The phenotypic responses identified, such as changes in plant resistance to the pathogen and plant size and appearance, will provide important information to improve our understanding of how the photorespiratory pathway interacts with the dynamic environmental stresses.

COMMUNICATION ARTS & SCIENCES
Poster Presentations

A PICTURE IS WORTH A THOUSAND WORDS: COMPARISON OF VOCAL FOLD VISUALIZATION AND VOICE AUDIO SIGNAL

Presenter: Trent Henry
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 601
Mentor: Maryam Naghibolhosseini

Adductor spasmodic dysphonia (AdSD) is a voice disorder that affects an individual's ability to control their intrinsic larynx muscles during speech and is neurological in origin. Our previous research has shown that high-speed videoendoscopy (HSV) can be used to analyze the phonation onset/offset and measure the glottal attack and offset times for patients with AdSD during connected speech. This study builds upon that and analyzes the acoustic signal in conjunction with the HSV video data. The two datasets are compared against one another to investigate the initiation and ending of phonation. The goal is to relate the vocal folds vibrations, captured using HSV, and the generated voice signals, recorded using a microphone. The data were obtained from five patients with AdSD and five vocally normal participants. The dataset was recorded while the participants produced: two productions of vowel /i/ at habitual pitch and loudness, two with a soft glottal attack and two with a hard glottal attack. The HSV system included a monochrome high-speed camera, coupled with a flexible nasolaryngoscope, which obtained video data at 4,000 frames per second. A rater analyzes the HSV data to determine the vocal folds' first contact, first oscillation, last oscillation, and last contact; also, to compare these numbers with the onset of the voice signal, measured from the recorded acoustic data. The results of this study will assist for developing objective measurements for voice assessment.

CRISIS COMMUNICATION THROUGH SOCIAL MEDIA DURING THE FIRST 6 MONTHS OF THE COVID-19 PANDEMIC

Presenter: Madelyn Darbonne
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 602
Mentor: Manuel Chavez

As crises emerge, the news constantly update with the latest facts, information and data. This is a time when the public is inclined to readily search and gather the knowledge they can about a situation to better understand it, but at the start of the COVID-19 pandemic, the forthcoming scale and impact of the virus was unknown. In a time when fast-paced and widespread information is desired, social media prevails as a dominant news source. The nature of social media makes it possible to receive updates at your fingertips from friends, news outlets, health and government officials. By understanding how various official news media outlets and public health social media accounts have communicated COVID-19 updates during the first 6 months of the pandemic through social media analysis, we can understand how social media is used for crisis communication.

HOW LOCAL CIVIC ORGANIZATIONS SHARE INFORMATION ON SOCIAL MEDIA

Presenter: Lydia Werth
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 603
Mentor: Kjerstin Thorson, Ava Francesca Battocchio

Local civic organizations have grown in their use of social media rapidly in the past few years. Through understanding the processes of "how" and "what" information is shared, citizens will become informed of what is going on in their communities. Researchers can help identify gaps in communication between organizations and individuals by understanding civic organizations' social media use. The purpose of this study is to understand how the use of social media by civic organizations is interpreted by their audience. This will be conducted through the qualitative coding of interviews with social media managers of six locations. The research will culminate into a poster highlighting the common themes in the community, comparing different civic organizations' perceptions, and providing a list of common platforms used by these organizations.

ISSUES IN RELIABLE AND VALID TRANSCRIPTION OF STUTTERED SPEECH USING CLAN

Presenter: Jenna Fisher
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 604
Additional Student Presenters: Erika Mueller, Olivia Parker, Kori Kloostra, Cameron Martin, Kayla Arafat
Mentor: J Scott Yaruss

The CLAN/FLUCALC programs (part of the TalkBank/FluencyBank project) allow clinicians and researchers to perform an analysis of stuttered speech from a transcript; however, the reliability of this method has not been fully explored. The primary objective of this project is to compare reliability of transcriptions between coders of varying skill levels. In addition to providing needed information about coding reliability, this project will provide data that clinical speech- language pathologists can use for understanding the assessment of both language and stuttering. In this study, 6 coders complete a detailed transcription of the same speech sample. Samples are then analyzed on a code-by-code basis for stuttered and non-stuttered disfluencies; comparisons are conducted to identify discrepancies and similarities. Data are used to identify the differences in transcription reliability and validity between coders. Errors will be analyzed to determine how much variation between coders makes a difference in total disfluency counts. The results of this project will examine and establish inter-rater reliability between coders of varying training levels; this will help to minimize error for future transcriptions to ensure reliable and valid coding of stuttered speech.

METAVERSE TECHNOLOGIES: ARE WE DOOMED TO CANCER AND BLINDNESS?

Presenter: Zachary Schultz
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 606
Mentor: Rabindra Ratan, Gabe Hales

This research examines the increased usage, impact, and potential long-term effects of metaverse technologies like Virtual Reality (VR), Augmented Reality (AR), and other related devices. Metaverse technologies are a new type of media technology that is ever growing in use. Hence, they are becoming more ubiquitous in our society due to the social, cultural, and technological "hype" surrounding the metaverse. Individuals are quickly embracing these technologies and we expect this to continue as they become increasingly more mainstream. Further, such technologies use wireless innovations (e.g., WiFi and 5G networks) that will facilitate communication for future users. However, increasing research has shown these wireless technologies emit radiation to function. As VR and AR are located on the users' face- this may lead to increased exposure to radiation with long term use. We hope to learn if extended exposure to the radiation emitted by metaverse technologies poses a health concern. We collected data about radiation relating to Specific Absorption Rate, the measure of energy absorption by a body relative to a radiation source. The results suggest that these rates are

within acceptable limits per FCC regulations. Despite the FCC regulations, the long-term effects have not been studied as this form of tech use has only recently been introduced, limiting the ability of present research but posing considerable potential for future work.

BUILDING A VIRTUAL ENVIRONMENT AS STIMULI FOR A PSYCHOLOGICAL STUDY

Presenter: Zachary Schultz
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 607
Additional Student Presenters: Mikayla Dinh
Mentor: Rabindra Ratan, Gabe Hales

This project examines the technical and theoretical development of a virtual reality environment for a study of human-avatar embodiment. Student researchers developed many new skills through this project. Specifically, our team used the platform Unity to create the experimental stimuli, and the programming language C# within Unity to develop the environment. The study involves a virtual reality environment wherein virtual agents ("MECHs") host participants as they volunteer for a simulated disaster relief task. Further, we used the digital painting software Krita to assign differentiating colors and patterns to the agent's virtual 'bodies.' These design differences are then assigned to participants themselves to further their identification with the virtual hosts during the simulation. Likewise, we designed the agents to speak to the participants throughout the experiment to reiterate such stimuli and other attitudes we programmed them to express. Text-to-speech software was used to generate these audio files and we finalized them with 'Audacity' to splice them into manageable chunks. Once the files were properly formatted, they were implemented into the virtual environment. Overall, our development team utilized software such as Unity, Krita, and Audacity to perfect the virtual experience for participants. Through this process, we learned many valuable development skills to enhance our research abilities and facilitate this study of human-agent interaction.

COMMUNICATION ARTS & SCIENCES
Oral Presentations

INSIDE FLINT TOWN: WHAT IS FLOW?

Presenter: Miriam Bingham
Category: Communication Arts & Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 608
Additional Student Presenters: Najla Hollins, Jada Vasser
Mentor: Geraldine Zeldes

"Flow & Flint Town," a book project, investigates the mental and musical flows among rap artists in the city. Our team is interviewing for this publication a new generation of Hip-Hop artists in Flint Town to explore the psychological and creative circumstances that lead to their rap songs. We interviewed King Ca$hes, B!Z, Bamstarr, and other prominent rap figures that

call Flint home. These interviews have archival value because little is known about the Flint rap scene, which is the birthplace of the Midwest rap genre. Many credit Chicago and Detroit as the birthplace of Midwest hip hop; this project pushes against that common knowledge, placing Flint deservedly on the map of rap music history.

FOSTERING SOCIETAL TRANSFORMATIONS IN ATTITUDES TOWARD NEURODIVERGENT POPULATIONS

Presenter: Mariam Sayed
Category: Communication Arts & Sciences
Time Slot: 10:00 AM
Room Location: Meeting Room A
Number: 611
Additional Student Presenters: Emma Erlenbeck, Kat Zuniga
Mentor: Laura Dilley

Receiving a neuropsychiatric diagnosis such as autism is associated with having reduced opportunities for education and employment, lower social status, and stereotyping and stigma. This project explores the perceptions of individuals with an autism diagnosis who cannot use speech reliably for communication, using their voices as a tool to promote progress of this marginalized group towards greater rights, autonomy, and opportunities. In this study, a corpus of self-narratives presented by diverse, non-speaking individuals was analyzed. A coding system was applied to narratives to identify cases in which non-speaking individuals identified a desire and aptitude to achieve more than the opportunities they are currently given in social, educational, and/or employment contexts. This phenomenological data was used to test alternative hypotheses about causal reasons for problematic behaviors in individuals with autism, and to determine the extent of evidence of perceptions by labeled individuals of a discriminatory social hierarchy in society, healthcare, and education towards disabled persons. To the extent that dehumanization often occurs toward individuals lacking reliable, normative speech and/or language, the results provide a basis for advocacy for communication as a basic human right. This study also aims to re-frame the language use around disabled persons, encourage action implicative discourse analysis directed towards healthcare professionals, speech therapists, and educators, where the needs of individuals with autism are being ignored, and raise awareness to the idea that de-stigmatization and successful integration of autistic individuals in a community require efforts by all those in society.

STREET TEAMS: GREATER LANSING FOOD BANK

Presenter: Keely Zeigler
Category: Communication Arts & Sciences
Time Slot: 10:15 AM
Room Location: Meeting Room A
Number: 612
Additional Student Presenters: Conor Kilpatrick, Emily Maze, Madelyn Darbonne, Ahmarea Covington, Ellie Striebich
Mentor: JeanaDee Allen

Street Teams are student-run, creative collaborations within ComArtSci. Interdisciplinary groups of students partner with nonprofit organizations and assist them with media projects. They have real-world learning opportunities while giving back to the community. This school year, Team

Golden, a Street Team, ran by 6 students, all communication based majors, worked alongside Greater Lansing Food Bank on a Street Team to help deliver them various media projects. These deliverables included updated information brochures, maps, handouts, and a video that presented their new food bank location.

STREET TEAMS AND LANSING ART GALLERY

Presenter: Grace Cyporyn
Category: Communication Arts & Sciences
Time Slot: 10:30 AM
Room Location: Meeting Room A
Number: 613
Additional Student Presenters: Julius Patto, Jennifer Rousseau, Nicoline Bradford
Mentor: JeanaDee Allen, Kaumudi Mahajan, Jonathan Whiting

Over the course of the Fall 2021 and Spring 2022 semesters, our small team of students from the Media Sandbox Street Teams organization worked with the Lansing Art Gallery to effectively achieve a list of deliverables that assist the gallery with their relocation. Our team name is Team Mantis, featuring 1 producer, 3 students, and 3 faculty advisors. Through weekly team meetings and monthly client meetings, our team began to apply many different strategies and creative tools to achieve a high level of quality in the work that was produced. The team worked to create a new fully virtual timeline of history for the gallery, collecting B-Roll footage and making a series of brochures. Working side by side with creative professionals and faculty mentors, our team received feedback on many of our creative endeavors and worked to make them the best that they could possibly be. Through this process, our team learned how to effectively communicate with a client, establish and apply a cohesive branding strategy to a variety of projects, and how to work well with other creatives. Throughout this school year, our team has immensely enjoyed the opportunity to connect with a client that is so integral to the culture of our local Lansing community. All in all, our team experienced the honor of creating some long-lasting tools for the Lansing Art Gallery to utilize for years to come. It was very special to be a part of the Lansing Art Gallery's history and this important time as they shift their brand to a new direction after a key physical location change.

BEN & JERRY'S ACTIVISM-INFUSED CAPITALISM: A CASE FOR CORPORATE SOCIAL ADVOCACY (CSA)

Presenter: Hailey Kenward
Category: Communication Arts & Sciences
Time Slot: 10:45 AM
Room Location: Meeting Room A
Number: 614
Mentor: Teresa Mastin

Ice cream is beloved by the masses, but how do people feel about ice cream with an agenda? Always an anomaly, Ben & Jerry's, incorporated in 1978, focused on activism-infused capitalism from inception. While churning out delicious flavors, the company stood up for their values, even naming ice cream flavors after causes they champion. Within ten years of their existence, they added a social component to their existing mission, which addressed economic justice, human rights, and environment justice. In this study, we examine traditional and social media coverage of Ben & Jerry's since its inception in 1978 to determine if the company was able to shape its media coverage narrative from an activism-infused lens. We aim to provide

insights regarding the value of corporate social advocacy from the perspective of Ben & Jerry's modeling activism-infused capitalism.

ABSENCE

Presenter: Zackery Garcia
Category: Communication Arts & Sciences
Time Slot: 11:00 AM
Room Location: Meeting Room A
Number: 615
Mentor: Amol Pavangadkar

A piece of artwork with an untold back story creates a not-so-happy holiday. This film brings light to the fear of being watched that is present with the existence of tracking technology all around us. Under Professor Amol Pavangadkar's teaching, I was able to see the process of creating a film from start to finish exploring everything from storyboarding to editing.

COMMUNICATION ARTS & SCIENCES
Film Presentations

COMARTSCI PRODUCTION PROMO

Presenter: Yesenia Zamora-Cardoso
Category: Communication Arts & Sciences
Room Location: Online Only
Number: 621
Additional Student Presenters: Daniel Pena, Zoe Fowlkes
Mentor: Amol Pavangadkar

Recognized as one of the largest and most respected communication colleges within the nation, the College of Communication Arts and Sciences in its mission to push the boundaries of discovery for communication art and science, encourages innovation in the way that people communicate and connect with one another in this quickly advancing world. Through a collection of short videos, the ComArtSci Production Promo explores the College of Communication Arts and Sciences and the various tools and resources that the college provides for its students, both within and outside of the classroom. Additionally, we highlight the new Digital Storytelling major, and demonstrate how it continues to enhance the previous Media and Information program, while providing the best information and learning experiences for its students. Through student, staff, and Alumni interviews, viewers are able to get a glimpse of the college as a useful learning and growing space where knowledge and skills can be both learned and applied, and how the tools learned within the college have prepared and assisted students for their future careers. As upperclassman filmmakers, with firsthand experiences of not only the classes, but of the resources that the college provides, we believe that we were able to provide the best insight on everything that the College of Communication Arts and Sciences has to offer. Through creating content for the college, which has molded us into the filmmakers that we are today, we were able to see how the college continues to further grow our knowledge and skills.

HIGHLIGHTING THE COLLEGE OF NATURAL SCIENCES

Presenter: Kailey Grooms
Category: Communication Arts & Sciences
Room Location: Online Only
Number: 622
Additional Student Presenters: Daniel Pena, Yesenia Zamora-Cardoso, Devin Davidson
Mentor: Amol Pavangadkar

As the largest college within Michigan State University, the College of Natural Sciences prepares students for careers in many different fields of science. NatSci at MSU strives to create a safe, diverse environment where students are able to learn using state-of-the-art equipment and have the opportunity to work one on one with some of the most qualified professors in the country. The college not only provides students with these opportunities but also continues to do cutting-edge research that will continue to push advancements in these different scientific areas. As the college continues to grow, both its students and the world benefit in many ways, which can be seen highlighted in this video campaign. As a team of upperclassman filmmakers who missed out on an entire year of hands-on learning, our team had to face the challenge of figuring out what production looks like post quarantine. This was many of our first times working with a high profile client and while at first this seemed very daunting, it turned out to be an extremely valuable opportunity to learn and grow as budding media content creators. The skills we learned and the knowledge we gained will not soon be forgotten and will without a doubt be taken to heart in our future careers.

YOU SHOULD HAVE USED A LYD

Presenter: Kailey Grooms
Category: Communication Arts & Sciences
Room Location: Online Only
Number: 623
Additional Student Presenters: Zoe Fowlkes
Mentor: Amol Pavangadkar

LYD is a fictional reusable coffee lid that is featured in this mock commercial campaign. For upperclassmen of the Filmmaking III Capstone, we were excited for the chance to finally be back in the classroom and working with other students and equipment again. As the crew set out to take our first swing at creating an advertisement, we did not realize how much work went into creating just a few seconds of content. From the original concept to the creation of our three commercials, we learned the fundamentals of what makes an advertisement successful. The more we learned about the immense detail that is put into making an effective commercial, the more we were thankful for the opportunity to try out this content style under the mentorship of our professor. As our first large group project since starting back in person post quarantine, it took us a moment to get back into the swing of working together as a film crew. Setbacks occur in every production, and we chose to look at each one as a way to learn and grow. The process was definitely one that taught us skills that we will carry over into our new careers after graduation.

NOT ONE WITHOUT THE OTHER: THE INTERSECTION OF CREATIVITY AND RESEARCH

Presenter: Mia Burghardt
Category: Communication Arts & Sciences
Room Location: Online Only
Number: 624
Mentor: Rabindra Ratan

SPARTIE-Cast is a series of conversations that highlights what the SPARTIE-Lab encapsulates regarding Social and Psychological Approaches to Research on Technology-Interaction Effects (SPARTIE). SPARTIE-Cast uses audio, video, and digital platform tools to convey important research findings on the Lab's unique topical areas such as avatar uses and effects and game studies. This provides an intersection of creativity and research, taking advantage of the beneficiary relationship between the mediums. SPARTIE-Cast's ultimate mission is to inform the public on SPARTIE-Lab's findings with creative, digestible, and entertaining methods.

WHY WON'T THEY WRITE GRAMMATICALLY?

Presenter: Ky Chimrak
Category: Communication Arts & Sciences
Room Location: Online Only
Number: 625
Additional Student Presenters: Apichaya Thaneerat, Juhua Huang
Mentor: Cheryl Caesar, Joyce Meier

Our team strongly believes that MSU can go beyond statistical diversity to ensure inclusion and equity in the classroom environment -- treating multilingual students fairly, being mindful of their varied cultural norms, and giving them the best possible opportunities for success. As a group of international students, we have created a series of short videos to stand for inclusion and equity, hopefully, reaching beyond an institution. The main purpose of the study is to heighten faculty awareness of the challenges that international students face in their learning. Our most recent video, "Why Won't They Write Grammatically?" challenges Eurocentric assumptions about "standard" and "native-speaker" English, and complicates grammar-only corrective responses to student writing. In this way, it questions views and practices of linguistic bias and promotes culturally-sustaining, asset-based pedagogies that support the richly diverse languages and cultures of MSU students.

CRIMINAL JUSTICE & LEGAL STUDIES
Poster Presentations

DELINQUENT YOUTH REOFFENDING TRENDS BY NUMERICAL AGE

Presenter: Casey Orr
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 801
Mentor: Erica Dalzell, Caitlin Cavanagh

In 2019, Michigan Governor, Gretchen Whitmer, signed into law 'Raise the Age' legislation that designated 17-year-olds as juveniles to be serviced by juvenile courts when appropriate. To better gauge what recidivism may look like among 17-year-olds', it may be helpful to examine reoffending by age among the population the court currently serves. The proposed study used data obtained through a longstanding court-research partnership to answer the question: does there appear to be a trend in reoffending by age? Results may indicate a drop-off or peak in reoffending by age, which may be useful for court planning and strategy.

IDENTIFYING ADJUDICATED YOUTHS? PRIMARY AREA OF NEED AND THE ASSOCIATION WITH RECIDIVISM OUTCOMES BY YOUTH SEX

Presenter: Karissa White
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 802
Mentor: Erica Dalzell, Caitlin Cavanagh

Researchers at Michigan State University have worked with juvenile courts for decades, diligently collecting and tracking data over time. The current project leveraged unanalyzed data to answer the questions: (1) was youth recidivism dependent upon a grouping variable of which identified an area of need (e.g. family or community needs) and was assigned to youth early in court-processing procedures, (2) did the effect vary between male and female youth? Results from the study have implications for the juvenile court we work with directly, those they serve, and practitioners who learn of the study and implement complimentary approaches in respective regions.

ARE MORE PROTECTIVE FACTORS OR FACTOR GROUPINGS ASSOCIATED WITH FEWER FUTURE COURT PETITIONS AMONG ADJUDICATED YOUTH?

Presenter: Maddie Allen
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 803
Mentor: Erica Dalzell, Caitlin Cavanagh

A common tool for decision-making injuvenile courts are risk assessments that assess youth for factors that put them at greater risk of reoffending or protect them future offending. While it may be assumed that greater protective factors are associated with reduced reoffending, without empirical inquiry it remains unknown for the sample. The present study asked the research question, is (1) any single protective factor or (2) grouping of factors (e.g. school or community) associated with reoffending among adjudicated youth? Results from the study will highlight protective factors that are particularly salient in the effort to curb repeated juvenile offending.

LA LOCA Y LA VICTIMA: AN ANALYSIS OF PENALIZING GENDER NON- CONFORMING PEOPLE AFTER DEATH

Presenter: Hailey Wood
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 804
Mentor: Christina DeJong

The United States experienced a record number of homicides against transgsender victims in the year 2020, six of which took place in Puerto Rico. Of the victims, five were trans women and one was a trans man. However, of the six victims, two did not fit into the traditional views of masculinity or femininity. Through the use of a storyline analysis and in-depth study of the language used by the offenders, the media, and the police in Puerto Rico, patterns indicate that these two victims specifically experienced high rates of deadnaming, misgendering, and victim-blaming. In this study, I analyzed how gender nonconformity (i.e., not taking on a defined gender) is stigmatized in society, particularly within the context of Puerto Rico through a case-study analysis and exploration of literature related to the stigmatization of gender nonconforming trans individuals. Using the framework of hetero-cis-normativity, I explored how hetero-cis-normative biases may explain why negative attitudes toward trans individuals vary, specifically for those that do not fit within gendered categories.

FACTORS ASSOCIATED WITH FLORIDA YOUTH RISK PROTECTION ORDERS

Presenter: Hana Al Aifan
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 805

Additional Student Presenters: Anna Molnar
Mentor: April Zeoli

Extreme Risk Protection Orders (ERPOs) are temporary restrictions on an individual's ability to possess or purchase firearms. Because of their preventative nature and ability to be placed on individuals of all ages, ERPOs can be used to decrease rates of gun violence and suicide by firearm across the country. We sought to better understand how courts in the state of Florida are using Risk Protection Orders and analyze what factors are associated with juvenile ERPOs being granted. We obtained Florida ERPOs from a public records request and data were abstracted via a data collection instrument. We performed simple logistic regressions to

examine the relationships between granted final ERPOs and a multitude of variables. We also dissected narratives of the petitioning officers in granted ERPO affidavits and performed a content analysis to determine patterns among granted juvenile ERPO cases. Our findings suggest that an ERPO is one of the many ways that help keep juveniles from engaging in life-altering behaviors. ERPOs contribute to preventing access to firearms for at-risk individuals and encourage mental health evaluations, as well as substance abuse treatment. Although juveniles cannot legally purchase firearms, they can still access them and present harm to themselves or others. The content analysis of granted ERPO affidavits confirmed that a considerable number of juvenile respondents had access to a firearm in their immediate household. The function of ERPOs is to reduce firearm violence and prevent tragedies, and our findings support that intent.

WOMAN FACING THE BOARD: WOMEN'S EXPERIENCES GOING UP FOR PAROLE

Presenter: Kayla Susalla
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 806
Mentor: Kaelyn Sanders, Merry Morash

Prior studies on parole focus on the parole board's vantage point rather than the person going up for parole. However, when justice-involved individuals' experiences are explored, it is typically confined to two areas. The first being during the hearing, and the second being post-parole release. Less is known about the first-hand preparation justice-involved peoples undergo for their hearing and their reflections on the experience especially for women. Using qualitative research methods, the current study addresses this gap by exploring justice-involved women's parole hearing preparation, experiences during the hearing, and reflections after.

THE ROLE OF INTIMATE PARTNER VIOLENCE IN TRANSGENDER HOMICIDES

Presenter: Caitlin Ziesmer
Category: Criminal Justice & Legal Studies
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 807
Additional Student Presenters: Andrea Kimmel, Alicia Gonzalez
Mentor: Christina DeJong

The role that intimate partner violence (IPV) plays in homicides has been studied extensively, but it is unclear to what extent IPV helps explain the homicide of transgender individuals. In this analysis,we assess the motives of transgender homicides in the United States and determine whether IPV-related homicides are more or less common than in cisgender homicides. We also review the current literature and make recommendations for reducing rates of IPV-related homicides for transgender as well as cisgender people.

DIVERSITY AND INTERDISCIPLINARY STUDIES
Poster Presentations

SOCIAL BELONGING INFLUENCES ON GENDER AND RACIAL GAPS WITHIN STEM MAJOR CHOICE

Presenter: Kerrington Curl
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1001
Mentor: Amanda Chuan, Andrew Johnson

Current statistics show there is a gap in representation among STEM majors for women and students of color within American colleges and universities. Although women outnumber men in college enrollment, existing research shows declared STEM majors among women are at lower rates than men. Prior studies report choice plays a large role in undergraduate STEM experiences rather than innate ability differences, this emphasizes the influence sociocultural factors, specifically, a lack of social belonging, have in regards to STEM major declaration among women and students of color. Students' sense of belonging is affected by the quality of their relationships with their peers, faculty, and role models, as well as their sense of their own ability. Students part of underrepresented backgrounds, e.g. women and students of color, within their academic domain, e.g. STEM, may face negative stereotypes and are more likely prone to a threatened sense of belonging. This study consists of survey data analysis regarding students' major choices and their attitudes regarding the roles of peers, their gender identity, and their racial background in their major choices. It is hypothesized this survey data will present a relationship between a lack of social ties and STEM major declarations. The analysis of this relationship will signify the importance of these sociocultural aspects and how they affect students' performance in their classes.

THE UNTOLD TRUTH ABOUT WOMEN IN SPARTA

Presenter: Jihyeon Moon
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1002
Mentor: Noah Kaye

"Spartan" - the first thoughts, when many people hear this word, will probably be adjectives such as strong, warlike, and patriotic. However, most of these ideas describe courageous men who were part of the war, more than viewing the Spartan population as a whole. Just then the men who were believed to have a bigger role in Sparta, to learn more about the other population that was also significant, I studied the roles, social status, and views on Spartan women. Given the opportunity, I was able to study multiple special collection books from MSU that were written before the 19th century and was able to compare the unique views and interpretations on Spartan women based on different authors.

OUT OF SIGHT, OUT OF MIND: EPISTEMIC EXCLUSION OF PEOPLE OF COLOR ACROSS STEM DISCIPLINES

Presenter: Lexi Nadolsky
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1003
Additional Student Presenters: Arika Hawkins
Mentor: Kendra Cheruvelil

Epistemic exclusion, or the devaluation of one's research and credibility by peers in their field, is known to be experienced in academia, especially among scholars of color (SOC). Its effects can have substantial impacts on the recruitment, retention, and advancement of SOC. As SOC are vastly underrepresented in academia, evidence supports that scholarly devaluation adds to their experiences of negative workplace climate and other barriers to success and career progression. We examined the experiences of workplace climate and epistemic exclusion for academics. We conducted a national survey of N=3,585 early-career scholars (graduate students, postdocs, and assistant professors) in 124 STEM departments in the fields of biology, physics, economics, and psychology. We hypothesized that SOC in academia would experience greater epistemic exclusion than white academics, and that the experiences would be different across the four fields. We found that SOC had significantly worse experiences of epistemic exclusion than did White scholars, as did those in economics compared to the other fields. Additionally, we found that individuals who experience more epistemic exclusion were more likely to be involved in community-engaged research and outreach. Our research fills a knowledge gap about the epistemic exclusion that is propagating the underrepresentation and devaluation of SOC's work in academia and decreasing SOC's scientific advancement. We discuss broadly howepistemic exclusion can be addressed in academia.

MSU SCIREVIEW: AN UNDERGRADUATE SCIENCE JOURNAL AND CLUB

Presenter: Natalie Spence
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1004
Additional Student Presenters: Lillian Young, Olivia Wheeler
Mentor: Margaret Petroff

Science literacy rates are low in the general population of the United States. Members of the general public who are not involved in disciplines in the sciences struggle to understand scientific information and concepts due to barriers such as complex jargon and the scarcity of open access journals. Conversely, scientists often fail to convey their knowledge to the general public in ways that are concise and understandable. These and other factors cause inequities in access to scientific knowledge. Through MSU SciReview, undergraduate students help scientific literacy rates grow on MSU's campus and beyond by providing an online scientific journal that is free to access for everyone. Students involved with SciReview are encouraged to write a research literature review article for the journal, and members are taught scientific reading, writing, and analytical skills. Professors from MSU's campus also volunteer as guest

speakers to further educate members on the art of science writing and communication. Members also engage in discussing current research around MSU to promote scientific conversation. MSU SciReview is committed to making scientific information accessible and digestible to members of all communities in hopes of increasing scientific literacy and involvement on the MSU campus.

EVALUATING THE EFFECTIVENESS OF BLIND RECRUITMENT: MINIMIZING INEQUITY IN JOB CANDIDACY

Presenter: Aylasia Steen
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1005
Mentor: Stacy Hickox

In today's society, discrimination is still a prominent issue that stigmatizes minorities distinctly in the workforce. During the application process, employers reject applicants based on factors such as name or address that coincide with a particular minority group. This type of screening has led to high unemployment rates in minority communities and shows the lack of value for diversity and inclusion amongst the workplace. After becoming better informed and paying closer attention to discriminatory hiring practices with significant negative impact on minorities, some employers are starting to be better informed about the dishonorable hiring techniques that are being exhibited against minority applicants. Some of these employers are implementing blind hiring as a means to reducing bias against protected classes and promoting diversityand inclusion. This paper will examine the effectiveness of blind hiring in promoting diversity and inclusion by first reviewing the social science and business literature related to blind hiring practices. The paper will then conduct a review of lawsuits involving hiring practices to analyze hiring where discriminatory intent is established and to determine whether blind hiring practices are an effective answer to resolving discriminatory hiring practices and advocating diversity, equity, and inclusion for minority applicants. Furthermore, there will be an exploration of suggestions on how to reduce discrimination in hiring practices.

FEMINIST COMMUNITY ENGAGED RESEARCH DISRUPTED: REFLECTIONS ON THE PROCESS OF A LEARNING COMMUNITY

Presenter: Ashley Strong
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1006
Mentor: Chelsea Wentworth

Feminist Community Engaged Research Disrupted is a learning community aimed at developing strategies for continuing and adapting feminist community engaged research projects through disruptions such as pandemics, natural disasters, and civil unrest. Over the course of the community's monthly meetings, discussions evolved to include questions about how feminist scholars label their work, unexpected consequences of community engaged research, and what it means to respond to disruptions from a feminist space. Discussion topics were chosen democratically by members of the learning community, and conversations were

held in a semi- structured format drawing from a bank of literature compiled by members of the community. In this way, the group embodied the values of feminist community engaged research discussed. The development of ideas in the community was recorded in the form of an infographic, as infographics are free to make and easy to understand, making them an accessible medium for research communication. This infographic was used not only as a record of information, but as a tool for reflecting on past conversations as they relate to current ideas. By using this infographic as a reflection tool, we were able to identify gaps in knowledge and pinpoint the ways in which new ideas emerged. The visual format of the infographic allowed us to draw parallels between similar but previously unconnected ideas. This poster presents a process of using an infographic for communicating, reflecting, and analyzing feminist community-engaged research.

FOREIGN HOUSE

Presenter: Siham Abdallah-Hassan
Category: Diversity & Interdisciplinary Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1007
Additional Student Presenters: Delia Bechmann, Zyair Clark, Katarina Keeley
Mentor: Paul Jaques, Lori Fischer, Christopher Sell

In a world full of humans, we are lacking humanity. We fail to accept people for who they are and create so many boxes and labels and judge them when they do not fit into those categories. Foreign House, founded by Siham Hassan, was established to promote diversity and inclusion by creating a community of artists and content creators who come from various backgrounds to change the narrative within social media and the communities we live in. Today Foreign House has over twenty content creators and artists with different skill sets ranging from music, dance, comedy, art, and more. Our creators represent more than ten countries. With the combination of our artists statistics, Foreign House has over one million Instagram followers combined and over 8.5 million TikTok followers combined. Through its diversity, Foreign House brings different communities together and celebrates diversity while empowering everyone to be their authentic selves. Foreign House's purpose is to ensure that our artists and the communities we serve are seen, heard, represented, and empowered through the different connected services that we offer.

EDUCATION
Poster Presentations

THE EFFECT OF EARLY LIFE GROWTH-RESTRICTION ON MOTOR MILESTONE DEVELOPMENT

Presenter: Megan Thorn
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1101
Additional Student Presenters: Aaron Etelamaki
Mentor: Eric Leszczynski, David Ferguson

Early life growth-restriction reduces physical activity engagement in adulthood, which increases the risk for chronic disease. While multiple factors regulate physical activity engagement, stunted neuromuscular development, initiated by early life growth-restriction, could contribute to this reduction in physical activity. The purpose of this pilot study was to examine the effects of early life growth-restriction on motor skill acquisition and to test the effects of an early life motor intervention on neuromuscular development in this at-risk group. To induce early life growth-restriction, experimental pups nursed from dams fed an isocaloric (8% protein) diet for the first 21 days of life. Control pups nursed from dams fed a normal (20% protein) diet. Motor skills were tested using surface righting, cliff aversion, and limb suspension tests at various points throughout development, video-recorded and scored with two independent researchers using Datavyu software. On days 10-21, half of the pups were prescribed a motor intervention that facilitated continuous voluntary movement. Growth-restricted mice displayed significant reductions in forelimb strength and trunk/postural control ($P<0.05$). At PN12, the motor intervention group displayed significant improvements in forelimb suspension time as compared to the sedentary group ($P=0.0407$). Early life growth-restricted mice display significant neuromuscular impairments, specifically in forelimb strength and trunk/postural coordination. The submaximal motor intervention significantly improved front limb suspension times. In conclusion, future studies should examine if these improvements in motor skills result in an increase in adulthood physical activity engagement.

ANALYSIS OF COMPUTATIONAL-BASED FORMATIVE FEEDBACK

Presenter: Tyler Stump
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1102
Mentor: Daryl McPadden, Paul Irving

The updated Next Generation Science Standards place an emphasis on computational integration into science classrooms through the inclusion of mathematics and computational thinking however, research focused on understanding the impacts and methods of computational integration is still in its infancy. Important questions around activity design and assessment remain unanswered and understudied. In this paper, we present an initial case study of one classroom that integrates computation into a second semester, introductory level physics class. The course instructional staff use formative feedback as an assessment tool to both evaluate students and help them develop computational practices. Instructor feedback for several years was coded for repeating trends, resulting in 3 categories of feedback: praise, notice and suggestion. An examination of the data revealed that the feedback is helping to develop positive norms around collaborative computational practices, but little attention is paid to the development of computational thinking practices.

EARLY PANDEMIC RESPONSE AND REMOTE TEACHING PREPAREDNESS OF MICHIGAN TEACHERS

Presenter: Brooke Barendsen
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1104
Mentor: Eric Hunter

Prior to Spring 2022, utilization of online instruction was primarily for supplemental support or special courses. In response to COVID-19, educators had to make a quick transition to online instruction regardless of previous experience. Using the Teachers4Reasearch pool, teachers across Michigan responded to a Spring 2020 survey regarding pandemic related instructional changes. Of the 476 respondents, educators were underprepared with only 38.655% having received prior training. Teacher responses will be discussed in light of the range of tools and online platforms tried and adopted for synchronous/asynchronous communication as well as to provide content. Through the chaos of early COVID-19, Michigan educators showed resilience and innovation in responding to the restrictions as well as provided insights on good practice during remote learning.

CULTIVATING CURRICULUM AND CONNECTIONS IN COSTA RICA: PART 1

Presenter: Casey Christy
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1105
Mentor: Brian Egan

The presenters plan to travel to Costa Rica in July/August to implement their experiential learning curriculum on environmental issues and sustainable practices. The partnership will be between ADESSARU, Visionarios de Paz, and MSU students from the First-Year Seminar Abroad (FSA) program. This poster presentation will outline the process of creating an experiential and environmental curriculum that will serve youth members of the Palmichal community and FSA students while showing how it could be a model for future community engagement and education abroad experiences. The collaborators share a vision to create a better world through meaningful engagement and genuine connections. At the core of the partnership, Mauro carries knowledge on community and sustainability, especially as a member of Palmichal community organizations and a university student in human ecology. Brian carries knowledge on experiential learning, specifically the impacts of experiential learning on education abroad. Finally, Casey carries an arts and humanities approach and skills in the documentation and dissemination of knowledge. Each member of the team has their own stories that are embedded into this project, which manifest themselves in unique and complementary skill sets and goals. This project emphasizes three things: 1. Sustainable global collaboration between MSU and rural communities is possible even during the many planetary crises of the 21st century, 2. Education Abroad experiences can become more meaningful when the curriculum is created in collaboration with the partnering community, and 3. The importance of local and rural knowledge on topics of the environment and sustainable practices.

UNDERGRADUATE STUDENT ERROR DETECTION IN BIOLOGICAL MODELS

Presenter: Gabriella Cuenca
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1106
Additional Student Presenters: Josh Marwede, Hannah Ahmed
Mentor: Tammy Long

Modeling-based learning (MBL) in biology engages students in constructing, evaluating, and revising models of biological systems and phenomena. Prior research has shown MBL to be an effective strategy for engaging diverse learners and reducing achievement gaps. Some studies suggest a disproportionate benefit for middle-achieving students in long-term conceptual retention. This study is part of a broader collaborative effort that aims to identify a mechanism that can explain relationships between MBL and long-term learning. Students' ability to detect errors is a core modeling skill and can be used as a measure of concept mastery. When detecting errors, students must recall prior knowledge and apply it to an existing representation. In this study, we analyzed the error detection capabilities of students (n=200) in a model-based introductory biology course. Interviews were conducted via brief video recordings using the online learning tool, Flipgrid. Each student evaluated nine models presented as correct or incorrect versions. Student responses (n=1800) were transcribed and coded for students' abilities to: (1) detect intended errors, and (2) justify their claims about model errors. Our preliminary results suggest that most students can identify intended errors, but some also perceived additional unintended errors in their responses. Biological concepts misrepresented in media can lead to misunderstandings and confusion. Our research provides evidence about students' capabilities detecting errors in biological models and can inform the design of instruction that further develops their skills in evaluating representations.

ASSESSING WRITING IN CHILDREN WHO USE AFRICAN AMERICAN ENGLISH: THE IMPACT OF A CULTURALLY RESPONSIVE SCORING APPROACH IN GRADES 3-4

Presenter: Sam Bourgeois
Category: Education
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1107
Additional Student Presenters: Ellie Friedman
Mentor: Lindy Johnson, Adrea Truckenmiller

African American English (AAE) is a rule-governed dialect system that is spoken with variable density by African American adults and children in the United States (Washington & Craig, 2002; Fitton et al., 2021). It is a variety of, but neither a deficiency nor degradation of, mainstream American English (MAE), which is most often taught in classrooms and seen in print (Johnson et al., 2017). Recent literacy research has focused on how AAE is treated in standardized scoring processes; students who use AAE "may be penalized unfairly on assessment and instructional measures that examine their literacy abilities" (Horton-Ikard & Pittman, 2010). The current study assesses student writing through Correct minus Incorrect

Word Sequences (CIWS), a standardized, sequence-based writing scoring method that detects word and sentence-level errors. However, speakers of MAE may mark allowable AAE syntax and grammar rules as incorrect when scoring with CIWS. In order to evaluate this dialectical disparity, we will be scoring informational writing for students in grades 3 and 4 using a culturally and linguistically responsive approach, one which accounts for students' use of AAE, and examining its impact on standardized writing scores. The goal of this research is to not only quantify possible scoring discrimination but also offer instructional tools for educators to account for dialectical diversity in their classrooms. We will also explore how our findings can be used to inform the ongoing construction of the Writing Architect, a web-based instrument developed to bridge the gap between student writing skills and instructional decision-making.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS Poster Presentations

SOYBEAN-DERIVED PHOTOPOLYMER RESINS: CHARACTERIZATION OF SURFACE AND BULK PROPERTIES

Presenter: Allison Huckins
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1201
Mentor: Caroline Szczepanski

Bio-sourced and biobased polymers are of interest for the development of sustainable materials. Currently, petroleum-based polymers are employed in many materials applications. However, environmental concerns associated with their degradation or incineration, potential cross-contamination during recycling, as well as consumer toxicity risks are problematic. Bio-sourced polymers may reduce these risks and be an alternative platform to address these challenges. Soybean-derived polymers, made from acrylated soybean oil, are one example of bio-sourced alternatives to explore for emerging applications. However, due to their complexity and the long hydrocarbon tail on the repeat unit, the impact of integrating soy-bean derived polymers with other entities is not yet fully understood. In this work we show the impact of integrating soybean-derived monomers into photopolymer resins. Using Fourier-transform Infrared Spectroscopy (FTIR) we characterized the kinetics of polymerization of the soybean derived photopolymer resins. We also investigated thermochemical behavior via dynamic mechanical analysis (DMA) and determined contact angle and surface properties using a goniometer. With these analyses we aim to better understand the properties of acrylated soybean oil polymer systems formed via photopolymerizations. Similar platforms are used in many coating applications, so identifying how we could introduce bio-sourced materials would have a major impact as polymers derived from soybean oil are more abundant, stable, and sustainable. Future and ongoing work is looking at further understanding how acrylated soybean oil can function as a polymer platform, with the overarching goal of integrating these materials into high-use applications.

A COMBINATORIAL PAINTING GAME

Presenter: Adrian Self
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1203
Additional Student Presenters: Uzair Mohammed
Mentor: Robert Bell, Richard Edwards

Combinatorial game theory (CGT) is the study of combinatorial games, which are turn-based games with perfect information. On each turn, a player makes moves to affect the game state until a winning or losing state is achieved. Examples include checkers, chess, and tic-tac-toe. CGT has been extensively studied in experimental math and was inspired through the solution to Nim in 1902 by Charles Bouton. It has connections to computer algorithms, complexity theory, number theory, and surreal analysis. The field concerns itself with finding a full or partial solution to a particular game and exploring its connections to other areas of math. We introduce the game "Convolutional Painting". The game starts from a 1 by n array of cells initialized at zero, each of which can store a binary value. Each player begins by painting a target state for the array. On their turn, the player selects a function that determines the value of each individual cell in the array based on its neighboring values. This function is applied to every cell in the array. After a set number of plays, the player whose target state is closest to the game state wins. We explore this and possible higher dimensional generalizations of this game. We study the properties of this game, including evaluating strategies for play and considering relations to other games and problems. We build on the body of work in CGT by applying established methods of analysis to this game.

SIMULTANEOUS CONTROL OF MULTIPLE HIGH LOAD LINEAR ACTUATORS

Presenter: Nathan Kowalski
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1204
Mentor: Tamara Bush, Justin Scott

Controls is the process of managing device behavior using input commands and sensor feedback. It is essential in a multitude of applications, from in-home appliances to cars to airplanes. Linear actuators are an example of devices that require specific controls to be used effectively in products. However, powering high-load linear actuators presents multiple hurdles as the internal mechanisms can place a large strain on the power source and hardware components. These challenges only compound when controlling multiple actuators with the same system. In this research, I sought to control multiple high-load feedback linear actuators bidirectionally, safely, and simultaneously using a Raspberry Pi. The goal was to create the system to be low-cost, with actuators moving to specified distances when coded to do so. To accomplish this, a circuit was created using 12 V batteries, relay switches, a step-down converter, and a Zener diode that allowed the Raspberry Pi to start, stop, and choose the direction of the actuator by giving specific commands through its GPIO ports. Within its software, the Raspberry Pi monitored the movement of each actuator concurrently by utilizing

multithreading, such that each command spawned a new process that facilitated the movement of the actuator. The system successfully moved multiple actuators simultaneously without high-cost equipment. To test this, two motors were wired to the system and could follow distinct commands at the same time. In its totality, this design presents a building block for which multiple actuators could be added and controlled with specificity and ease.

ANALYZING THE MICROSCOPIC STRUCTURE OF BUTTERFLY WINGS USING SCANNING ELECTRON MICROSCOPY

Presenter: Marvins Joseph
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1205
Mentor: Carl Boehlert

Butterflies are one of the most unique insects belonging to the lepidoptera group. Their wings are covered with thousands of tiny scales overlapping each other in rows. These scales depending on the species come in many different colorful designs which act as protection against predators like birds and spiders by allowing them to camouflage themselves in their surroundings. For this project I intend to use a scanning electron microscope (SEM) to analyze the microscopic structure of different butterfly wings to discover how the scales are connected and work together to give them their amazing camouflage abilities. For the sample preparation I plan to dehydrate the wings through air drying to remove all the water and coating the wings to get a better image of the scales.

CLASSIFICATION OF ION SIGNALS: MACHINE LEARNING REVEALS MASS OF INDIVIDUAL ISOTOPES

Presenter: Walter Kretzer
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1206
Mentor: Ryan Ringle

Understanding the fundamental properties of rare isotopes has applications throughout the scientific community, from nuclear astrophysics to fundamental interactions of particles to the medical industry. This project seeks to generate a system capable of identifying the exact masses of numerous rare isotopes. To find these masses, a Single Ion Penning Trap (SIPT) reads electrical signals from ions as it spins around an electrically accelerated vacuum chamber. The signals were converted to individual events via a Fourier transform, then the signals were sorted into groups comparing the signals to a set of test data. This data was run through python-based machine learning algorithms, including Gaussian Naïve Bayes, KNN, SVM, and neural networks. Through variation of parameters and comparisons of each method's ability to correctly identify signals, the Naïve Bayes algorithm was implemented to identify these signals. The results of this algorithm can be used to calculate the mass of isotopes generated in the FRIB. The presentation will include a poster and short verbal explanation detailing an overview of the project and details of the machine learning algorithms.

UNDERSTANDING QUANTITATIVE MICROBIAL RISK ASSESSMENT: APPLE STORAGE CASE STUDY

Presenter: Tyler Stump
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1207
Mentor: Jade Mitchell

The United States Department of Agriculture (USDA) has identified Michigan in the top 10% of apple production in the United States allowing for the Michigan Department of Agriculture & Rural Development (MDARD) to have established laws and regulations around the controlled storage atmosphere of fruits and vegetables, including apples. (1,2,). Despite these regulations Listeria monocytogenes continues to be prevalent within the agricultural production environments. (3). L. monocytogenes continues to have microbial virulence factors, such as the production of biofilms, and therefore poses human health risks to both the general population and several more susceptible subpopulations. In an effort to develop and communicate risk management practices around current apple storage practices, a Quantitative Microbial Risk Assessment will be performed to quantify the risks associated with contamination of L. monocytogenes. Quantitative Microbial Risk Assessment (QMRA) modelling is a well-established tool for food safety that addresses exposure to microbial hazards. The process integrates data on models across the farm-to-fork pathway to quantify and predict potential health risks associated with illnesses such as listeriosis. Parameters such as bacterial attachment rates, removal rates during washing, transfer rates during processing, inactivation and growth rates during transportation and storage along with associated durations such that quantities of Listeria spp. may be predicted for each handling practice. A conceptual model will be presented including the apple processing and handling practices in order to identify critical control points within the exposure pathway for sampling measurements and data needs from the peer reviewed literature to develop the QMRA.

PROCESS CONTROL EXPERIMENT USING AN ARDUINO BOARD AND LED LIGHTS

Presenter: Ryan Atkison
Category: Engineering, Computer Science, & Mathematics
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1208
Mentor: Maddalena Fanelli

In this study we focus on designing, assembling, and running a simple control system using an Arduino Uno R3 microcontroller board. The system involves controlling the light level in a small box. An LED and a photoresistor are placed on opposite sides of the box. A second light is added to the box, underneath the first light. This second light is independent of the control system and acts as a disturbance. The control system is run by MATLAB Simulink. The system was assembled, the controller was tuned, and the process was tested. The brightness of the light inside the box was controller to achieve a desired set point. During this testing, the secondary light was manually adjusted in Simulink and the response of the control system was observed. This simple, low cost, hazard-free system can be a first hands-on introduction to process control,

allowing students to familiarize themselves with controller boards and put to practice principles they can apply to other small or large-scale processes.

VISUALIZING THE DISTRIBUTION OF PRIME NUMBERS AND THE RIEMANN HYPOTHESIS

Presenter: Colin Davidson
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1211
Additional Student Presenters: Wei-Jie Zhou
Mentor: Preston Wake

The Riemann Hypothesis is a longstanding theory that relates the distribution of prime numbers to the series known as the Riemann-Zeta Function. Throughout the semester, we used techniques such as elementary number theory and proof writing to visualize the distribution of prime numbers and the Riemann Hypothesis. The research poster consists of graphs made using SageMath and proofs written using LaTeX, and explain important concepts of the distribution of prime numbers throughout history, from Euler's prime number theorem to Yitang Zhang's results for the gap between the prime numbers.

EFFECTIVE FIELD DATA COLLECTION STRATEGIES TO EVALUATE DRIVER RESPONSE TO TRAFFIC CONTROL DEVICES

Presenter: Myles Overall
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1212
Mentor: Timothy Gates

Data collection is one of the most crucial parts when evaluating driver behavior. Primary data (data collected by the research team out in the field) is preferred to secondary data (data collected by surveys, etc.) due to being more accurate, focused to the point, and more up to date. Two methods of primary data collections that were performed involved using a series of stationary camera setup or a series (sometimes singular) of LIDAR setups which both allow for driver's speeds to be analyzed when regarding a traffic control device. The stationary camera method, which involved setting up 1-5 cameras along a stretch of road, allows for speeds to be recorded from each camera setup and then analyzed to see the increase or decrease in speed. The benefit of this approach is that drivers are not being impacted by cameras on the side of roads as they are out of site which allows for an accurate measurement of the speeds and the drawback being that there are only as many data points as there are cameras. The LIDAR setup allows driver speeds to be analyzed along an entire profile with up to an infinite amount of data points per LIDAR. This allows a speed profile to be constructed giving a better understand of accelerations and decelerations when reacting to traffic controls devices. While both approaches have their benefits, the decision on when to use either is dependent on the site conditions and the objective of the project.

ORIGINS OF ULTRALOW THERMAL CONDUCTIVITY IN KAg2SbS4

Presenter: Bonnie Stolt
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1213
Mentor: Sevan Chanakian

Thermoelectric (TE) technology converts heat to usable electricity, making these devices promising candidates for renewable energy applications. To make this technology viable for applications such as waste heat recovery for manufacturing processes or car engines, the efficiency of TE devices need substantial improvement. One means to achieve this is to improve the materials' thermoelectric conversion efficiency. Promising thermoelectric materials have high electrical conductivity and low thermal conductivity. This poses a challenge, as thermal conductivity has an electronic component, thus increased electrical conductivity is often coupled with increased thermal conductivity. Complex diamond-like semiconductors (DLSs) are a prominent class of electronic materials which exhibit high electronic conductivity. DLSs are modified versions of the basic diamond crystal structure. Recently, there have been reports of mercury-containing DLSs that exhibit low thermal conductivity while maintaining high electronic conductivity. This sparked an interest in research into DLSs as potential thermoelectric candidates. Here, we investigate the thermal properties of the DLS quaternary compound KAg2SbS4, which forms in a distorted stannite structure. This compound was selected for its anomalously low thermal conductivity from a high throughput computational screening. We experimentally confirm the ultralow thermal conductivity computational prediction through the synthesis and characterization of KAg2SbS4 and work to understand the origins of this behavior through an analysis of the experimental elastic tensor properties.

NUMBER THEORY AND CRYPTOGRAPHY

Presenter: Lily Baker
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1214
Additional Student Presenters: Joon Chung Yoon
Mentor: Olga Turanova

We will present several examples of real-world encryption systems, such as ciphers and RSA encryption. Cryptography is an important practical application of number theory, which involves understanding features of prime numbers as well as modular arithmetic. As part of our research project, we implement some encryption algorithms in Sage. Our poster will include the theoretical underpinnings of these algorithms.

LOW-TEMPERATURE PLASMA SYNTHESIS OF GROUP III-NITRIDE NANOCRYSTALS

Presenter: Chloe Ho
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1215
Additional Student Presenters: Dalton Dobyns
Mentor: Rebecca Anthony

Semiconductors have found near ubiquitous use in the modern era. Group III-Nitrides in particular are promising in electrical and optical applications in part due to their thermal and mechanical stability. Synthesizing these semiconductors as nanoparticles allows the properties to be tuned through variation of the particle size, most notably the tunability of the bandgap. For our experiments we used a non-thermal continuous flow through plasma reactor with the constituents in gas phase. The metal precursor gases were trimethylindium (TMIn) or trimethylgallium (TMGa), ammonia (NH3) as a nitrogen source, and argon was supplied as a background gas. To ignite the plasma, a radio frequency power supply and a matching network were used to deliver power to the reactor through three ring electrodes encircling a quartz tube. Nanoparticles were collected at the exit of the reactor through inertial impaction of the particles onto various substrates such as a glass slide. Fourier-transform infrared spectroscopy (FTIR), transmission electron microscopy (TEM), and X-ray Diffraction (XRD) were used to characterize the nanoparticles' physical properties. With FTIR surface groups containing indium or gallium, nitrogen, carbon, and oxygen were observed. XRD and TEM analysis demonstrated the presence of crystalline InN or GaN particles with diameters less than 10 nm. The results of these experiments indicate that synthesis of GaN and InN nanoparticles via a nonthermal plasma reactor is achievable. Future work includes alloying GaN and InN for further tunability of properties and performing optical and photocatalytic measurements to confirm functionality.

A GENERAL NLP APPROACH TO AUTOMATICALLY INTERPRET GENE LISTS BASED ON THE LITERATURE.

Presenter: Matthew Artuso
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1216
Mentor: Arjun Krishnan

In computational biomedicine research, researchers frequently investigate genes related to complex diseases, traits, and disorders. Using computational models, researchers either score all available genes or develop a list of significant genes based on their relation to a trait. Difficulty arises when interpreting these generated lists or rankings. Usually, researchers manually scour the literature to make sense of these predictions. However, this process is inefficient and subjective. Here, we present a method to automatically annotate and describe gene lists using available biomedical literature. By leveraging the PubMed Entrez API, we retrieve a list of publications related to genes and ontology terms and use these to compute correlations between genes and terms. These correlations are then utilized to map ontology

terms to newly inputted genetic data. We demonstrate that this method captures signals from a variety of sources, including disease-gene prediction scores, genome wide association studies (GWAS), and single-cell transcriptomics.

MANIPULATION OF NANOCERIA VALENCE STATE AND ITS EFFECTS ON ANTI- INFLAMMATORY EFFICACY

Presentation: Ian Carley
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1217
Mentor: Taeho Kim

Cerium oxide nanoparticles (<5 nm) with mixed-valence states (Ce3+ and Ce4+) are attractive biological redox-active agents (Xu et al. NPG Asia Materials 2014, 6, 90). Albumin-nanoceria, composed of cerium oxide coated in albumin proteins, when administered into the rheumatoid arthritis animals, exhibited strong anti-inflammatory effects (Kalashnikova et al. Theranostics 2020, 10, 11863). These nanoparticles exhibit enzymatic behavior mimicking SOD, catalase, and peroxidase, which allows them to remove O2- and OH- associated with inflammatory response and cell death (Soh et al. Angew. Chem. Int. Ed. 2017, 51, 11039). The ROS scavenging particles demonstrated reduced pro-inflammatory M1 and increased anti-inflammatory M2 macrophages (Zeng et al. Angew. Chem. Int. Ed. 2018, 57, 5808). In this study, we intend to elucidate Ce3+/Ce4+ ratios of nanoceria on alteration of phagocytes polarization. Albumin- nanoceria were synthesized via in situ bio-mineralization method with attendance of hydrogen peroxide and ammonium hydroxide. Transmission electron microscopy (TEM) revealed uniform small-sized crystalline nanoceria. The particles' surface oxygen vacancy was determined by using X-ray photoelectron spectroscopy (XPS). Using flow cytometry, we were able to quantify the anti-inflammatory effects of the particles by measuring the amount of CD80 and CD206 present on the surface of the cells, which mark pro-inflammatory M1 and anti-inflammatory M2 macrophages, respectively. We found that the phenotype change of M1 and M2 macrophages were affected by the particles' ratio of Ce3+/Ce4+. Cells treated with nanoceria with elevated Ce3+/Ce4+ exhibited enhanced anti-inflammatory efficacy.

CRYSTALLIZATION OF LARGE, HIGH QUALITY, SINGLE CRYSTAL ERBIUM CHLORIDE

Presenter: Nathan Jansen
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1221
Mentor: Shannon Nicley

Superconducting qubits have been used in recent years for many impressive demonstrations of quantum computing, however one of the largest issues with this platform is that long distance communication between potential superconducting qubit nodes by microwave photons would require a cryogenic channel, and therefore a conversion of this microwave photon to an optical photon would be required. Due to its electronic structure, Erbium (Er) in a

high-quality single crystal can potentially be used for microwave to optical transduction required for this transfer. While Er-doped materials such as yttrium orthosilicate (YSO) or yttrium fluoride (YLF) are commercially available, the Er-concentrations in these materials are limited to low levels by the increasing strain in the crystal with increasing doping, which hurts the performance. The interaction strength of the material with both the microwave and optical photons would be increased by higher levels of Er, and therefore we seek to grow crystals based on ErCl3, to form crystals with high Er concentrations without the drawback of high strain. This presentation describes the development of hydrated Erbium Chloride crystal growth from an aqueous solution. A chemo-mechanical process exploiting the mild solubility of these crystals in ethanol was then developed for polishing these crystals into optical quality plates was. As a result of this research, high quality Erbium Chloride crystals have been prepared for further research in quantum applications.

EXPERIMENTAL CHARACTERIZATION OF PERMANENT MAGNET SYNCHRONOUS MACHINES

Presenter: Marcus Wolff
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1222
Mentor: Shanelle Foster

High-performing controllers for permanent magnet synchronous machines (PMSMs) require accurate estimation of the machine parameters. This presentation focuses on the experimental characterization process to extract parameters for PMSMs. Specifically, the focus of this presentation is on estimating the maximum torque per ampere (MTPA) angle, the flux linkages, and the inductances of the direct ("d") and quadrature ("q") axes. Flux linkages must be found experimentally due to their dependence on both the d and q-axis currents. To extract this information, the stator current magnitude and angle were varied at fixed step sizes using LabVIEW software. The phase A voltage, line A current, and position of the rotor were recorded for each current magnitude and angle combination. Knowing these quantities, the torque, flux linkages, and inductances for the d and q-axes were calculated. Because the flux linkage and inductance calculations depend on stator winding resistance, which in turn varies with temperature, an infrared thermometer was used to ensure the motor remained near a constant temperature during the experimental process. Finally, Matlab software was used to plot the parameters as a function of stator current angle for each of the current magnitude levels. With the machine properly characterized, a suitable controller has been created using LabVIEW and the motor will now be used for research in electric machine fault detection.

THUMB MOTION: A NEW VIEW

Presenter: Emily Kelly
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1223
Mentor: Tamara Bush, Nicole Arnold, Adam Chrzan

Function of the thumb and fingers can be significantly hindered by osteoarthritis (OA), which is a degenerative disease that decreases the joint's range of motion, strength, and overall hand function. Simple measures are taken in the clinic to evaluate the functional ability of a person's thumb. With new technologies, new approaches to quantify thumb function are possible. The goal of this study is to study dynamic thumb motion and compare motions between healthy individuals and people with OA. Two groups were recruited for this study: healthy participants and participants with OA. A three-dimensional motion capture system and reflective markers located on the segments of the thumb were used to track the movements and determine the thumb's range of motion while performing numerous tasks. It is seen that the participants with OA have a smaller range of motion when compared to the healthy participants. Future work will involve testing individuals after surgical treatment for OA using the same protocols. By better understanding the motions of the thumb, the data will support new measurement approaches, improved treatments, and surgical interventions.

AN INVESTIGATION OF HOUSEHOLD ADHESIVES AND THE IMPORTANCE OF SUBSTRATE TO MAXIMIZE FUNCTION

Presenter: Emily England
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1224
Mentor: Carl Boehlert, Per Askeland

Adhesives hold the world together: from shutting a cereal box to sealing an envelope, from securing dental crowns to being the centerpiece of a child's art project, glue is found everywhere. Consequentially, there is a multitude of types of glue available to service various applications. Although there are many industrial-strength and medical-use adhesives, there are also plenty of glues that we're familiar with on a more day-to-day basis: hot glue, school glue, wood glue, and super glue are a handful of different types of household glues. The objective of this project is to examine the adhesive interfaces of various glues to plastic and wood substrates for the purposes of determining what characteristics an adhesive or application surface must have in order to make a glue suitable for a specific application. Employing the use of scanning electron microscopy (SEM) to examine cross-sections of samples with and without adhesive, energy dispersive spectroscopy (EDS) to study adhesive constituents, and further research on polymeric structures, I will investigate this sticky question: what makes glue so good at adherence?

WHAT WE PUT ON PAPER

Presenter: Justin DeHoff
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1225
Mentor: Carl Boehlert, Per Askeland

Even though we are in the age of technology, paper is still widely used to transfer information. Using a scanning electron microscope (SEM) I determined how three materials are applied to paper. These materials were printer ink, pen ink, and pencil lead. First, I explored the surface

topography using secondary electron detection. I then used backscatter electron detection to compare the materials' densities to create a basic understanding of their composition. I also plan to use electron dispersive spectroscopy (EDS) to expand on the specific chemical composition of all of these materials as well as the paper they are on. These measurements hope to show the microscopic differences between what we put on paper.

ESTIMATION OF EX VIVO MURINE URINARY BLADDER MECHANISTIC BEHAVIOR

Presenter: Sara Purdue
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1226
Mentor: Sara Roccabianca

This project focuses on developing a method to accurately estimate the mechanical behavior of murine bladders in a visual and numerical manner. Previously, tests were conducted using the pentaplanar reflected image macroscopy (PRIM) method, developed by Dr. Tycocki's lab, which allows for ex vivo filling of samples while being surrounded by mirrors. Throughout the test, the samples were filled with a solution at a constant rate, and a video was taken from the aerial view. As a result, five views of the bladder were accessible. Using manual image analysis and thresholding, a 3-D model of the bladder was created. This presentation will describe the continuation of the above methods. To improve upon a static 3-D model, a video was created that demonstrates the contractions of the bladder while being filled. Within this video, small contractions can be seen; these "micro contractions" result in changes in the mechanical properties of the tissue but may also be an indication of other unknown reactions of the bladder. To analyze these events, numerous frames surrounding the time of the micro contractions were taken from the complete video described above. Using ImageJ, three views of the bladder were outlined, and the background was made completely black. This allowed the software, courtesy of Eli Broemer, to recognize the bladder based on the color of each pixel and isolate it from the rest of the image. By analyzing the micro contraction visually and numerically, this event and its real purpose can be better understood.

THE DIFFERENT SHAPES OF POLLEN

Presenter: Sanjeda Khan
Category: Engineering, Computer Science, & Mathematics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1227
Mentor: Carl Boehlert, Per Askeland

Pollen is an essential element to maintaining and balancing our world's ecosystems. Pollen travels from flower to flower via various methods to germinate other plants and allows very important vegetation to reproduce and survive. Although we as humans benefit from pollen being spread, there are drawbacks to it for many people. Pollen, especially certain kinds, can cause allergic reactions for some, inhibiting their ability to complete various tasks and enjoy time outside. As someone who suffers during every change in season because of these types of allergies, I would like to understand just why pollen affects the human immune system to

such a degree. Utilizing a Scanning Electron Microscope (SEM), I will analyze several different types of pollen through various techniques, such as Energy Dispersive X-ray Spectroscopy, Secondary Electron Imaging, and Backscattered electron Imaging, in hopes of finding common traits in different pollen species' structures and chemical makeups that may suggest a reason as to why they may cause allergies for people.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS Oral Presentations

OVERVIEW OF LIGHTS OUT

Presenter: Burke Dugan
Category: Engineering, Computer Science, & Mathematics
Time Slot: 9:45 AM
Room Location: Meeting Room D
Number: 1231
Additional Student Presenters: Ethan Davidson, Liam Herbert
Mentor: Robert Bell, Richard Edwards

Lights Out is a single player game invented in 1995 by Tiger Electronics. The player sees a 5 x 5 grid of squares, and each square is either green (light on) or red (light out). Given a random initial state of the grid, the player attempts to turn off all the lights. The catch is that whenever a light is touched, it will flip it on or off as well as changing varying lights adjacent to it. One approach to solving Lights Out is to come up with an algorithm that solves the problem for us. The algorithm accomplishes two tasks. First, it determines whether the board is even solvable, with the use of Gauss-Jordan elimination to invert the adjacency matrix. If it determines that it is solvable, it finds the most efficient way to solve the board. We investigate the relationship between the size a board and the number of moves required to solve the puzzle. In particular, we compare the number of moves in the algorithmic solution to the minimal number of moves required to solve the puzzle.

ENGINEERING CONTROL STRATEGIES FOR THE MITIGATION OF INFECTIOUS DISEASES IN UNIVERSITY CLASSROOMS

Presenter: Jacob Stabler
Category: Engineering, Computer Science, & Mathematics
Time Slot: 10:00 AM
Room Location: Meeting Room D
Number: 1232
Mentor: Susan Masten

Current strategies to control the transmission of SARS-CoV-2 in classrooms involve physical distancing and mask-wearing. Airborne and the aerosols remain in the air for hours, a better approach may involve the use of improved ventilation, CO2 and particulate monitoring, and HEPA filtration. HEPA filters will be constructed with box fans and MERV-13 furnace filters. Particle sensors will be constructed with Arduino, dust sensors, and a breadboard. The HEPA filters will be challenged in the engineering computer labs to determine particulate level removals. The results of the fabricated particle sensor will be compared to those obtained from a commercially available home particle sensor. Depending on the results, the

university could be motivated to invest in similar filters on a wider scale to prevent the transmission of infectious diseases in classroom environments.

PATTERNS IN THE RECIPROCALS OF PRIMES

Presenter: Julia Zera
Category: Engineering, Computer Science, & Mathematics
Time Slot: 10:15 AM
Room Location: Meeting Room D
Number: 1233
Additional Student Presenters: Areebah Mahdia
Mentor: Preston Wake

We examine the decimal representation of the reciprocals of primes. Specifically, we seek to find extreme values of the average digit of the decimal representation. Additionally, we compare the average digits across an extensive list of primes to investigate potential patterns and predict average digits for other primes. We then extend the search to other bases. We use graphs to visually interpret the patterns across the average digits. This project was motivated by the conjecture in the video "What's special about 59,281?" by Persiflage.

NEURAL NETWORKS VS TRADITIONAL METHODS OF PET IMAGE RECONSTRUCTION

Presenter: Ishaan Pathak
Category: Engineering, Computer Science, & Mathematics
Time Slot: 10:30 AM
Room Location: Meeting Room D
Number: 1234
Mentor: Adam Alessio

Neural Networks are a novel technology that have a variety of applications in a lot of fields. The aim of this research is to explore their efficacy in the realm of PET image reconstruction. Neural Networks are a very powerful modelling tool, especially in cases where a perfect mathematical model is difficult to establish between the dependent and independent variables. Although traditional methods of image reconstruction work well in many situations, the time required to complete the reconstruction remains quite high despite all the advances in computer hardware. We aim to determine whether neural networks can allow for better reconstruction times and examine whether we also observe a decrease in the accuracy of the final reconstruction.

BEYOND POINT PREDICTION: CAPTURING ZERO-INFLATED & HEAVY-TAILED SPATIOTEMPORAL DATA WITH DEEP EXTREME MIXTURE MODELS

Presenter: Andrew McDonald
Category: Engineering, Computer Science, & Mathematics
Time Slot: 11:15 AM
Room Location: Meeting Room D
Number: 1237
Mentor: Pang-Ning Tan

Zero-inflated, heavy-tailed spatiotemporal data is common across science and engineering, from climate science to meteorology and seismology. A central modeling objective in such settings is to forecast the intensity, frequency, and timing of extreme and non-extreme events- yet in an era of deep learning, this objective presents several key challenges. First, a deep learning framework applied to zero-inflated, heavy-tailed data must unify a mixture of distributions characterizing zero events, moderate events, and extreme events. Second, the framework must be capable of parameter constraint enforcement across each component of the mixture to maintain numerical stability. Finally, the framework's predictions may vary with the threshold used to define an extreme event, and it is likely that users will want to vary these thresholds after training. To address these challenges, we propose a novel Deep Extreme Mixture Model (DEMM), fusing a deep learning-based hurdle model with extreme value theory to enable point and distribution prediction of zero-inflated, heavy-tailed spatiotemporal variables. The framework enables users to dynamically set a threshold for defining extreme events at inference-time without the need for retraining. We present an extensive experimental analysis applying DEMM to precipitation forecasting and observe significant improvements in point and distribution prediction over comparable baselines.

INCORPORATION OF CELLULOSE NANOCRYSTALS AND REACTIVE SURFACTANT FOR IMPROVED PERFORMANCE OF PRESSURE SENSITIVE ADHESIVES

Presenter: Justin Hamlin
Category: Engineering, Computer Science, & Mathematics
Time Slot: 11:30 AM
Room Location: Meeting Room D
Number: 1238
Mentor: Caroline Szczepanski

Pressure sensitive adhesives (PSAs) are polymeric viscoelastic materials that adhere instantaneously to solid surfaces requiring only the application of light pressure and easily debond without leaving any adhesive residue on the substrate. The most notable applications of PSAs include a variety of high-demand consumer goods, such as self-adhesive envelopes, and Post-it-Notes, as well as cosmetics, paints, and medical products. In this work, cellulose nanocrystal (CNC) enriched PSAs stabilized with a reactive surfactant (HITENOL AR-1025, AR-stabilized PSAs) were synthesized via in-situ emulsion polymerization. Upon the incorporation of CNCs to AR-stabilized PSAs, a drastic improvement of peel strength, shear strength, and loops tack was recorded with peak properties at a CNC concentration of 0.75 phm. A comparative investigation of PSAs stabilized with reactive (AR) and non-reactive (sodium dodecyl sulfate) surfactant reveals a significant improvement in adhesive properties of AR-stabilized PSAs. The novel formulation of CNC-enriched AR-stabilized PSAs exhibit unparalleled adhesive properties compared to other commercially competitive PSAs that employ CNC additives. Unlike previous studies that record a trade-off in adhesive properties, we present a well-rounded PSA with exceptional peel strength, shear strength, and loop tack.

A COMPARISON OF EFFECTS OF CONSTANT AND VARIABLE PRACTICE ON MOTOR LEARNING

Presenter: Ethan Newman
Category: Engineering, Computer Science, & Mathematics
Time Slot: 11:45 AM
Room Location: Meeting Room D
Number: 1239
Additional Student Presenters: Aryan Verma
Mentor: Simon Cone, Rajiv Ranganathan

Ballet dancing, martial arts, painting, and countless other activities require much practice to master. However, not all practice is equal: some forms of practice are more effective than others. The purpose of this study was to compare the effects of constant and variable practice. The task studied was similar to the well-known shuffleboard game. Here, the participant threw a virtual puck towards a narrow target line. The study featured two practice groups, one constant group that always aimed at the same target line, and one variable group that aimed at a different target line each throw. Each group performed a pretest on the first day of the study, followed by a practice session. A retention test was performed on the second day. Analyzing each group, several interesting patterns were revealed. In the first 3 blocks, the mean scores for each group were very similar. However, the constant group was generally faster to improve than the variable group during day 1. Interestingly, the constant group trended worse on day two, with the variable group performing better at the survey's end. These findings suggest that constant groups will improve faster than variable groups. In recalling skills, variable groups will perform better than constant groups; the variable group is also better able to adapt to modified tasks than the constant group. If rapid improvement is desired, constant practice may be best, while if long-term retention is targeted, variable practice is preferred.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES Poster Presentations

REVEALING DIEL, STORM EVENT, AND SEASONAL CONDUCTIVITY DYNAMICS OF A WETLAND COMPLEX

Presenter: Eryn Greuel
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1301
Mentor: Jay Zarnetske

Conductivity is an indicator of source water to aquatic ecosystems and potential pollution within a catchment. When there are large variations in conductivity, it can strain aquatic organisms, and impact pH, temperature, and dissolved oxygen. An accurate appraisal of wetland processes cannot be gained without an accurate understanding of what water and solutes enter a wetland. Here, we focus on conductivity variability in the inlet and outlet tributaries of a large wetland complex (2.87 km2) of the lowland, mixed land use Augusta Creek catchment (98 km2) in southwestern Michigan, USA. We used high-frequency (every 15 minutes) in-situ sensors to measure specific conductivity across the Summer, Fall, and Winter of 2021. Our data shows

differences in specific conductivity of both tributaries' water. Moreover, we see a diel cycle in specific conductivity of both the inlet (range of ~5 uS/cm) and outlet (~20 uS/cm) that also varies somewhat by season. Within the inlet and outlet, this diel cycle only occurs during the Summer. The summer diel cycle is intermittently interrupted by storm events that increase discharge and decrease conductivity, but shows resilience, recovering within a few days after the storm flow recedes at both tributaries, and recovering quicker in the outlet. The outlet's baseline conductivity builds before being "flushed" out during storm events. This study shows that wetlands have both seasonally present diel and brief hydrologic event controls on wetland water conductivity conditions, indicating that wetland source waters and internal biogeochemical conditions may be highly variable.

MICROBIAL SOURCE TRACKING OF FECAL PATHOGENIC BACTERIA IN ENVIRONMENTAL WATERS

Presenter: Jack Kivi
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1302
Mentor: Kara Dean, Jade Mitchell

Microbial Source Tracking (MST) methods represent a powerful tool to track the persistence of fecal bacterial biomarkers in water sources. Pathogen contamination in environmental waters represents a large threat to human health due to potential risks associated with pathogenic bacteria, viruses, and protozoa. The amplification and source tracking of specific bacterial biomarkers represent a method of tracking and predicting waterborne bacterial outbreaks through identifying probable sources of fecal bacteria. The identification of possible sources of fecal pollution helps better inform decision-makers about management options. However, an optimal MST marker will have similar fate and transport characteristics to indicators and pathogens. A literature review was conducted to identify studies that evaluated the persistence of various bacterial biomarkers of interest in environmental ecosystems including HF183, HF134, CF128, CF193, and human adenovirus. These different biomarkers were tested under different conditions including saltwater or freshwater and natural light or darknessexposure. The data was digitized and fit to a suite of persistence models to identify best-fitting models and trends. Comparisons were made to data on indicators and pathogens in similar matrices. This research has the potential to assist in quantitative microbial risk assessment (QMRA) and help decision-makers support public health and safety in environmental waters.

QUANTIFYING FOULING AND CLEANING CYCLES ON MEMBRANE SURFACE CHEMISTRY

Presenter: Vincent Marinelli
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1303
Mentor: Volodymyr Tarabara

Membrane filtration systems enable the reuse of water. However, fouling over the membrane's lifespan requires concentrated cleaning chemicals to be backwashed through the membrane,

affecting its surface characteristics. Over time, continued use and cleaning of membranes causes deterioration, dubbed "aging". A membrane's age can be quantified as the product of the concentration of the cleaning agent and the duration of cleaning (C*t). Certain additives can be used to change the properties of the membranes, making them more hydrophilic or hydrophobic. Understanding these surface qualities is paramount to understanding membrane treatment technologies and their subsequent improvement. Analyzing the surfaces of these membranes will illuminate their characteristics throughout the fouling and cleaning cycles.

STUDENT PSYCHOLOGICAL IMPACT OF BIODIVERSITY OF PLANTS ON CAMPUS

Presenter: Sam Dougherty
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1304
Additional Student Presenters: Fabiha Islam, Emma Callender
Mentor: Georgia Peterson

Mental health problems are a serious issue among students in the United States. Spending time outdoors in the fresh air is a proven way to improve your mood and focus. Research shows that being around plants causes people to feel better mentally, but not much is known about the impacts of differing plants on psychological health. Differing colors have certain effects on people's psychological activity, so it stands to reason that different colors and species of plants may have varying impacts on the mental health of some of the most stressed people in America: college students. Our research shows the different impacts of plants on our mental health and students' opinions on what plants would be the most effective at relieving stress.

INVESTIGATING MOLD AT MICHIGAN STATE UNIVERSITY LABORATORY COOLERS

Presenter: Tegan Worthington
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1305
Additional Student Presenters: Emilee Bellant, Shreya Kankanalapalli, Ananya Rao
Mentor: Steven Safferman

Mold is a vexatious fungus that can grow anywhere given certain conditions. Specific molds can be harmful to people if inhaled. Some common symptoms of this include, stuffy nose, trouble breathing, and itchy/irritated eyes and skin. For people with mold allergies, these symptoms can be multiplied and can become extremely dangerous. The goal of this project is to test certain coolers on campus for mold, identify the mold, and finally present solutions to the mold problem while informing people about the health effects of mold. While working with many facility members at Michigan State, we will enter the coolers, and use test kits to measure the mold. The type of test kits we will be using are tape tests and swab tests. We will then take this data and send it to a lab where the mold type and concentration will be identified. Following that, we will then present our findings along with the best way to prevent mold growth in any cooler

along with health risks to the molds we identified. Finally, we will have achieved our goal of creating our own research project and finding a solution.

PILING UP: US OVERREPRESENTATION IN WASTE AND WHAT MAKES OUR FOOTPRINT SO BIG?

Presenter: Hannah Buhlmann
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1306
Additional Student Presenters: Jacob Novak
Mentor: Matthew Grossmann

The US accounts for 4% of the world's population yet produces 12% of the planet's garbage. With so much discussion regarding climate change proposals, what about the structure of the US government and its politics makes us so filthy? We are going to focus on waste such as food waste, plastic and packaging waste, and water waste. We intend to use qualitative research in comparative politics, current literature on the subject, and data regarding climate change and our carbon footprint to ask how other countries waste less on average and what we can do to make policymakers clean up our mess. Although a few other countries produce more municipal solid waste than us, US citizens produce a staggering amount more waste per capita. Are there institutional reasons for this, and what are the structures and institutions other countries have in place to mitigate this?

ASSESSMENT OF COVID IMPACTS ON RECYCLING EFFORTS AT A MAJOR UNIVERSITY

Presenter: Jacklyn Alsbro
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1307
Additional Student Presenters: Luz Alvarez, Jp Nelson, Valdine Pegy Tchinda Pegou, Mari Basaldua Del Cid
Mentor: Steve Marquie

Covid-19 has disrupted many of our systems including the recycling system. With fewer people working and the concern for spreading the virus, recycling goals on college campuses were sidelined (EPA, 2021). Prior to the 2020 Covid-19 outbreak, Michigan State University was right on track to meet their sustainability goals. After the outbreak, restrictions required a modification to recycling on campus (Iansiti, 2022). The purpose of this research project is to reduce the amount of plastic that is disposed of in landfills by evaluating the causes of plastic consumption. This research was accomplished through interviews with the MSU Recycling Center, Residential and Hospitality Services, and assessment of the different adaptations of recycling to the pandemic taken by the University of Michigan, Penn State, Purdue, and The Ohio State. The goal is for Michigan State University to return to a more sustainable path by reducing the amount of plastic that is disposed of in landfills.

IDENTIFYING SIGNALS OF SEPTIC CONTAMINATION IN GROUNDWATER MICROBIAL COMMUNITIES OF THE GRAND TRAVERSE BAY WATERSHED

Presenter: Maria Berry
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1308
Mentor: Matthew Schrenk

Microbial communities in groundwater adapt to their local physical and chemical environment. When this environment contains contaminants, it may be reflected in the genetic content of resident microbial communities. This project explores the utilization of environmental DNA to record the influence of septic fields and other potential contaminants in the Grand Traverse Bay watershed by linking microbiological, geochemical, and hydrological approaches. A total of 13 wells were sampled and analyzed for microbial cell counts, taxonomic diversity using the 16S rRNA gene, and genetic content using metagenomics. These data were explored for correlations with physical-chemical indicators of septic contamination (e.g. Br:Cl, Boron, xenobiotic compounds, antibiotic resistance genes, and human fecal microflora). Populations within the orders Betaproteobacteria and Chloroflexi were prevalent within the wells. Metagenomic data was used to construct metagenome assembled genomes from these clades that were then examined for the presence of functional and physiological adaptations to septic contamination. These included comparison to databases of antibiotic resistance genes, and searches for metabolic pathways involved in biogeochemical cycling and organic matter degradation. Knowledge about the composition of groundwater microbial communities, their relationship to potential contaminants and to hydrology is critical to the potential use of eDNA as an environmental tracer. In Michigan, there are approximately 1.3 million septic systems, and at least 10 percent of those systems are failing. Developing a unique "fingerprint" for septic contamination can inform mitigation and management strategies that can protect important water resources in the state, including the Grand Traverse Bay Watershed.

EVALUATING THE INFLUENCE OF A NOVEL COMMUNITY OUTREACH INTERVENTION ON WASH IN ITCHI-AGU, ENUGU STATE, NIGERIA

Presenter: Kate Wernicke
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1311
Mentor: Jade Mitchell

Water, Sanitation, and Hygiene (WASH) is a program that works on the long-term prevention of waterborne diseases and community understanding of water, sanitation, and hygiene. The project is aimed to understand WASH in Itchi-Agu, a rural community of Enugu State, Nigeria that has previously experienced waterborne disease outbreaks like the Cholera outbreak in Nigeria in 2010. A pre-and post-intervention WASH survey was collected in the community after a novel community outreach intervention was conducted to provide insight on the possible

changes in behavior in the community from the WASH intervention. Questions addressed the contributing factors of water quality including water source, water storage, and the length of storage. In addition, the survey captured water accessibility in homes by asking questions about water, hygiene, sanitation practices, and health outcomes within the households. An analysis was conducted to determine the possibility of distinguishing any changes in community behavior across the surveyed topics. We measured statistical differences amongst the proportion of responses for questions related to water source, water storage, sanitation practices, and the understanding of proper hygiene. The outcome provides an understanding of how the community outreach influenced changes in the contributing factors relative to water quality as well as possible water treatment methods and sanitation practices in the community. Future work will investigate the relationships between each factor like if the source of water influences whether it is treated using a certain method or how long it is stored.

IMPROVING SPATIAL ACCURACY OF DATA CHARACTERIZING SPAWNING AND NURSERY HABITATS IMPORTANT FOR GREAT LAKES FISHES

Presenter: Laura Lepek
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1312
Mentor: Jared Ross

Published in 1982, the Atlas of the Spawning and Nursery Areas of Great Lakes Fishes (or more simply known as the Goodyear Spawning Atlas) recorded spawning and nursery habitat locations for dozens of socio-economically and ecologically important Great Lakes fishes. Spawning ground locations were collected from articles, literature, and personal communications from the mid 1800's to the publication date (1982). Hence, these data points are considered historical spawning sites, some of which have been degraded by human activities over time. Spawning locations were originally mapped in 2011 in support of the Great Lakes Aquatic Habitat Framework project (GLAHF) using the coordinates found within the Atlas. As many of these anecdotal accounts and coordinates were general in nature, we have now taken to improving the spatial accuracy of these data by gathering spatial information regarding spawning locations from the Goodyear Atlas and it's references and editing point locations to reflect the additional information we are able to obtain (e.g., depths, substrates, shoreline features). Improving the spatial accuracy and providing more information will help support future research on and conservation of spawning and nursery habitats important for Great Lakes fishes.

EXAMINING MICHIGAN STATE SUSTAINABILITY STUDENT'S VIEWS ON SUSTAINABILITY AND THEIR CLOTHING PURCHASING HABITS

Presenter: Taylor Schellmat
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1313
Mentor: John Kerr

The fashion is one of the most polluting industries in existence as it is a cycle of buying clothing and throwing away clothing at an unsustainable speed. The rise of this unsustainable industry has led to questions; do people who feel strongly about sustainability partake in the same unsustainable clothing practices as those who feel less passionate? This research will look into Michigan State University sustainability student's ideas on sustainability as well as their personal habits when it comes to purchasing clothing. The goal of this study is to discover if these students collectively act a certain way in regards to purchasing clothing.

GEOCHEMICAL STRATIGRAPHY OF A CONTINENTAL FLOOD BASALT - THE PELEKETCH SECTION OF THE TURKANA DEPRESSION (EAST AFRICAN RIFT SYSTEM)

Presenter: Jessica Ruhukya
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1314
Mentor: Tyrone Rooney

The Peleketch Section is a 300-400 meter thick series of stacked basaltic lava flows located within the Turkana Depression in northern Kenya. Continental flood basalts, like those preserved at Peleketch, represent an important precursor to the development of the East African Rift System. However, little attention has been given to the sequences in northern Kenya in comparison to detailed studies of the NW Ethiopian plateau. An important tool in examining these lavas is the analysis of the bulk composition of the flows. Here we present X-Ray Fluorescence data on the major elements from selected Peleketch lavas. We compare these data to a previously constructed petrology-based stratigraphy of the flows to create a unified model of magma chamber evolution. The geochemical data provides insight on crystallization conditions when observing the texture of these flows. Initial observations show that the sequence could be divided into three sections: a lower section with compositional variability, a middle section showing geochemical consistency, and the upper section exhibiting more mafic compositions with high TiO_2, with a silicic break between the middle and upper sections. These changes in geochemistry could be indicative of temporal breaks within the sequence, which in turn could represent different magmatic differentiation processes occurring in the magma chamber. The initial geochemical observations are in agreement with the textural changes seen through the stratigraphy. The initial observations of Peleketch allows for a better understanding of the magma chamber evolution, as well as the magmatic activity prior to the development of the EARS.

HOT ON THE TRAIL: UTILIZATION OF RADIO TELEMETRY TO TRACK AND MANAGE INVASIVE RED SWAMP CRAYFISH IN MICHIGAN

Presenter: Aaron Sullivan
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1315
Mentor: Brian Roth

The Red Swamp Crayfish, Procambarus clarkii, is a globally distributed invasive species and can lead to severe ecological and economic impacts. In 2017, populations of P. clarkii were documented in several ponds in Southeastern Michigan associated with urban and recreation areas. There is substantial concern that additional spread through both overland dispersal and underground drainage networks could yield new infestation sites. In 2021, radio telemetry was implemented to assess spatial and temporal movements of crayfish to determine the potential of metapopulation dynamics and dispersal leading to new colonization. Our studies indicate that movement patterns and home ranges of crayfish differ by location and are thought to be influenced by resource availability, and that inter-pond movement is possible through underground drainage systems. As these locations are subject to eradication methods, the use of radio telemetry to understand daily and long-term movements of invasive crayfish can aid in planning and execution of management efforts.

WHAT BACTERIA STILL LIVE IN THE SOIL FROM 50,0000 YEARS AGO?

Presenter: Quinn Pare
Category: Environmental Science & Natural Resources
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1317
Additional Student Presenters: Calla O'Connor
Mentor: James Tiedje

Not a lot is known about the deep soils and the microorganisms in them. Soil samples were taken from the Loess Hills in Iowa at varying depths with deposition of the deeper samples occurring up to 50,0000 years ago. We sought to culture, identify, and determine the growth and physiological characteristics of the microbes that have lived for a long time with limited carbon in starvation conditions. Soil cores were drilled by collaborating scientists up to 75 feet deep in two locations in Western Iowa. These samples were extracted, diluted, and plated on media with low nutrients such as xylan, R2A, and 1/100 dilute nutrient agar. After isolated colonies were streaked for purity, they were grown, and their DNA was extracted and sent to Novogene for whole genome sequencing. This was followed by assembly, binning, and taxonomic identification. The growth rates of the colonies differed vastly. There was a clear trend where soils closer to the surface had larger populations, but there were still significant populations at depth, especially in the paleosol layers. Around 200 samples were plated and grown in both anaerobic and aerobic conditions. Other tests done were with and without vitamin B12 and at three different pH values. Most grew best on a pH of 7 to 8. The taxonomy from the deep loess isolates included Pseudomonas, Caulobacterales, and Xanthomonadales.

When the DNA sequence of the picked colonies was binned, many were mixed cultures suggesting the members were co-dependent.

A COMPARISON OF SAND COMPOSITION FROM COAST TO COAST

Presenter: Kaiya Lawing
Category: Environmental Science & Natural Resources
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1322
Mentor: Carl Boehlert, Per Askeland

Why does the sand on beaches look and feel different from coast to coast? To answer this question, I plan to compare the composition of sand samples from Virginia, California, Hawaii, and Lake Huron using a scanning electron microscope (SEM) and energy dispersive x-ray spectroscopy (EDS). The SEM emits electrons at a sample, which transmit back signals that contain information about and create a picture of the surface topography of a sample. The EDS machine is able to interpret the chemical makeup of a sample. Using these tools, I am looking to discover how sand differs both physically and chemically.

CERAMBYCID DIVERSITY AND FOREST COMPOSITION IN CAMPUS NATURAL AREAS

Presenter: Connor Vanwagoner
Category: Environmental Science & Natural Resources
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1323
Mentor: Deborah McCullough, Paige Payter

I captured woodboring beetles in the family Cerambycidae using cross vane panel traps baited with a broadly attractive lure in three MSU Campus Natural Areas from June 2021 to August 2021. Cerambycids feed on the inner bark and sapwood of trees that are dying or have recently died or been felled. Native cerambycid beetles play important roles in decomposing dead trees and returning nutrients to the soil. They also help to maintain healthy productive forests by thinning out low vigor or suppressed trees. For many cerambycids, however, little is known about the tree species and the type (size, decay status) of coarse woody debris they use as hosts. Additionally, invasive cerambycids, such as Asian longhorned beetle, can colonize and kill healthy trees. Trapping cerambycids provides a means to detect any unwanted non-native species that might be present. I installed one trap in the canopy and one trap near the ground in each Natural Area to assess possible differences in cerambycid abundance or species composition in the two habitats. I also established fixed radius plots and recorded overstory trees by species and diameter in the three areas. Coarse woody debris pieces, volume and decay class were measured in linear transects in each area. Cerambycid species identification is in progress. Beetle abundance, diversity and species assemblages will be compared between canopy and ground traps and related to overstory tree diversity and volume of fresh coarse woody debris.

AVIAN PREDATION OF THE RED-BACKED SALAMANDER (PLETHODON CINEREUS)

Presenter: Endi Piovesana
Category: Environmental Science & Natural Resources
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1324
Mentor: Alexa Warwick

One of the primary contributors to the bio mass of a forest ecosystem is the salamander family plethodontidae, the lungless salamanders. In parts of the Midwest and stretching into the northeast, the predominant plethodontid species is Plethodon cinereus, the red-backed salamander. Although the species is well studied, the salamander's importance as a prey item for forest dwelling avian species is inconsistent in current literature. Through a literature search using keywords related to Plethodon cinereus and avian predation, only 20 studies were found, and their conclusions ranged from birds being insignificant and inefficient predators of Plethodon cinereus to avian predation being hypothesized to be a major driver of the salamander's polymorphism. Not only that, but only 11 of the 20 reviewed papers made references to specific predator species, and the species referenced greatly varied across those papers. Many forest dwelling birds are species experiencing long term population declines. Several of these species primarily forage on the forest floor to find a food source and may potentially interact with the salamanders, which are predominantly active on the forest floor. Therefore, it is important to understand how species such as these use or do not use the massive population of plethodontids in forest ecosystems as a food source to inform conservation efforts and habitat management. Furthermore, it is important to continue to elucidate the red-backed salamander's ecology and their role in northern North American forest ecosystems.

ENRICHING FOR DOMINANT AND NOVEL PHYLA IN DEEP SOIL MICROBIOMES

Presenter: Calla O’Connor
Category: Environmental Science & Natural Resources
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1326
Additional Student Presenters: Quinn Pare
Mentor: James Tiedje

The soil microbiome is a diverse microbial community essential for cycling carbon and nutrients and restoring water quality. We sampled loess soil, which is wind deposited, as it has no rocks and very little clay, so can be sampled to depths covering two glacial periods, or 50,000 years. We sought to identify soil microbes present in these deep soil profiles and to determine which of them can be cultured. Their food supply is extremely limited so the types of microbes may be very different from known and surface soil microbes. We also sought to determine if the paleosol layers formed during interglacial periods had different types of microbes. Our collaborators drilled 75 ft deep cores at two locations in the Loess Hills of Western Iowa. We used very low nutrient agar media with 11 different carbon sources, inoculated them with loess soil, and after growth, washed the agar surface to collect all colonies, "plate wash" method. We

extracted their DNA and the original soil DNA and sequenced their 16S rRNA genes to identity the microbes there and which ones grew under our media conditions. We obtained thousands of full length 16S rRNA sequences from the 72 plate wash samples and identified them by matches to the RDP database. The dominant phyla that grew in all three deep core samples were Proteobacteria and Actinobacteria. Other novel phyla such Firmicutes, Acidobacteria and Chloroflexi were also found at varying depths.

MSU WATER-LEVEL SENSORS IN OAKLAND COUNTY

Presenter: Phyllis Feldpausch
Category: Environmental Science & Natural Resources
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1327
Additional Student Presenters: Hunter Zachary Hansen
Mentor: Aaron Asher

Drainage is a crucial component of infrastructure, particularly in cities and surrounding rural areas with regards to runoff. Flow of water in rivers and streams can be difficult to measure, and budget-friendly solutions have not been developed. The US Geological Survey has implemented a network of river and stream gages across the country; however, the resolution of this network is not enough to answer specific local questions. The goal of this project is to develop and build small water-level sensors which are optimized in such a way that their cost is kept to a minimum without sacrificing accuracy of data. Specifically placed throughout Oakland County, MI, these sensors serve to measure changes in the Clinton River Watershed spatially and seasonally over time in response to increasing urbanization and impacts of climate change. The data that the sensors collect also answer questions about how water resources management infrastructure is currently functioning. The sensors were developed using free, open-source programming software, Arduino. They are small enough to be battery powered, but also have solar panels attached in order to keep the batteries charged. Excel was used to process and analyze water-level and temperature data and optimize cost and performance to ensure the best quality results for the lowest price per unit. By having low cost water-level sensors, city planners/engineers can monitor and even predict flows of streams and rivers, allowing them to take into account weather patterns and regional climate when designing infrastructure.

EPIDEMIOLOGY & PUBLIC HEALTH
Poster Presentations

COHORT-SPECIFIC ADOLESCENT RELIGIOSITY TRAJECTORIES: EPIDEMIOLOGICAL EVIDENCE FROM THE UNITED STATES, 2002-2019

Presenter: Ishana Galgali
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1401
Mentor: James (Jim) Anthony

This project's aim is to illuminate cohort-specific facets of religiosity as experienced by adolescents in the United States (US), first sampled, recruited, and assessed between the 12th and 13th birthdays, starting in 2002. The project's adaptation of population-level cohort-sequential panel study designs required multi-stage area probability samples from US National Surveys of Drug Use and Health (NSDUH). This adaptation's yield is nationally representative estimates for each of 13 successive US birth cohorts traversing adolescence. The first and last samples of 12-year-olds were drawn in 2002 and 2014, respectively, with each sampled cohort newborn assessed at age 12 years. Then, across a five-year span, in each successive year of adolescence, the NSDUH team drew a new probability sample of the same birth cohort's survivors (without replacement), recruited them, and completed a standardized assessment (i.e., between the 13th and 14th birthdays, …, between the 17th and 18h birthdays), with one and only one assessment per individual participant. Each participant completed an audio computer-assisted self-interview (ACASI). Standardized ACASI items assessed facets of religiosity, in addition to drug use and health. The resulting NSDUH data were compiled, stored, and made available in public use files, ready for analyses that the MSU Institutional Review Board judged to be 'not human subjects research.' This project's estimated cohort- and age-specific proportions are analysis-weighted with Taylor series linearization for variance estimation. If successful, Hill functional analysis parameter estimates with 95% Bayesian credible intervals will be presented, in addition to primary proportions to be estimated.

OCCURRENCES OF ADOLESCENT BRIEF DEPRESSIVE SPELLS BEFORE/AFTER THE GREAT RECESSION OF 2008

Presenter: Anne Jansen
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1402
Mentor: James (Jim) Anthony

Since January 2020, the COVID-19 pandemic has amplified public concern about adolescent-onset Major Depressive Disorders (MDD) and related mood disturbances, but recently increased MDD prevalence might mean no increase in becoming an MDD case ('incidence'). It might mean an increased duration of being an MDD case because epidemiological 'prevalence' parameters, by definition, vary as functions of both 'incidence' and 'duration.' In addition, steps

toward MDD require experiences of 'Brief Depressive Spells (BDS)' (several days or longer when most of the day there are feelings of sadness, emptiness, or depression). Therefore, my work focuses upon estimation of year-specific BDS Annual Incidence Rates (AIR) by taking differences of BDS Cumulative Incidence Proportions (CIP) based on lifetime histories of BDS. For this work, I specify the study population as non-institutionalized community-dwelling adolescent residents of the United States (US), as sampled, recruited, and assessed for each year's National Surveys on Drug Use and Health (NSDUH), 2004-2019. Audio computer-assisted self-interviews (ACASI) included standardized items to identify lifetime BDS histories. Analysis-weighted CIP differences, with calculus (Taylor series) for variance estimation, yield year- and sex-specific AIR estimates. If successful, this project will shed light on male-female variations in AIR estimates before and after the 'Great Recession,' and will forecast expected BDS AIR values based on the time trend. These forecasts will help us understand whether the COVID-19 pandemic years are followed by greater than expected BDS incidence (and possibly subsequently larger MDD incidence estimates).

SUICIDE THOUGHTS AND PLANS OF ADOLESCENTS EXPERIENCING BRIEF DEPRESSIVE SPELLS

Presenter: Olivia Leblanc
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1403
Mentor: James (Jim) Anthony

Evidence from psychiatry research indicates that suicide thoughts and plans (STP) almost always surface after advanced mood disturbances such as Major Depressive Disorders (MDD). Nevertheless, in some cultures and in some age subgroups of populations, STP can form as 'rational' or ritualized decisions in the absence of MDD (e.g., 'harikari' in Japan). My project is focused on STP occurring among adolescents in United States in recent years and who have experienced a Brief Depressive Spell (BDS), defined to encompass several days or more of feeling sad, blue, or depressed, or a related BDS experience. The study population includes non-institutionalized community-dwelling adolescent residents of the United States (US), as sampled, recruited, and assessed for each year's National Surveys on Drug Use and Health (NSDUH), 2004-2019. Audio computer-assisted self-interviews (ACASI) included standardized items to identify lifetime histories (e.g., STP). Analysis-weighted CIP estimates and CIP differences, with calculus (Taylor series) for variance estimation, yield year- and sex-specific CIP and AIR estimates. It is my hope that my presentation will include both Fisher's frequentist 95% confidence intervals as well as Bayesian 95% credible intervals, and I will be able to describe the differences between the frequentist and the Bayesian approaches to interval estimation.

AN ESTIMATE OF AN ALCOHOL TREATMENT ENTRY EFFECT: DID OBAMACARE ACCELERATE TREATMENT ENTRIES OBSERVED SOON AFTER ALCOHOL PROBLEM ONSET?

Presenter: Ellen Young
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1404
Mentor: James (Jim) Anthony

In this project, I seek to understand the degree to which 'Obamacare' might have achieved its aim of promoting earlier entry into treatment for alcohol problems, and to learn whether there might have been ethnicity-associated variations or male-female variations that deserve attention in public health work to intervene soon after formation of alcohol syndromes. For my project's estimates, I turned to the United States National Surveys on Drug Use and Health (NSDUH) completed between 2002 and 2019. Each year's NSDUH multi-stage area probability sample is designed to yield nationally representative estimates for our nation, with standardization and rigor for time trend analyses. After successful recruitment and consent, each participant completes an audio computer-assisted self-interview (ACASI) with a fixed sequence of standardized items within modules that cover alcohol problems, entry into alcohol treatment, and related variables needed for this project. The NSDUH research team compiles, stores, and makes available public use files for analyses, which the MSU Institutional Review Board has judged to be 'not human subjects research.' For this project, I estimated analysis-weighted proportions that take sample selection probabilities and other variables into account, with calculus (Taylor series) for variance estimation. My plan is to finish estimates for population subgroups (e.g., by Hispanic ethnicity, male-female variations), but in work to date, I might have to make use of epidemiological analysis approaches such as age standardization in order to draw firm inferences about the subgroup variations.

ANALYZING PERSISTENCE MODELS OF MS-2 DECAY ON FOMITES

Presenter: Stephanie Starr
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1405
Mentor: Jade Mitchell

Fomites are porous and nonporous surfaces that can play an important role in the indirect transmission of pathogens. They are a leading source of transmission because they consist of everyday objects such as doorknobs, countertops, towels, and cellphones. The COVID-19 pandemic has recently highlighted the importance of fomites in the transmission of viral infections, as it is thought to be one of the top three routes of transmission for COVID-19. The way viruses’ decay on different surfaces and under varying environmental conditions dictate the quantity of plaque-forming units (PFUs) that a person could be exposed to through fomite contact. Indicator organisms are a key tool used to predict the decay of viruses, and the bacteriophage MS-2 has been considered a surrogate for enteric virus behavior. This study evaluated data from experiments looking at MS-2 decay on stainless steel, plastic laminate, and fabric cotton surfaces. Maximum likelihood estimation methods were used to fit a variety of models with one, two, and three parameters, and the goodness of fit was evaluated. Results

indicate that the best fitting model for all surface types was consistently a two or three- parameter model. These results expand on prior work that challenges the conventional method of modeling and predicting decay with the one-parameter exponential model. The models recognized by this work can be used to predict and manage the risk in scenarios relevant to fomite exposure.

RACIAL AND ETHNIC DISPARITIES DURING PREGNANCY IN HEALTHCARE SETTINGS

Presenter: Cameron Fielder
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1406
Mentor: Claire Margerison

Women of color are at a much higher risk of pregnancy related mortality and morbidity compared to white women, but it is unknown whether hospital settings and level of care are directly associated with mortality and morbidity outcomes. We reviewed the literature to compare the effects of hospital settings and healthcare on racial and ethnic disparities in pregnancy related mortality and morbidity. Research articles were obtained from the PubMed database. The initial search yielded 283 articles that we narrowed down to 8 articles using a PRISMA flow chat. From each study, we extracted the study population, main exposure, main outcome, and results. Out of the 8 studies reviewed all show the same trend for black women having the highest risk of severe mortality and morbidity. Second to black women Latina women were also highly affected by these outcomes. Two studies examined hospital characteristics and found that Black women were more likely to deliver in hospitals with higher rates of severe maternal morbidity. Four studies examined treatment that women receive and found that Black and Latina women are more likely to receive less quality care. Studies also noted that most maternal deaths occurred outside of hospital settings. The evidence presented in this review suggests that hospital settings and treatment within hospitals may be linked to racial and ethnic disparities in severe maternal morbidity.

USE-OF-FORCE POLICY TRANSPARENCY: MICHIGAN SHERIFF AND POLICE DEPARTMENTS

Presenter: Zahra Ahmad
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1407
Mentor: Mieka Smart

Government transparency promotes democratic governance, increases public oversight, and reduces corruption. Furthermore, data overwhelmingly points to the life-saving impact that administrative interventions can have on controlling police behavior, especially use-of-force. There is no prior statewide investigation of police department policy transparency in Michigan--to see if policies are public or posted on the respective department website. The aim of this study was to conduct a survey of the prevalence of public use-of-force policies in the state of Michigan, or policies posted on the respective city or county department website. We used an internet search process and found that only 3 of 83 Michigan Sheriff's departments and only 7 of the 10 cities examined had public use-of-force policies. Given prior evidence of the benefits of

institutional transparency paired with the reality that police policy does influence police discretion, efforts should be made to increase transparency of Michigan Law enforcement. Policies should be posted on the respective department websites, at a minimum.

MORPHOLOGY AND MNP BINDING CHARACTERISTICS OF CARBAPENEM RESISTANT ESCHERICHIA COLI

Presenter: Chloe Zaborneykline
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1411
Mentor: Oznur Caliskan Aydogan, Evangelyn Alocilja

Antimicrobial resistance (AMR) occurs when bacteria change and become resistant to the antimicrobials that are meant to kill them. This is often caused by exposing bacteria to subinhibitory doses and overdoses of antibiotics. The Centers for Disease Control and Prevention (CDC) has reported that more than 35,000 people die each year from AMR in the United States alone and that carbapenem-resistant E. coli is one of the most urgent issues, and the World Health Organization has listed AMR as one of the top ten global health threats to humanity. In addition, the high prevalence of AMR bacteria causes a significant economic impact by requiring expensive alternative treatment and longer hospital stays. In this study, the bacteria of focus will be carbapenem-resistant Escherichia coli strains. Previous research shows that when bacteria are exposed to subsequent subinhibitory doses of antibiotics, the size and shape of the bacteria are affected, as well as their MNP (magnetic nanoparticle) binding capabilities. Hence, this research aims to expand upon this study by examining the morphology of carbapenem-resistant E. coli using microscope imaging and size and shape measurement software. Additionally, this research explores the MNP binding capacity of resistant E. coli. Preliminary results indicate that the MNP binding capacity of resistant E. coli is lower than susceptible E. coli. This research aids in developing further understanding of resistant cell morphology with MNP binding properties and how it can be detected, contributing to a global effort to understand and reduce the effects of AMR.

RACIAL MISCLASSIFICATION OF AMERICAN INDIAN AND INDIGENOUS AMERICANS IN EPIDEMIOLOGICAL AND PUBLIC HEALTH STATISTICS

Presenter: Ceco Maples
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1412
Mentor: Danielle Gartner

There is speculation that a significant percentage of AI/AN is not included in disease surveillance which leads to an underestimation of disease burden and inadequate resource allocation in/for these groups in the United States. In this study, we investigate the strengths and weaknesses of unused/used solutions proposed by researchers to fix AI/AN racial misclassification in health data. We collected data from published scientific articles using specific criteria: Sex, Age, Race, Chronology, Pathology, Geography, Mode of Racial

Classification, and Proposed Solutions. We then looked at each specific study in regard to its limitations and data, the aforementioned criteria, to determine its pros and cons for the best solutions. Most studies use data from larger data sets such as the census and national vital statistics system which are more likely to leave out some AI/AN then link it to AI/AIN specific data sets such as the IHS. Some studies find fixes to misclassification from qualitative routes such as addressing racial profiling in the health system. We found that studies using the data linkage method may have not accounted for all AI/AN due to geography barriers in who their datasets encompass.

THE ATTITUDE AND INTENTION OF GETTING COVID VACCINES BETWEEN INTERNATIONAL AND DOMESTIC STUDENTS IN THE U.S.

Presenter: Loveleen Kaur
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1413
Mentor: ChengChing Liu

Approximately 60% of Michigan residents are fully vaccinated with attitude and intention of getting vaccines influencing everyone's behaviors. A few studies investigate the attitude and intention of getting COVID vaccines among domestic students; however, no similar study among international students exists. International students are a huge portion of the student population at MSU. It's vital to understand the attitude and intention of getting vaccines among international and domestic students. This was a cross-sectional survey study and IRB exempt. To collect data, a reliable and valid questionnaire was developed based on the Theory of Planned Behavior including four subscales (intention, attitude, subjective norm and perceived behavior control). One hundred and ten male (55.8%) and 86 female (43.7%) full-time international students completed the survey compared to 112 male (50.5%); 110 female (49.5%) domestic students. Six international students (3%) have not received any COVID vaccines compared to 13 domestic students (5.9%). Eight international students (4.1%) indicated they have received the booster shot compared to none of the domestic students. Chi-Square was utilized to determine statistical significance. International students had higher mean scores on intention and attitude toward getting COVID and booster vaccines (p=.005) and subjective norm (p=.000), but domestic students had a higher mean score on perceived behavioral control. The causes of these differences are not clear and warrants qualitative research to further investigate why international students intend to get COVID and booster vaccines.

VACCINATION STATUS AND POST-COVID SYMPTOMS

Presenter: Tessa Koenigsknecht
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1414
Mentor: Horng-Shiuann Wu

363 million COVID-19 cases have been documented since January 2020. Being a relatively new disease, and many people remain unvaccinated, research is necessary to understand COVID-19 lasting effects. This study examined post-COVID mental health symptoms (fatigue, anxiety, depression) for both vaccinated and unvaccinated adults. This on-going descriptive study collected data from randomly sampled patients who tested positive for COVID-19 ≥ 3 months ago. Phone interviews using numeric rating scales assessed fatigue, anxiety, and depression, and yes/no questions for vaccination status. Of the 76 participants 73.7% were fully vaccinated. Among all sampled, 26.3% reported feelings of fatigue, 15.8% reported anxiety, and 14.5% reported depression, on the average of 12.4 months since infection. Reported ratings (scale of 1-9, 9 being worst) for fatigue and depression were descriptively higher in unvaccinated participants than vaccinated participants (fatigue = 6.8 vs. 5.9, respectively; depression = 7.0 vs. 6.1, respectively). Unvaccinated participants rated worse interference of daily activities (scale of 0-9, 9 being worst) by fatigue and anxiety than vaccinated participants (fatigue = 5.2 vs. 4.7, respectively; anxiety = 4.0 vs. 3.8, respectively). Unvaccinated participants reporting worse feelings of fatigue and depression, and additionally worse interference of daily activities by fatigue and anxiety, suggesting that contracting COVID-19 while unvaccinated may be associated with worse post-infection mental health symptoms. The findings suggest that COVID-19 negatively effects mental health, as evidenced by prevalence of fatigue, anxiety, and depression. These findings warrant further investigation to better understand lasting symptoms of COVID-19.

ASSESSMENT OF HEAVY METAL CONTAMINATION IN GARDENS OF A MICHIGAN COMMUNITY WITH LEAD WATER CONTAMINATION

Presenter: Amulya Vankayalapati
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1415
Mentor: Courtney Carignan

In 2018, a community water system was switched due to detection of high levels of poly- and perfluoroalkyl substances linked to a local former paper mill. This switch triggered leaching of lead from the water mains, motivating replacement of the pipes. During this time, some community members continued to irrigate their gardens. In this pilot study, we aimed to investigate concentrations of metals in the public water supply (water main), private wells (other metals linked to paper mills), and residential garden soils and compare to health protective guidelines. Water and soil samples were collected from homes supplied by the public water system and private wells. Samples were analyzed for lead, copper, cadmium, and barium using ICP-MS and mercury using Milestone DMA-80 evo. Results were compared using Wilcoxon rank sum tests and safety was assessed using health protective guidelines. Due to our small sample size, we defined a p-value < 0.1 as significant and < 0.2 as suggestive. For homes on the public water supply, lead and cadmium concentrations were 4 and 2.5-fold higher in soil (p=0.15 and 0.03) respectively. Copper was 7.3 and 3.3-fold higher in water and soil (p=0.02 and 0.06), respectively. Concentrations of all metals were below health protective guidelines. The increased levels of lead and cadmium in soil suggest a long-term impact of irrigating gardens with metal contaminated water. No sample contained metal levels exceeding guidance

values. Thoroughly washing homegrown vegetables before consumption could minimize ingestion of contaminants.

VIRUS ADHESION TO FOMITES IN A GROCERY STORE SETTING

Presenter: Xheneta Vitija
Category: Epidemiology & Public Health
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1416
Additional Student Presenters: Mahfuza Meem, Ajay Kumar, Phi Nguyen
Mentor: Volodymyr Tarabara

Fomites play an important role in the spread of viruses. Higher probability of transfer is associated with fomites in indoor environments such as classrooms, hospitals, nursing homes and especially with surfaces that are frequently touched. In this study, we numerically estimated adhesion of several viruses to surfaces (epoxy, polyvinyl chloride, polyethylene, produce peels) commonly encountered in typical grocery store settings. Adhesion was quantified and interpreted based on physicochemical properties of viruses and fomites. Surface charge and hydrophobicity data were obtained in part from published literature and in part by experimental measurements. Hydrophobicity was determined based on measurements of contact angle on the surfaces of selected fomites. Virus-fomites interactions are predicted using the extended Derjaguin-Landau-Verwey-Overbeek (XDLVO) theory and are experimentally assessed in tests with quartz crystal microbalance with dissipation (QCM-D). The obtained can guide screening and selection of materials that discourage virus adhesion, help design anti- adhesive surfaces and develop surface cleaning solutions and protocols.

VIRUS ADHESION TO FOMITES IN HEALTHCARE SETTINGS: MASKS, BIOMEDICAL MATERIALS, AND OTHER INDOOR SURFACES

Presenter: Sanjanasri Pothuraju
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1421
Additional Student Presenters: Sydney Bush, Atef Choudhury, Blake Potvin
Mentor: Volodymyr Tarabara

In the world today there are many viruses that are a concern to human health. These viruses are especially prone to be found in a hospital setting where individuals are being treated for viral infections. Fomites play an important role in the spread of viruses. Higher probability of transfer is associated with fomites in indoor environments and especially with surfaces that are frequently touched. In this study, we numerically estimated adhesion of several viruses (human respiratory syncytial virus, human adenovirus, and coronavirus) to a number of different surfaces (stainless steel, polypropylene, polyvinyl chloride) commonly encountered in settings typical for health care facilities. Adhesion was quantified and interpreted based on physicochemical properties of viruses and fomites. Surface charge and hydrophobicity data were obtained in part from published literature and in part by experimental measurements. Hydrophobicity was determined based on measurements of contact angle on the surfaces of

selected fomites. Virus-fomites interactions are predicted using the extended Derjaguin-Landau- Verwey-Overbeek theory. The obtained data can guide screening and selection of materials that discourage virus adhesion, help design anti-adhesive surfaces and develop surface cleaning solutions and protocols.

FOOD INSECURITY COMPARISONS BETWEEN RURAL AND URBAN FAMILIES DURING THE COVID-19 PANDEMIC

Presenter: Sevana Mailian
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1422
Mentor: Jiying Ling, Wachira Suriyawong, Sisi Chen

Food insecurity is a prominent issue in the U.S., primarily impacting low-income families. The COVID-19 pandemic has severely influenced food insecurity, with greater impacts on families with children. It is currently unknown whether rural households are facing additive challenges due to the pandemic. Thus, this study compared the food insecurity among low-income families between urban and rural areas of Michigan. Baseline data from 53 parent-child dyads participating in a healthy eating and stress management program were used. The dyads were recruited from two Head Start organizations using non-random sampling. Parents completed the U.S. Household Food Security Survey Module to assess their household, parent, and child food insecurity status. Among the 53 dyads, 19 were from urban areas and 34 were from rural areas. For parents (mean age=29.34 years), 18.9% were Black, 37.7% were single, 50.9% received a high school education or lower, and 43.4% were unemployed. Additionally, 39.6% had annual incomes <$20,000. Among children (mean age=3.62 years), 50.9% were female, 9.4% were Hispanic, and 20.8% were Black. Overall, 35.8% of households, 34% adults, and 24.5% children were food insecure. Although statistically insignificant, 47.4% of households, 42.1% of adults, and 36.8% of children in urban areas were food insecure compared to 29.4%, 29.4%, and 17.6% in rural areas, respectively. The results indicate that urban families experienced more food insecurity than rural families. This may be due to the higher prevalence of job and income losses because of the pandemic. More research is needed to identify the root causes for this disparity.

WHAT MAKES MASKS A MUST?

Presenter: Ju-Young Park
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1423
Mentor: Carl Boehlert

Since December 2019, the COVID-19 pandemic has put the entire world in crisis. People have been forced to wear masks everywhere and anywhere, traveling was restricted in many areas, and in some countries, having more than a certain number of people in a single area was legally prohibited. The Centers for Disease Control and Prevention (CDC) recommended that everyone wear masks to restrict the spread of viruses. The focus of this project will be based on the claim of the CDC that masks are efficient in blocking the spread of viruses. What makes a mask so

efficient in blocking the spread of viruses? I will answer this question by looking at the structure of different masks, including cloth and surgical, through the Scanning Electron Microscope (SEM) and contrasting how the masks' structures relate to the restriction of the spread of germs.

USE-OF-FORCE POLICY TRANSPARENCY: MICHIGAN SHERIFF AND POLICE DEPARTMENTS

Presenter: Zahra Ahmad
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1424
Mentor: Mieka Smart

Government transparency promotes democratic governance, increases public oversight, and reduces corruption. Furthermore, data overwhelmingly points to the life-saving impact that administrative interventions can have on controlling police behavior, especially use-of-force. There is no prior statewide investigation of police department policy transparency in Michigan--to see if policies are public or posted on the respective department website. The aim of this study was to conduct a survey of the prevalence of public use-of-force policies in the state of Michigan, or policies posted on the respective city or county department website. We used an internet search process and found that only 3 of 83 Michigan Sheriff's departments and only 7 of the 10 cities examined had public use-of-force policies. Given prior evidence of the benefits of institutional transparency paired with the reality that police policy does influence police discretion, efforts should be made to increase transparency of Michigan Law enforcement. Policies should be posted on the respective department websites, at a minimum.

PARENTS KNOWLEDGE OF RECOMMENDATIONS FOR THEIR ADOLESCENT'S PHYSICAL ACTIVITY AND HEALTHY EATING

Presenter: Caitlin Mather
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1425
Mentor: Lorraine Robbins

The prevalence of overweight and obesity among adolescents in the U.S. has risen dramatically, especially among minorities and those of low socioeconomic status. The purpose of this cross-sectional study was to assess the extent of parental (or legal guardian) knowledge of current recommendations for physical activity, screen time, healthy eating, and sleep for their adolescents (10-13 years old). Fifty-five racially diverse, low-income parents (n=50 [90.9%] female; n=5 [9.1%] male) living in an urban area in Michigan completed a multiple-choice survey (3-4 response choices/question) asking about recommendations. The majority of the parents were Black/African American (n=31, 56.4%), had annual income <$29,000 (n=35, 64.8%), and did not have any college degree (n=38, 69.0%). Of the 14 knowledge-based questions that were asked, only 6 were answered correctly by the majority of parents (42.8% of questions). Most parents (n=37, 67.2%) answered between 5 and 8 questions correctly. The maximum number of questions answered correctly was 11, and this outcome occurred for only 2 parents. The question answered most correctly by parents (n=52, 94.5%) focused on the

recommended number of hours of sleep per day for an adolescent, which is 8-10 hours. Parents, especially those living in disadvantaged areas, are not sufficiently aware of recommendations for physical activity, screen time, healthy eating, and sleep for their adolescents. Interventions are needed to increase parental knowledge of the recommendations, so they have the information needed to assist their adolescents in attaining or maintaining healthy weight.

PANDEMIC BEHAVIORS CHANGE WITH VIDEO GAMES

Presenter: Advait Rathi
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1426
Mentor: Zachary Neal

With over 5 million lives and trillions of dollars lost, COVID-19 has taken a huge toll on all of us. Research has shown that wearing masks and being vaccinated dramatically reduces the spread of COVID-19. However, people have been hesitant to adopt these measures. We hypothesize that people might be more willing to adopt these measures if they understood how their decision to wear a mask and get vaccinated affects others. To test this hypothesis, we built a computer simulation that allows people to explore what would happen to others around them based on their own decision to wear a mask and/or get vaccinated. A test of our hypothesis is pending.

PER AND POLYFLUORINATED SUBSTANCES DYSREGULATE GAP JUNCTIONAL INTERCELLULAR COMMUNICATION

Presenter: Jamie Liebold
Category: Epidemiology & Public Health
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1427
Mentor: Brad Upham

The selection of gap junctional intercellular communication (GJIC) as an endpoint is a significant step in developing a systems-based in vitro model to assess the toxic potential of environmental contaminants, as this biological phenomenon is crucial for integrating signaling mechanisms within cells with that of neighboring cells in a tissue and is an important early-stage event in abnormal cell proliferation within tissues. Thus, we are determining the effects of per and polyfluorinated substances (PFAS), major environmental contaminants known as "forever chemicals", on GJIC. I am using the well-established "scalpel load - dye transfer" assay to assess GJIC as a function of dose and time and then comparing the results to those of the lab's newly established high throughput screening (HTS) assay. Both assays use the F344 WB cell line, which is an excellent in vitro cell model of liver oval cells, a self-renewing bipotent stem/progenitor cell that give rise to hepatocytes and hepatic biliary duct cells. The new HTS is quite unique in that it depends on a subset of donor and receptor cells where the donor cells are stably transfected with the iodide transporter gene and the acceptor cells with the yellow fluorescent protein (YFP) gene. The addition of iodide initiates the bioassay by entering the donor cells via the iodide transporter, and then transfers through gap junctions to the receptor

cells, in which iodide quenches the YFP-fluorescence. My results will help validate the new HTS assay system and provide crucial data for assessing the toxicity of PFAS.

EPIDEMIOLOGY & PUBLIC HEALTH
Oral Presentations

THE SOCIOECONOMIC IMPACT OF THE COVID-19 PANDEMIC ON PREGNANT BLACK WOMEN'S LIVES

Presenter: Eve Njoku-Shells
Category: Epidemiology & Public Health
Time Slot: 11:30 AM
Room Location: Meeting Room B
Number: 1431
Mentor: Dawn Misra

We explored employment, food insecurity, and housing difficulty during the early phase of the COVID-19 pandemic as well as whether women felt they had experienced changes in these domains prior to the pandemic compared to during the pandemic among a sample of pregnant Black women. A sample of 33 pregnant Black women who participated in the Biosocial Impact on Black Births (BIBB) and were still pregnant in May-June 2020 completed an online survey about their experiences during the pandemic. Fourteen of these 33 women and an additional two who did not complete the online survey participated in qualitative interviews. Descriptive statistics and mixed methods analyses were employed. Results showed that women in the study experienced job loss, had difficulty meeting basic needs, reported changes in employment, and had housing challenges during the pandemic. Furthermore, our study found that Black women's socioeconomic disadvantages were only increased by the pandemic.

EXPOSURE FROM PER- AND POLYFLUOROALKYL SUBSTANCES IN INFANTS THROUGH HUMAN MILK

Presenter: Megha Pratapwar
Category: Epidemiology & Public Health
Time Slot: 11:45 AM
Room Location: Meeting Room B
Number: 1432
Mentor: Sarah Comstock, Courtney Carignan

Per- and polyfluoroalkyl substances (PFAS) are a group of chemicals that are widely used in consumer products that can lead to adverse effects on health in exposed humans. Exposure usually occurs through dust, drinking water, and food. These chemicals break down very slowly and therefore can cause long-term contamination in both humans and the environment. Some possible health effects PFAS can have are decreased fertility, developmental delays in children, increased risk of some cancers, reduced immunity, and interference with hormones. PFAS levels in human milk have been positively associated with decreased diversity in the gut microbiome of 1 month old infants. A literature review identified the levels of various PFAS in human milk in countries around the world. Levels ranged from 0.0073 ng/mL to 24 ng/mL, with milk samples from Faroe Islands having the highest and milk samples from Sweden having the lowest levels of PFAS. This is part of a continuum of research that will eventually analyze the

impact of PFAS exposure on the infant gut microbiota at 3 months of age. Since the infant gut microbiota membership is established early in life, understanding the exposures which can alter the composition of this microbiota will enable a clearer understanding of the mechanisms by which compounds, such as PFAS, impact health.

CHARACTERIZING ANTIBIOTIC USE DURING PREGNANCY: MICHIGAN HOSPITAL SYSTEMS

Presenter: Madeleine Russell
Category: Epidemiology & Public Health
Time Slot: 12:00 PM
Room Location: Meeting Room B
Number: 1433
Mentor: Sarah Comstock, Lixin Zhang

The emergence and dissemination of pathogens resistant to antimicrobials has become a forefront concern for clinicians and researchers alike. Antimicrobial resistance (AMR) is exacerbated by the misuse and overuse of antibiotics. Pregnant women and their infants are an important area of focus, as antibiotic use during this vulnerable period of development may generate reservoirs of AMR genes which could contribute to future risk. It is thus imperative to identify the extent of antibiotic use and its association with AMR gene abundance and persistence. The first aim of our study is to assess the antibiotic classes prescribed and the extent of antibiotic use during pregnancy in a cohort of women currently living and receiving prenatal care in Michigan. Participants (n=200) were recruited from the following hospital systems in Michigan: Siani Grace, Spectrum, University of Michigan, and Hutzel. Medical record abstraction was used to determine the types and extent of antibiotic use during pregnancy. Preliminary analyses demonstrated differences in antibiotic administration by hospital system. Ultimately, the purpose of this research is to inform clinical providers so that they may choose to use antibiotics and/or treatment regimens that minimize the risk of antibiotic resistance during critical stages of development where use of antibiotics is common.

PLASMID MEDIATED TRANSFER OF ANTIBIOTIC RESISTANCE GENES BETWEEN MULTI-DRUG RESISTANT COMMENSAL AND PATHOGENIC BACTERIA

Presenter: Mia Van Allen
Category: Epidemiology & Public Health
Time Slot: 12:15 PM
Room Location: Meeting Room B
Number: 1434
Mentor: Azam Sher, Linda Mansfield

Exposure of antibiotic resistant bacterial strains to the gut have the potential to introduce antibiotic resistance genes that may spread within the microbial community via conjugation of plasmids carrying antibiotic resistance genes (ARG). We hypothesized that pairings of particular donor and recipient strains, as well as the introduction of antibiotic selection to the system influences the rate of plasmid transfer. Bacterial donor strains and conjugative plasmid marked with fluorescent markers were used to quantify ARG transfer from donor to commensal and multidrug resistant recipients. We engineered commensal E. coli LM715-1 carrying a green fluorescent protein GFP-labeled broad host range RP4 plasmid to be used as a donor strain.

Recipient bacteria included laboratory, commensal and pathogenic strains of bacteria carrying rifampicin resistance. Transconjugants were further used as donors in secondary donor recipient pairings to test for subsequent conjugative transfer. We performed? In vitro conjugation using different combinations of donor and recipient strains in the presence and absence of antibiotic. We determined conjugation frequencies and confirmed transconjugant colonies using antibiotic selection plating, PCR and fluorescent microscopy. The RP4 plasmid was successfully transferred to recipients by commensal donor LM715-1. Variations in plasmid transfer frequency between commensal donor E. coli LM715-1 and various recipients were observed as well as variations of plasmid transfer frequency observed in the presence of antibiotic as well. In secondary transfers using the commensal LM715-1 RifR as the recipient, we observed different plasmid transfer frequencies when employing various transconjugant bacteria as the donors. Strain specific features of donor and recipient strains, as well as antibiotic presence influenced ARG plasmid transfer frequency in same and different species pairings.

FILM & DIGITAL MEDIA
Film Presentations

DANCE THROUGH COVID-19

Presenter: Angelina Au-Tran
Category: Film & Digital Media
Room Location: Online Only
Number: 1502
Mentor: Nancy DeJoy

Dance Through COVID-19 is about what I've learned during my time researching on dance organizations/dancers' lives during the time of COVID-19. Gathering what I've learned as well as being a part of a dance group during the COVID-19 years, I created a video about a timeline from the start of COVID-19, during COVID-19, and present time. Using dance videos from my dance group during this time, I hope to tell/inform my audiences what it was like being a dancer in a dance group at MSU.

SPIRITUAL GIRL IN A MATERIAL WORLD: LOOKING AT THE COMMODIFICATION OF EAST AND WEST ASIAN CULTURE THROUGH AN ORIENTALIST LENS

Presenter: Amina Darabie
Category: Film & Digital Media
Room Location: Online Only
Number: 1504
Mentor: Eddie Boucher

The line between cultural appropriation and appreciation is a thin one. West and East Asian cultures alike have been idealized and abhorred at the same time since the beginning of European colonialism. As we see trendy yoga spots pop up around the country, evil eye necklaces on Instagram, and numerous other ancient beliefs largely reduced to a surface level aesthetic, we must question the larger implications of what happens when cultural and religious

practices are taken out of their original context. When does an "outsider" to a culture get to partake and when do they take it too far? Are the cultural objects we often see appropriated even necessary for a true spiritual experience? As a personal stakeholder in this matter as both an Arab woman who has seen my own culture watered down with a price sticker atop and a practitioner of Buddhist beliefs, I seek to find the answers and solutions by collecting creative, qualitative data and analyzing these issues through an interdisciplinary lens, critiquing them based on theory from Edward Said and Karl Marx. In this film, I take a journey of investigation to find out where this boundary truly lies and how (if possible) to respectfully participate.

GENERATION GAP

Presenter: Devin Davidson
Category: Film & Digital Media
Room Location: Online Only
Number: 1506
Mentor: Amol Pavangadkar

Generation Gap is a documentary that focuses on how the COVID-19 pandemic affected a range of different people. Our group specifically targeted children and the elderly. We wanted a variety of opinions of how each group handled the pandemic, respectfully. Through our process, there were a lot of challenges that were faced during our production. Some of those include finding a way to navigate comfort levels due to the contagiousness of the virus or by having children stay still when trying to film them on such a serious topic. Not only did we want to bring insight to a different perspective of how the COVID-19 pandemic was dealt with, but we also wanted to bring awareness to the fact that everyone has had a different experience during these arduous times.

SHADOW OF A DOUBT

Presenter: Cole Schmidt
Category: Film & Digital Media
Room Location: Online Only
Number: 1507
Mentor: Amol Pavangadkar

The film tells the story of a budding romance from the point of view of a young man. The story develops from both a perspective and a reality and a window into the mind of the main character, Shane, which is portrayed by somewhat uncanny night time scenes. While the plot is driven by the romance, the focus of the film is truly on Shane's mental health which is both entirely reliant upon the relationship, and the reason for its eventual collapse. The conflict is between Shane and his romantic interest, but Shane and himself, and it eventually leaves him as the only victim of his romantic failure.

MINUS ONE

Presenter: Daniel Pena
Category: Film & Digital Media
Room Location: Online Only
Number: 1508
Additional Student Presenters: Chad Harvey, Heather Kulkis, Madisyn Hoke, Luke Atzinger, Brenda Walker, Xiaoya Niu
Mentor: Amol Pavangadkar

In the fall of 2021, I had the unique opportunity to work collaboratively with a group of filmmakers to produce a 6-minute short film. Our goal with the project was to explore the nature of complex relationships, told through a brilliantly written comedy. The setting of the short film is a wedding day in a Midwest town at a beautiful outdoor venue with freshly fallen snow on the ground. A happily in-love bride and groom arrive on their special day to a whirlwind of chaos and confusion. Was this chaos a product of their own doing? Or was it a fool-proof sabotage plan? We were in production for this film during the beginning of winter which posed some obvious challenges. Besides the bitter shooting conditions, we had the unprecedented challenge of filming during a global pandemic. Since most of our filmmaking classes had been online, we dealt with the added technical disadvantage of not having experience with using high-end equipment. I genuinely love telling stories through film, and this project allowed me to learn how to effectively communicate my ideas in a collaborative setting, as well as how to provide feedback and adapt to criticism. From that I was able to further develop my skills in time-management and most importantly, my skills as a leader.

THE PICK-UP

Presenter: Zoe Fowlkes
Category: Film & Digital Media
Room Location: Online Only
Number: 1509

Additional Student Presenters: Nick Fee, Jonathan Cassano, Kenny Franklin, Olivia Zhang
Mentor: Amol Pavangadkar

We created a six-minute short film over the course of one semester consisting of a group of six students. We faced challenges such as underestimating the amount of time it would take for each shoot, along with difficult night shoots. We also enhanced our production skills and equipment knowledge. With this project, we were also able to improve our collaboration and time management adeptness. This was also the first on-set and production experience for many of us due to the ongoing pandemic. We learned how to navigate sets with COVID protocols as we will need to know this upon graduation.

GLOBAL & AREA STUDIES
Poster Presentations

FAN ATTITUDES TOWARDS KOREAN BOY BAND BTS TARGET SHIFT FROM A KOREAN TO WESTERN AUDIENCE

Presenter: Seohee Kim
Category: Global & Area Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1601
Mentor: Steven Fraiberg

BTS, a South-Korean boy band, has recently become a global phenomenon. While BTS's discography has consisted of Korean songs and a loyal Korean fanbase, its increasingly

international focus has led to a shift in their target audience. In their attempts to reach out to Western marketplace, their style has begun to shift with four recent singles all in English. This has led to tensions amongst the Korean fanbase who believes that BTS is slowly losing its identity. In this study, I more closely look at these attitudes by drawing on a range of ethnographic methods: participant observation, gathering artifacts (e.g., social media posts), and semi-structured interviews of Korean and Western fanbases. The purpose of this study is to present my findings and identify ways that they are linked to issues related to identity, westernization, and globalization.

DIVERSITY & INCLUSION IN THE WORKPLACE: PRACTICES & STRATEGIES BETWEEN FRANCE AND THE US

Presenter: Matt Sutton
Category: Global & Area Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1602
Mentor: Elizabeth Tuttle

Hiring practices around the world are often protected BY policies intended to create fair and ethical workplaces. This study examines diversity and inclusion practices in the United States and in France. The cultural analysis of this study will help explore the intersection of global hiring practices and what strategies different cultures take when navigating the dynamic nature of Human Resources. This paper analyzes the hiring practices of French and American businesses using data from one-on-one interviews with HR professionals, experiential recounts, and secondary resources published in the past ten years to inform a generalized audience. Ultimately, understanding standards and practices as related to human resources in France and the United State can help carve out a more inclusive path towards workplace equity and equality.

GURYEONG: SEOUL'S HIDDEN POCKET OF INEQUALITY

Presenter: Catherine Fisher
Category: Global & Area Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1603
Mentor: Guo Chen

As South Korea has emerged from decades of fast-paced economic development, it has shed its past image of a war-torn and struggling nation. The quick economic change has exposed the cracks in the system. Once the least developed region of the capital, Gangnam, Seoul, became synonymous with luxury and wealth in a brief period. Yet, in a small area within the tall skyscrapers and cultural hotspots, there lies a hidden slum, exemplifying the wealth inequality found in South Korea. Its long history stems from the Korean War and the 1988 Olympics and reaches into today. Because of the slum remaining undeveloped, Seoul has presented plans to erase the shantytown to install high-rise apartments, which the residents of Guryeong cannot afford. Residents range from the wealthy, waiting for the moment to sell when the government redevelops the land, migrants, families, and the elderly, who are statistically the most disadvantaged group in South Korea. While there have been attempts to provide resources,

they face obstacles entangled with legal and outreach inefficiencies. This area of Gangnam has intersected with many legal and political systems that have dug the residents further into isolation. By cataloging the history of the slum and contextualizing it within the glamor of Gangnam, this presentation employs research data and visual materials to reveal how the public discourses have historically and continually seen the residents of Guryeong as eyesores rather than a population in need of a better quality of life.

WOMEN OF SPARTA

Presenter: Chelsea Kamm
Category: Global & Area Studies
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1604
Mentor: Noah Kaye

Michigan State University chose a spartan, Sparty as we like to call him, to be the school's mascot. Sparty can represent many things for the student body at MSU. Things such as strength, discipline, or bravery which are held to be important to students at this institution. Since Sparty is depicted to be a man, what does he represent for women being educated at Michigan State? And how do women of Ancient Sparta, their education and role in society, relate to women of Michigan State University, even 1000 years later?

GLOBAL & AREA STUDIES
Oral Presentations

EXPLORING MENSTRUAL HEALTH THROUGH THE EXPERIENCE OF INDIAN SLUM DWELLERS

Presenter: Rebekah Schoen
Category: Global & Area Studies
Time Slot: 1:30 PM
Room Location: Meeting Room A
Number: 1611
Mentor: Guo Chen

Menstrual health continues to be a prevalent issue for many slum communities in India. The lack of focus on menstrual equity both in these communities and worldwide has exacerbated the problems faced by menstruators in India's slums. In this presentation, audiences will learn of the complex barriers of misinformation, stigma, infrastructure issues, and improper use of period products that slum menstruators regularly face - gaining a complete understanding of the systemic problems of menstrual health crisis in Indian slums.

BLENDING IN: THE HIDDEN NATURE AND EVOLUTION OF NEW YORK CITY'S INFORMAL HOUSING MARKET SINCE THE 1930S

Presenter: Jillian Plant
Category: Global & Area Studies
Time Slot: 2:00 PM
Room Location: Meeting Room A
Number: 1613
Mentor: Guo Chen

Informal housing is a form of residence considered to be illegal due to its deviation from rules dictating the ways in which someone can occupy a space. This phenomenon is especially prevalent in New York City, where informal residents are estimated to contribute to a 2010 Census undercount of over four hundred thousand; past analyses point to many of these residents having immigrant status or being people of color. This paper analyzed the changing legal and tenure statuses of informal housing structures, drawing from research literatures, historical accounts, quantitative data, and interviews/narratives of New York residents impacted by informal housing. In New York City, informal housing can take on various forms, such as lofts, accessory dwelling units, and squatter-occupied buildings. Among these types, the most legally fluctuating type of formal housing is the loft; the specific statures dictating these changes and their impacts are described in a chronological format. Gentrification is thoroughly discussed as a primary impact of legalization as this has occurred historically with loft residences; the implications of this process occurring with accessory dwelling units are evaluated. In addition, images of accessory dwelling units are provided as well as a picture of a modern loft to demonstrate the impact of gentrification on their appearance. The consequences of the legalization of informal housing on residents in New York City provide a framework for evaluating similar communities in the Global South; further investigation regarding gentrification in the South should occur.

FROM HIDDEN SLUM TO SPRAWLING CITY: THE RESILIENCE OF CIUDAD NEZA, MEXICO SINCE THE 1940S

Presenter: Gabby Nelson
Category: Global & Area Studies
Time Slot: 2:15 PM
Room Location: Meeting Room A
Number: 1614
Mentor: Guo Chen

Against the backdrop of global slums, this research focused on the rarely discussed examples of slums turning into thriving cities through the case study of Ciudad Neza, Mexico. Using a combination of quantitative and qualitative data based on historical archives, news accounts, and individual narratives, I examined the historical development and spatial changes in the structural elements of Ciudad Neza. I explored the central question of how Ciudad Neza transitioned from a hidden, informal settlement to a secure and expanding municipality and what historical and geographical contingencies and actors have contributed to the critical moments of the "formalization" of Ciudad Neza. More specifically, in the context of rising inequality and rural-urban migration post World War II, I discussed the shaping of Ciudad Neza by political reforms involving improving infrastructure, education, and public services. Further, I asked who/what contributed to the improved conditions of the city and the community's

resilience? In addition, this research combined an analysis with a photodocumentary that highlight the vitality of Ciudad Neza and its community. The success of Neza can be applied to other slums around the world and provide a roadmap for developing a secure and safe environment and promoting social and environmental justice for the world's slum populations.

THE DYNAMIC OF FEMINISM AND CAPITALISM: A STUDY OF DR. NAWAL EL SAADAWI'S WORK

Presenter: Sky Young
Category: Global & Area Studies
Time Slot: 2:30 PM
Room Location: Meeting Room A
Number: 1615
Mentor: Camelia Suleiman

The writings of Egyptian Feminist Dr. Nawal El Saadawi were studied to understand the relationship of Feminism and Capitalism. Her works were examined to gain perspectives on the Egyptian Feminist Movement and the Global Feminist Movement to better undertand similarities and differences. The obituaries and speeches of Dr. Saadawi were viewed to better understand her stance and influence on Feminism and Socialism in Egypt. This research was then applied to a broader scale by correlating it to in class research selected and lead by our professor. Dr. Saadawi's theory is important for discussion because her modern thinking holds a universal message as she considers the influence of global systems (e.g., economics and religion) on the social patriarchy.

THE MEDICAL FIELD IN SYRIA

Presenter: Damonet Johnson
Category: Global & Area Studies
Time Slot: 2:45 PM
Room Location: Meeting Room A
Number: 1616
Mentor: Camelia Suleiman

In most parts of the world patriarchy prevails. If a country has a patriarchal society, then that patriarchy will show itself in nearly every part of that society whether it is noticeable or not. Today I will be focusing on how patriarchy affects the medical system in Syria for both the women that system cares for and the women who work within it. Americans may assume problems arise in Syria's medical care system due to systematic flaws. These types of assumptions will be combated during this presentation. I rely on conversations with a women doctor from Syria who now lives in Germany. I also rely on the academic literature of the medical field in Syria. I use 'the dangers of a single story' as a prism to investigate the problem. My method is inductive. This presentation is meant to breaks down some of the American stereotypes towards Syria pertaining to its healthcare system, as well as raise awareness on women's position in the healthcare system.

HEALTH SCIENCES
Poster Presentations

VITAMIN D AS COFACTOR FOR NEURODEVELOPMENT AND COGNITIVE FUNCTION

Presenter: Michael Kaven
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1701
Mentor: Ilce Medina Meza

"Vitamin D" refers to a group of closely related secosteroid metabolites- calcidiol, calcitriol, and others- with demonstrated roles in bone and immune health in humans. Its deficiency in human nutrition has been associated with major health outcomes including renal failure, rickets, and dysregulated bone mineralization. Vitamin D metabolites are hypothesized to support human neurology and cognition. Isoforms D2 and D3 pose significant structural similarities yet differing sources. Vitamin D3 is produced by photosynthesis of 7-dehydrocholesterol in mammalian skin, while Vitamin D2 results from irradiation of plant ergosterol in dietary sources. Initial study sought to obtain the current status of chromatography and mass spectrometry (LC-MS/MS) techniques for Vitamin D quantification and offer insight on metabolite bioavailability. This aim was attained by critical review of peer publications for a multitude of cytochrome P450 proteins- intracellular (and intranuclear) receptors, transport enzymes, and other globulins relevant to Vitamin D metabolism. A comprehensive, functional protocol for isolation of Vitamin D from biological matrices was crafted and evaluated. The GC-MS and LC-MS data successfully measure each analyte with fragmentation patterns. In the current project phase, human plasma specimens are run with the novel protocol, with a goal to identify associations between calcitriol (1α,25-(OH)2D3) deficiency and neurological wellness, defined by the presence (or absence) of diagnosed cognitive, developmental, and degenerative disorders.

INTERACTION OF FUSOBACTERIUM AND PORPHYROMONAS IN ANEROBIC BIOFILMS

Presenter: Aysiah Kirk
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1702
Mentor: Jonathan Hardy

Fusobacterium nucleatum is a Gram-negative, anaerobic bacterium that colonizes the gingival space. This organism forms strong biofilms that contribute to periodontitis and has recently been linked to colorectal cancer. We will be analyzing metabolic factors that alter biofilms of Fusobacterium through the use of a model. The model utilizes cover glass slips that permits the characterization of Fusobacterium biofilms for electron microscopy. We will also analyze the effects of sucrose and lactic acid, two crucial metabolites for oral colonization. We will create a mixed biofilm model of Fusobacterium and Porphyromonas gingivitis.

CAN SALIVA REPLACE TRADITIONAL METHODS OF GLUCOSE MONITORING?

Presenter: Maria Scannell
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1703
Additional Student Presenters: Maggie Naco
Mentor: Chunqi Qian

A less intrusive glucose monitoring system can help both health monitoring in everyday lifestyles as well as maintaining a patient's conditions in a hospital setting. The switch in sampling other bodily fluids can lead to great efficiency and lifestyle improvements. Less invasive options like sweat and saliva were tested alongside blood samples to compare results to discern if these other types of bodily fluids could be used to perform accurate readings for blood glucose levels. The less invasive sampling would allow individuals who suffer from conditions such as hyperglycemia and hypoglycemia effectively measure their health status with a more convenient methodology so that they can make needed changes instantaneously. Beyond the literature search a commercially available glucometer was used to measure blood glucose levels but was unable to read other bodily fluids. The next step tested an electrode, which can intake smaller quantities of samples. The results of the research can lead to further implications in continuous monitoring and reduce patient expenses.

EFFECTS OF PSYCHOTHERAPY ON REDUCING STRESS AND DEPRESSION AMONG TRANSPLANT PATIENTS

Presenter: Stephanie Pitsch
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1704
Mentor: Ann Annis, Jiying Ling

Roughly 40,000 organ transplant surgeries are performed each year, with 41,354 transplants occurring in 2021. While these statistics suggest medical feats, the process of waiting for transplantation is associated with stress and depression among patients. Approximately 50% of transplant patients have experienced a significant mental health concern like depression. Psychotherapy to address stress and depression experienced throughout this journey may impact how patients cope. The objective is to conduct a literature review of studies that examined the effect of psychotherapy interventions on stress and depression among patients before or after organ transplantation. The CINHAL and PubMed databases were searched, using the keywords: psychotherapy, psychotherapy intervention, therapy, transplant, transplant recipient, stress, and depression. Inclusion criteria were studies focused on transplant patients and interventions to lessen stress and depression. Articles not in English and published prior to 2012 were excluded. Five articles were selected. Two studies demonstrated significant decreases in stress and depression associated with group therapy intervention for both patients waiting for kidney and liver transplants and those on the liver transplant list. Another study found improvements in patients stress and depression with a resilience intervention. The liver SMART intervention resulted in no significant change in depression. However, patients

appraised it as excellent. The review of these studies signifies the importance of addressing patients' mental health throughout their medical journey to achieve more favorable outcomes, and to put the patients' needs first.

RELATIONSHIPS BETWEEN SCREEN TIME AND ANTHROPOMETRICS AMONG LOW-INCOME PRESCHOOLERS

Presenter: Sia Rajgarhia
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1705
Additional Student Presenters: Stefania Ward
Mentor: Jiying Ling, Sisi Chen, Teresa Ng

During the pandemic, screen time for preschoolers dramatically increased. Although the relationship between screen time and anthropometrics has been established, it is unclear how the pandemic might have impacted this relationship. Therefore, this study examined this relationship in low-income preschoolers during the pandemic. A total of 57 preschoolers were recruited from local Michigan Head Start Centers, which served low-income families. Parents completed an online survey via Qualtrics that assessed their preschoolers' screen time. Preschoolers' height, weight, and percent body fat were measured by trained MSU research students. The mean age of these preschoolers were 3.73 years old, with 64.9% being female, 15.8% being Hispanic, and 42.1% being Black. About 22.2% of the preschoolers were overweight and 11.1% were obese. On average, preschoolers had 5.12 hours of screen time per day, and only 17.9% had less than an hour of screen time each day which is the recommended level for this age group. Their screen time was positively correlated with their body mass index (BMI, r=0.13), BMI-P (r=0.06), and percent body fat (r=0.18). Preschoolers meeting the screen time recommendation had lower percent body fat than those not (21.63% vs. 23.96%). The results imply that increased screen time during the pandemic increased the anthropometrics of preschoolers. It is important to assist preschoolers in getting enough physical activity rather than being dependent on screens to foster a long-term positive well-being.

PSYCHIATRIC ELECTROCEUTICAL INTERVENTIONS AND THEIR POTENTIAL TO INFLUENCE PERSONALITY: A CROSS-ANALYSIS OF SURVEY AND INTERVIEW RESULTS

Presenter: Marissa Cortright
Category: Health Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 1706
Mentor: Laura Cabrera*, Robyn Bluhm, Eric Achtyes, Aaron McCright

The current neuroethics literature regarding the potential for neurotechnologies to alter a patient's personality focuses almost entirely on Deep Brain Stimulation, and little discussion has occurred about other psychiatric electroceutical interventions (PEIs). To better understand how concerns vary across treatment modalities and stakeholder groups, we conducted semi-structured interviews across three stakeholder groups - 16 psychiatrists, 16 patients diagnosed

with depression, and 16 members of the general public - to identify perceptions of PEIs' potential effects on self. We then administered a national survey with an embedded experiment to psychiatrists (n=505), people diagnosed with depression (n=1050), caregivers (n=1026), and members of the general public (n=1025). Here we present a cross-analysis of results related to PEIs impact on sense of self from the interviews and survey. In the interviews, there was no evidence of significant differences on changes to self by modality. Among stakeholder groups, both psychiatrists and patients interviewed tended to perceive potential changes to self as positive. In the national survey, compared to subjects assigned to ECT, participants assigned to TMS perceived it to have greater influence on sense of self. Also, compared to members of the public, psychiatrists, patients, and caregivers, perceived a stronger influence on self. It is possible that compared to the public, these other groups see the potential benefits in treating the condition as positive changes to self, consistent with our interview findings. The next step in the project is to develop an analytic map to identify shared concerns, and differences across interventions and stakeholder groups.

ARE SHOWER SHOES WORTH IT? OBSERVING BACTERIA IN COLLEGE SHOWERS

Presenter: Allison Gentner
Category: Health Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1711
Mentor: Per Askeland, Carl Boehlert

When living in dormitories at colleges with community bathrooms, students are often advised to purchase shower shoes to avoid any potential infections or exposure to unwanted bacteria. Many students purchase shower shoes without question, but never investigate the issue further. In my research, I plan to use a Scanning Electron Microscope (SEM) and an Optical Microscope to take pictures of and analyze the bacteria present on shower shoes from college bathrooms. I hope to discover how useful shower shoes really are, and if they actually protect students from unfortunate infections and exposure to bacteria.

UTILIZATION OF MAGNETIC NANOPARTICLES TO ANALYZE BACTERIA IN CONTAMINATED WATER

Presenter: Margarita Chekhova
Category: Health Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1713
Mentor: Evangelyn Alocilja

Waterborne illnesses cause 3.1% of deaths around the world. This is partly due to polluted water supply. Conventional processes to detect waterborne bacteria can take over 2 days to produce conclusive results. The purpose of this research is to develop a quicker and more efficient way to analyze the concentration of bacteria in local water sources. In this experiment, interactions between magnetic nanoparticles (MNPs) and bacteria are utilized to capture and concentrate bacterial cells. Purified water is inoculated with varying concentrations of Salmonella and then MNPs are added. This is followed by magnetic separation and re-

suspension in the buffer solution. Each suspension is then placed in tubes. These tubes are placed in a magnetic separator and the supernatant is extracted from each tube leaving only MNP and bacteria attached to the tube wall. In addition to concentrating bacteria, this method can also be used to approximate the bacterial concentration. MNP distribution on the tube surface after supernatant removal has been shown to correlate with the concentration of bacteria in the sample Then, this method will be done with local water sources. This procedure has the potential to be used in low-income areas for a faster way to determine if there is a high concentration of bacteria present in water sources. Current results show the concentration factor at around 9.5x10^5 CFU/mL. More studies will be done to increase the sensitivity of the method.

TESTING FOR FOODBORNE PATHOGENS USING E. COLI O157 BIOSENSOR

Presenter: Kaily Kao
Category: Health Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1714
Mentor: Evangelyn Alocilja

Each year in the United States alone, E. coli infections cause 265,000 illnesses and around 100 deaths. Almost half of these infections are caused by the strain E. coli O157:H7. Current methods of testing for foodborne pathogens, like E. coli O157:H7, are expensive and time consuming. Creating a faster, more cost-effective test makes testing options more accessible and can be more helpful in identifying pathogens early. In this work, a DNA-based biosensor using gold nanoparticles (GNPs) is used to differentiate target and non-target DNA. This biosensor produces visible colorimetric results due to the unique properties of GNPs. When GNPs aggregate, they become a blue or purple color, which signifies a non-target DNA in the sample. A pink or red color signifies the presence of target DNA. In addition to qualitative results, absorbance spectra can numerically determine whether the sample contains target DNA. Preliminary data for specificity testing from pure DNA cultures shows successful differentiation between target E. coli O157:H7 DNA from several non-target foodborne bacteria species. In addition, testing with pure DNA cultures shows that the biosensor can detect samples with concentrations of target DNA as low as of 5 ng/µL. This method also has been shown to be effective in detecting DNA extracted directly from foods. With a 30-minute assay time, this biosensor has the potential to be more accessible, affordable, and rapid than current testing methods.

PRESCHOOLER'S ANTHROPOMETRICS WERE RELATED TO PARENTAL FEEDING ATTITUDES, BELIEFS, AND PRACTICES

Presenter: Isabel Lara
Category: Health Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1715
Mentor: Jiying Ling, Teresa Ng, Sisi Chen

Limited research has been conducted to examine the relationships between preschoolers' anthropometrics (body mass index [BMI], percent body fat) and parental feeding attitudes. Therefore, this study analyzed the data of 111 Head Start parents (mean age=29.80 years) and preschoolers (mean age=3.68 years) to examine how parental attitudes, beliefs, and practices were correlated with preschoolers' anthropometrics. Parents completed an online demographic survey and Child Feeding Questionnaire via Qualtrics to assess their demographics and feeding attitudes, beliefs, and practices. Preschoolers' height, weight, and percent body fat were measured objectively by trained data collectors. The participants were 27.9% Black, 57.7% White, and 1.8% American Indian. About 45.9% parents were single, and 52.3% reported an annual family income less <$20,000. Additionally, 18.5% preschoolers were overweight and 9.8% were obese. Parental feeding restriction and perceived child weight were positively related to their preschoolers' BMI (r=0.26, 0.53), BMI-percentile (r=0.26, 0.52), and percent body fat (r=0.22, 0.39), respectively. Moreover, parental feeding responsibility was negatively related to their preschoolers' BMI (r=-0.28), BMI-percentile (-0.24), and percent body fat (r=- 0.22). Parental concerns of their child weight were positively related to their preschoolers' BMI (r=0.22). The study's results indicate that parents limited their preschoolers' access to high- sugar and high-fat foods when having concerns of child weight. Also, parents' perceptions of their responsibility for child feeding showed some promising of helping their preschoolers maintain a healthy weight. Given the cross-sectional nature of the study, longitudinal research is warranted to further examine the causal relationship between child weight and parental feeding practices.

DO LYSOL® WIPES REALLY KILL 99.9% OF BACTERIA?

Presenter: Erin Rhodea
Category: Health Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1716
Mentor: Per Askeland, Carl Boehlert

It is accepted by most that disinfecting surfaces is an effective way to prevent the spread of illness and disease. There are many different products that are used as disinfectants, one of the most common being Lysol® Disinfecting Wipes. Lysol® claims that their wipes kill 99.9% of all bacteria. Within my research, I established if this statement was true and determined how effective Lysol® Disinfecting Wipes truly are. To accomplish this, I used an Electron Scanning Microscope (SEM) to examine different surfaces before and after being disinfected with a Lysol® Disinfecting Wipe. I then compared the concentration of bacteria before disinfection and after. I found a decrease in bacteria concretion; however, I did not observe a decrease of 99.9% in every trial.

HEALTH SCIENCES
Oral Presentations

META-ANALYSIS OF SARS-COV-2 VIRAL LOADS OVER TIME BY SAMPLE TYPE AND DISEASE SEVERITY

Presenter: Gwyneth Dunbar
Category: Health Sciences
Time Slot: 12:45 PM
Room Location: Meeting Room D
Number: 1721
Mentor: Jade Mitchell, Ryan Julien

More research is still needed to understand the viral dynamics of SARS-CoV-2 as it continues to evolve. The ability for SARS-CoV-2 to spread over the past two years changed with new variants along with vaccines and boosters that are now available. Spread is a function of how much virus is secreted by infected individuals, and viral load is the amount of virus in a person's sample at a given time. A literature search conducted in October 2020 helped yield 82 articles from January 1st, 2020, to December 20th, 2020, with 8 sample types including nasopharyngeal, throat, fecal, saliva, sputum, blood, ocular, and urine. Thirty-eight (n=38) of the reviewed articles were used in a quantitative analysis comparing viral load over time in various sample types, and 30 of those 38 articles provided a defined severity or symptoms to be placed in a severity group for an analysis comparing severity categories with viral load over time. Several statistical approaches were used to analyze the data to determine the relationship between viral load and the relevant sample types and reported severities. An ANOVA indicated that severity, sample type, and the interaction between sample type and severity were all statistically significant predictors of viral load. A post-hoc Tukey test was conducted to further evaluate the differences between each level of the two independent variables. This analysis can be used to evaluate risk management strategies like appropriate periods of isolation while one is still shredding viruses and monitoring wastewater as a means of passive surveillance.

PARENTAL PERCEIVED STRESS WAS SIMILAR BETWEEN RURAL AND URBAN SETTINGS DURING THE SARS-COV-2 PANDEMIC

Presenter: Nicholas Bouchard
Category: Health Sciences
Time Slot: 1:00 PM
Room Location: Meeting Room D
Number: 1722
Mentor: Jiying Ling, Sisi Chen, Teresa Ng

Understanding the nature of parental stress is vital in guiding practice to reduce parental stress effectively. However, there is little knowledge concerning the perception of stress among parents living in rural areas vs. urban areas during the SARS-CoV-2 pandemic. Therefore, this study compared the stress differences between urban and rural low-income parents during the SARS-COV-2 pandemic. This study used baseline data from 109 Michigan parents of preschool- aged children who participated in health promotion interventions. Parents were

recruited from three Michigan Head Start organizations and grouped based on residency in a rural or urban environment. Parents completed a demographic survey and the 10-item Perceived Stress Scale (PSS) via Qualtrics to assess their demographics and perceived stress level. Independent t-test and Pearson Chi-Square test were performed to analyze the data using the IBM SPSS Statistics 27. Participants included 97.2% female, 10.1% Hispanic, 28.4% black, and 46.8% single parents, with a mean age of 29.8 years (SD=5.62). Among the parents, 29%, 56.1%, and 15% reported having low, moderate, and high levels of stress, respectively. Perceived stress levels were similar between rural and urban settings (M=18.35 vs. 17.81). Furthermore, urban and rural parental perceived stress levels were not significantly different when comparing low (28.8% vs. 29.4%), moderate (57.5% vs. 52.9%), and high (13.7% vs. 17.6%) stress levels. The study findings imply that parents' perceived stress levels were similar between rural and urban settings, highlighting the need for equal assistance in the guidance of stress reduction between urban and rural parents.

PRENATAL CHARACTERISTICS ASSOCIATED WITH MATERNAL FECAL MICROBIAL COMMUNITIES

Presenter: Nikita Nel
Category: Health Sciences
Time Slot: 1:15 PM
Room Location: Meeting Room D
Number: 1723
Mentor: Sarah Comstock

The maternal microbiome is often an overlooked, but critically important tool for understanding maternal and pregnancy outcomes. However, for pregnant women, there is still a large gap in knowledge about the specific relationships between a pregnant mother's microbiome and their health, including BMI, medication use, etc. This study has two aims. The first, to understand which maternal characteristics are associated with pre-pregnancy BMI category. The second, to establish whether we can associate microbial diversity with different maternal characteristics. Stool samples were collected from participants (n=85) during their third trimester of pregnancy, fecal microbial communities were assessed, and data was analyzed using R software. All analyses were univariate. Those women whose BMI category was obese tend to have used antibiotics before their pregnancy, smoked, have a lower education level, and be unmarried. Alpha diversity was significantly different between communities when participants were categorized by BMI, education level, marriage status and bond status. Alpha Diversity was also significantly different between those with a BMI status as normal compared to those in the obese category. Beta Diversity was also unique in mothers within each BMI category, education levels, and marriage status. The abundance of Prevotella was associated with maternal BMI category. These results suggest that there is a microbial connection between a pregnant mother's gut microbiome and their pre-pregnancy BMI. This information gives further support to the importance of the maternal gut microbiome and gives new insight into the microbial relationship between a mother's microbiome and their prenatal health.

VALIDATION OF THE EYETELEMED IOPVET INDENTATION TONOMETER FOR USE IN DOGS

Presenter: Lydia Kapeller
Category: Health Sciences
Time Slot: 1:30 PM
Room Location: Meeting Room D
Number: 1724
Mentor: Andras Komaromy

To assess the accuracy of intraocular pressure (IOP) readings from the eyeTelemed IOPvet indentation tonometer by comparing measurements to those taken using the Tono- Vera® rebound tonometer. A total of 50 eyes from 26 beagle dogs were used in conducting this study - 21 ADAMTS10-mutant beagle dogs with open-angle glaucoma (ADAMTS10-OAG) and five non-glaucomatous beagle dogs. For each dog used in the study, IOP readings of both eyes were first measured in mmHg with the Tono-Vera®; an average of three measurements were taken with the assistance of the instrument's alignment system. The data were taken and recorded by Person 1, who concealed the results from Person 2. Subsequently, proparacaine HCl ophthalmic solution was administered for ocular surface anesthesia, and Person 2 then estimated the IOP using the eyeTelemed IOPvet device. Instead of numbers, this instrument provided the results as green (normal), yellow (elevated), or red (high). Roles of collecting pressures from both the Tono-VeraTM and the eyeTelemed IOPvet alternated between two people, but Person 2 who collected measurements from the eye Telemed IOPvet was always blind to the results of Person 1 who collected measurements from the Tono-VeraTM. Tono-Vera® readings were always taken first and concealed from Person 2, who obtained the measurement with the IOPvet. Over three months, a total of 265 IOP measurements were taken with both the IOPvet and Tono-Vera® tonometers, respectively. Results and conclusions are pending (will be added and available before edit deadline).

HISTORY, POLITICAL SCIENCE, & ECONOMICS
Poster Presentations

PIPELINE POLITICS: GERMANY, THE UNITED STATES, AND THE CRISIS IN UKRAINE

Presenter: Evan Anderson
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1801
Mentor: Norman Graham

In the past month, the longtime tension between Russia and Ukraine has once again put the international community on edge. Russian troop movements near their borders, in the tens of thousands, invoke fears of war as the United States and the NATO alliance contemplate the proper response. However, while the West might aspire to a united front against Russian actions in Ukraine, the actual arrangement is not so clear-cut. Although sanctions are a popular option in Washington, their reception among EU member-states is frostier, especially for

Germany with its upcoming Nordstream2 pipeline. Should Nordstream2 go online, Ukraine would lose the leverage gained from the Russian pipelines it currently plays host to. More generally, Russia's status as a major energy and trade partner for Germany and the EU dampens the possibility of a strong response to Russia, even should an invasion occur. My presentation seeks to examine the actual extent of German and European economic and energy ties with Russia, explain the reasons behind them, and the prospects for changing the situation. Russian and EU trade and energy statistics, American congressional reports, academic papers, and German language media form the basis of this analysis. Overall, the presentation hopes to provide greater perspective on the economic situation so that the current crisis and its future can be better understood.

SPARTY AND SPARTINA: A CLOSER LOOK INTO THE WOMEN OF ANCIENT SPARTA

Presenter: Shrishti Jalan
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1802
Mentor: Noah Kaye

The project uncovers and collects facts about women in ancient Sparta from written accounts from pre-20th century eras and aims to hypothesize why Michigan State University chose the Spartan as its mascot. Through this project, I will present the values of patriarchy, or lack thereof, in the Spartan community and also present the various opinions academicians had on the same.

AN UTOPIA NO MORE? - A LOOK AT POPULAR THOUGHT ON SPARTA'S POLITICAL SYSTEM IN THE ENLIGHTENMENT AND BEYOND

Presenter: Mila Straskraba
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1804
Mentor: Noah Kaye

A look at the views concerning Sparta's political system and how it evolved as governments in Western Europe became more democratic.

OPPOSITE EXPERIENCES DURING A PANDEMIC: THE SAMOAN ISLANDS DURING THE SPANISH INFLUENZA PANDEMIC OF 1918 TO 1920

Presenter: Britton Gustafson
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1805
Mentor: Siddharth Chandra

The Spanish Influenza Pandemic of 1918 to 1920 devastated populations across the globe, killing an estimated 40 to 80 million people (Shanks 2012). The severity of the pandemic itself varied significantly across different regions. In the Pacific Islands, some areas were devastated whereas others were left untouched by Spanish Influenza. Nowhere else in the Pacific Islands or even the world exemplifies the dramatic differences in pandemic experiences better than that of the Samoan Islands. Western Samoa had the highest death rate in the world at 22%, whereas its neighbor American Samoa did not record a single death (Shanks 2012). The aim of this research is to explain how and why the two Samoas had opposite experiences during the Spanish Influenza Pandemic. I will be discussing how the distribution of power and authority as well as other factors contributed to their differences.

THE ROLE OF SOCIAL MEDIA IN THE EXACERBATION OF DEMOCRATIC BACKSLIDING IN HUNGARY

Presenter: Ruwarashe Mukwada
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1806
Mentor: Ani Sarkissian

In recent years countries have been entering a period of democratic backsliding. Phenomena such as the jailing of political dissidents have flourished. I hypothesized that an increase in the use of social media has exacerbated such illiberal practices. I argued that, though traditionally, the jailing of dissidents was targeted towards opposition members and journalists, the rise of social media has allowed the government to prosecute ordinary citizens for their social media posts under insult laws. I looked at Hungary as a case study. Hungary, a European Union nation was seen as a success story of democratization. However, in recent years it has been touted as an example of democratic backsliding. I analyzed how social media has exposed more private citizens to prosecution under laws that protect the government against "insult." I measured this by analyzing the percentages of private citizens vs journalists who were prosecuted under insult laws prior to the rise of social media in the 1990-2010 period, compared to the era of high social media usage of the 2010s. This also corresponds to the political juncture of the Hungarian constitutional change (2011-2021). I analyzed how the rise of the Fidesz party and Viktor Orban have transformed the state with changes to these laws to incorporate social media posts, to be used during insult laws prosecution.

SPARTY AND THE WOMEN OF SPARTA

Presenter: Tobi Guisinger
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1807
Mentor: Noah Kaye

Our beloved mascot, Sparty, is a symbol for MSU, its students and athletes, and its supporters. However, one must consider whether he is a proper representation of MSU, and if the Spartans were a group worth aligning ourselves with. In this study, I looked into the roles of women in ancient Spartan society and the way they were treated by their male peers.

THE MISSION TO "HELP AND EDUCATE THE CHILDREN OF THE PROLETARIAT": COMMUNIST SUMMER CAMPS IN 1930S FRANCE

Presenter: Madeline Korte
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1808
Mentor: Elizabeth Tuttle

My research focuses on the use of summer camps for children as a tool for spreading ideologies, specifically "Les Vacances Populaires Enfantines" (VPE). These summer vacation camps for children were sponsored by communist organizations in France in the 1930s and used as a way to spread communist and socialist values to a young generation. My findings demonstrate why communists in France and globally chose summer camps as a vehicle for the spread of their ideology and why these camps were successful at spreading communist ideologies. My presentation describes Les Vacances Populaires Enfantines, discusses their specific instance of success, makes connections to similar summer camps in a global and modern context, and concludes with why organizations choose summer camps to spread their ideologies. This research is significant because it is important to understand historical trends in the way ideas are spread, especially to young people.

TOWARD A MODERATE ANTISLAVERY POLITICS: FREE SOIL DEMOCRATS AND THE MAKING OF THE FREE SOIL PARTY

Presenter: Jack Carlson
Category: History, Political Science, & Economics
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 1809
Mentor: Thomas Summerhill

Recent scholarship on antislavery politics has focused on the influence of political radicalism on the formation of antislavery political parties. Scholars have correctly pointed to the radicalism of abolitionists and other opponents of slavery as central to the rise of antislavery parties such as the Free Soil Party. But this scholarship has overlooked the essential role played by moderate antislavery politics in the formation of the Free Soil Party. Accordingly, my research focuses on

the contribution of moderate antislavery politics, such as the free soil ideology and opposition to slavery's expansion, to the broader ideology of the Free Soil Party. It has departed from recent historical scholarship by contending that moderate antislavery politics was integral to widening the antislavery electorate and transforming slavery from a state into a national issue, and that the turn toward political moderation rather than radicalism helped further antislavery politics nationally. I have drawn from the work of contemporary historians while also arguing that their emphasis on the influence of radical antislavery proponents is misplaced. In contrast to their work, I have put forward my interpretation that the effort of the Free Soil Party to place the issue of slavery and its expansion at the center of national politics is best attributed to its politically moderate, rather than radical, stance on slavery. My research ultimately argues that the influence of moderate antislavery politics was the most crucial factor in the ascent and partial success of the Free Soil Party, and antislavery politics more broadly, from 1848 until 1854.

HISTORY, POLITICAL SCIENCE, & ECONOMICS
Oral Presentations

THE BEFORE AND AFTER: BLASPHEMY LAWS IN TUNISIA BEFORE AND AFTER THE ARAB SPRING

Presenter: Harnoor Kaur
Category: History, Political Science, & Economics
Time Slot: 3:30 PM
Room Location: Meeting Room A
Number: 1821
Mentor: Ani Sarkissian

As the originating land of the Arab Spring in 2011, Tunisia was the epicenter of the revolutionary changes that came with the overthrow of the dictatorial government of President Ben Ali. A majority Muslim nation, Tunisia under Ben Ali had oppressive laws that outlawed the expression of any dissenting opinions and actively took away the rights of citizens to peacefully protest and criticize the authoritarian regime. Today, over a decade after the revolution, Tunisians are ruled by a newly drafted constitution under a democratic government. This research presentation focuses on the differences between the application of suppression and blasphemy laws in Tunisia before and after the Arab Spring while using laws from other democratic nations as points of comparison to estimate the long-term success of the Tunisian democracy.

"HOW LONG MUST WE SING THIS SONG" THE RELATIONSHIP BETWEEN NORTHERN IRISH NATIONALISM AND POPULAR MUSIC DURING THE TROUBLES

Presenter: Melissa Nally
Category: History, Political Science, & Economics
Time Slot: 3:45 PM
Room Location: Meeting Room A
Number: 1822
Mentor: Matthew Pauly

The Troubles in Northern Ireland was a 30-year conflict stretching from the late 1960s to the late 1990s. Nationalist feelings spread across the country through many methods, including popular music. The central question that guided this research was how did popular music influence nationalistic feelings, and in turn how did that impact the outcome of the Troubles? Popular music has always been a reflection of current feelings and opinions. Prior research on music and the Troubles has observed the instrumentation and lyricism of songs; this paper expands the scope. The goal of this research was to compile songs relating to the Troubles and analyze how they impacted nationalistic feelings and the outcome of the Troubles. Sources for this research were compiled from different scholars of Irish nationalism and history, musicologists, and songs from various artists. The sources revealed that the Troubles impacted many parts of Irish culture including the music that was created and consumed. Nationalists used lyrics to convey messages, Loyalists used classic anthems and instrumentations to provoke Nationalists, and more neutral artists approached the war from a pacifist perspective. Through interactions with the public, such as concerts, popular music was able to help bring an end to the conflict. The findings that popular music impacted the outcome of the Troubles by generating nationalism demonstrates how music can impact history.

FROM EMPEROR TO ORDINARY CITIZEN: A STORY OF TWENTIETH CENTURY CHINA

Presenter: Martin Lee
Category: History, Political Science, & Economics
Time Slot: 4:00 PM
Room Location: Meeting Room A
Number: 1823
Mentor: Aminda Smith

As China's last emperor, Aisin-Gioro Puyi had a distinctive life. One of his most significant experiences was his imprisonment by the communist party just after the establishment of the People's Republic of China. During his reeducation, he underwent major changes, including learning what it meant to be an "ordinary citizen" in a rapidly modernizing, socialist China. The communist party found the last emperor's thinking to be important and instructive enough that they later promoted the forced confession he wrote as a model of successful thought reform. This study tracked the life of the man the communists called "a feudalistic ruler" turned repentant "member of the masses." It contrasted Puyi's experiences in the first and second halves of his life, as recounted in his confession. It relied on different versions of the emperor's autobiography, published and unpublished, which were produced by the state at different times and under different political circumstances. This study also investigated Puyi's life and the various ways it was narrated by him and by others. Scholarly and popular accounts often use Puyi's life as a symbol of China's turbulent twentieth century, as a once "backward" place with an outdated imperial ruler became a "modern nation" with "ordinary citizens." This study shows that this narrative supported the goals of the Chinese state while obscuring important elements of China's global history. Puyi's story challenges such narratives, about his life, about China's transformation, and about the meaning of ideas like "modernity" most broadly.

PHOTOJOURNALISM AND THE VIETNAM WAR

Presenter: Lauren Gudeman
Category: History, Political Science, & Economics
Time Slot: 4:15 PM
Room Location: Meeting Room A
Number: 1824
Mentor: Michael Stamm

The Vietnam War was a bloody conflict between Communist North Vietnam and South Vietnam, along with their leading ally, the United States. The war spanned over two decades and took the lives of 58,000 Americans and 1.5 million Vietnamese citizens. From 1968-1972, three influential photos were published, and photojournalism began to rise. This presentation addressed the implications photojournalism had on American and English public opinion of the Vietnam War from 1968-1972, explained through three specific photos. This paper looked at the history of the Vietnam War and the public opinion prior to the publication of the photos. The paper analyzed two secondary sources about public opinion of the war and sought to draw connections between three photos, two taken in Vietnam, and one in America, and the public opinion of the war. These three photos seemed to have shifted the overall belief about the war, and the visual aspect of what was transpiring overseas fueled anti-war sentiment. Ultimately, this paper discussed how photojournalism and consumption of media contributed to anti-war sentiment and led to a noticeable shift in public opinion of the Vietnam War.

THE ROLE OF NEW YORK NEWSPAPERS IN PERPETUATING ISLAMOPHOBIC STEREOTYPES

Presenter: Abbie Barnum
Category: History, Political Science, & Economics
Time Slot: 4:30 PM
Room Location: Meeting Room A
Number: 1825
Mentor: Michael Stamm

The media, guided by publicly held stereotypes of Islam, covered American Muslims in ways that perpetuated a plethora of these Islamophobic stereotypes. This perpetuation of negative stereotypes of American Muslims was the media's way of representing Islam as the true perpetrator of militancy and in the years following terrorism. Through an analysis of several articles from newspapers such as The New York Times my piece identified and examined common stereotypes of Islam to determine their implications on minoritized Muslim American communities. Guiding this analysis is a series of key questions the most relevant being, how did New York newspapers throughout the 90s perpetuate modern Islamophobic stereotypes of Muslims? Through answering this question, the ways Muslim Americans have faced discriminatory media, policy, and societal norms will highlight how we may foster a progressive end to misrepresentation to lessen or eliminate American perpetuated Islamophobia.

HUMANITIES
Oral Presentations

HAITI THROUGH THE LENS OF VODOUN

Presenter: Milek Jaros
Category: Humanities
Time Slot: 8:30 AM
Room Location: Meeting Room B
Number: 1901
Mentor: Christopher Estrada

Religion is a constant of the human condition, serving as a medium through which we aspire to enlightenment. We use it as a guide to our most paradoxical existential questions, and for light in our darkest moments. Each culture has its own religion, or interpretation, entirely unique from all others, and each interpretation often reveals more about that culture's history and socioeconomic tensions than appears at first glance. Voodoo acts as a vessel for the syncretistic culture and history of the people of Haiti. Through the examination of the religion, we gain a greater insight into the tensions and struggles that pervade Haitian society, socioeconomically, internationally, domestically, and philosophically both today and in the annals of its history.

OBJECTIVE RELATIVISM AND DIALECTICAL MATERIALISM, AND ITS IMPLICATIONS FOR CLASS CONSCIOUSNESS

Presenter: Areeba Nadeem
Category: Humanities
Time Slot: 8:45 AM
Room Location: Meeting Room B
Number: 1902
Mentor: John McClendon

In preparing Dr. John McClendon's manuscript for two chapters of his book on Science and the Black Philosophical Experience, I had the opportunity to critically engage with his research. He argues that Parker English makes a failed assessment of Kwame Nkrumah's Materialism by 1. approaching the apparent issues as epistemological, when they are ontological, 2. incorrectly characterizing those issues, and 3. by arguing against Nkrumah's apparent direct realism for representative realism, he commits to an idealist approach instead of the materialist framework Nkrumah started out with. English's endorsement of indirect realism underscores the problem of a subjectivist approach to Marxism. Dr. McClendon elucidates on the relevant role science and the natural world plays in conceptualizing the socio-political relations of the material world. He expands on Marx and Engel's emphasis on the physical world by recognizing how the objective relativism Einstein presents in his Theory of Relativity does not engage with subjectivism, and how it ties back to Marx's approach in analyzing the dialectical nature of human history. In my presentation, I explore the implications of Dr. McClendon's research on the nature of objective relativism in provoking class consciousness. In offering reflections on my research experience in preparing Dr. McClendon's manuscript, I offer a critical engagement and analysis of the

objective relative nature of the relationship of an agent to their class and the natural, material world.

AESTHETIC DISAGREEMENT: CAN TECHNICAL TRAINING INFLUENCE WHAT PARTS OF POETRY WE FIND AESTHETICALLY PLEASING OR DISPLEASING?

Presenter: Carly Wholihan
Category: Humanities
Time Slot: 9:00 AM
Room Location: Meeting Room B
Number: 1903
Additional Student Presenters: Sydney Logsdon
Mentor: Natalie Phillips

The Digital Humanities and Literary Cognition Lab (DHLC) at Michigan State University is conducting an interdisciplinary study of sonnets seeking to examine the similarities and differences in the aesthetic pleasure that English majors and non-English majors (students from the Psychology pool) experience while reading poetry. This study was run in two rounds, the first consisting solely of English majors, and the second round consisting of participants from the Psychology pool. In the study, participants were tasked with real-time highlighting of moments they found aesthetically pleasing in green and aesthetically displeasing in red. The lab compiled the data by counting how many times each word was highlighted for each data set. The lab graphed this qualitative data to visualize the results and then compared the results of both parts of the study. When initially looking at the graphs, we found that the trends between the two groups were more similar than initially hypothesized. However, as we continued to analyze the data, we became interested in investigating the places where the two groups diverged in either their positive or negative highlighting, leading to a numerical analysis of these patterns. Now, we have transformed this numerical data into word-by-word visualizations of the sonnets to investigate what types and patterns of words drive these differences. We aim to explore if these words and phrases could be interpreted in ways that either promote or discourage aesthetic pleasure, and if the technical training for English majors may encourage one interpretation over another.

DOCUMENTING COMMUNITY: 19TH CENTURY SIGNATURE QUILTS AS MATERIAL CULTURE

Presenter: Berkley Sorrells
Category: Humanities
Time Slot: 9:15 AM
Room Location: Meeting Room B
Number: 1904
Mentor: Marsha MacDowell

In 2020, the MSU Museum acquired a redwork signature quilt from 1892 connected to the historic St. Michael's All Angels Church in Cambridge Township, Lenawee County, Michigan. One of southern Michigan's oldest churches, Irish-born Episcopal Reverend William Lyster founded the congregation in 1858. The church is situated across from the restored Walker Tavern on the early Detroit-Chicago road and settler's route. The quilt comprises 30 squares, some with 20 or more embroidered signatures per block, accompanied by intricately

embroidered themed designs and patterns. Donated to the museum by descendants of Alfred Case, the namesake of Michigan State University's Case Hall, the quilt documents a richly connected group of historic families in southern Michigan. Conducting object-based research utilizing depositories of historical data like Ancestry, census records, plat maps, family and community histories, and with help from local historical specialists, we are able to further our understanding of the roles that religious institutions played in the history of southern Michigan's early settlers, such as serving as meeting sites for community members and activities, and supporting fundraising for community needs. Through this research, we are able to more holistically understand the role of material culture as a tool of community cohesion and building. It also sheds light on the roles that the Ladies' Aid Society of the St. Michael's All Angels Church played as principal fundraisers and record keepers within their community. Lastly, we can see how textile materials can be important documents alongside other written, photographic, and oral resources in understanding history.

ZENOBIA: THE QUEEN OF THE PALMYRENE EMPIRE

Presenter: Hanna Honeycutt
Category: Humanities
Time Slot: 10:00 AM
Room Location: Meeting Room B
Number: 1907
Mentor: Camelia Suleiman

Queen Zenobia of Syria, ruled over the Palmyrene Empire during the third century and conquered lands from the Romans. Her triumphs deemed her as the Warrior Queen. She conquered lands including Egypt and a great portion of the Eastern part of the Roman Empire. From a young age, Zenobia had a strong influence and took that into her adulthood; especially after her husband had died. She cared for her son while collecting taxes from citizens and commanding her army. Her death date is unknown, but it was believed to be sometime after 274 AD, after the Romans captured her. Her influence from the third century turned back up in the 1900s in Syria.Queen Zenobia's history is important to us today because she influences social change amongst the Middle East and gives women confidence today to access their own ideology of femininity and leadership. This influenced feminism during that time and the ideas of intersectionality in history.

WE NEED A FEW MINUTES, YOU SCOUNDREL: A SOCIOLINGUISTIC ANALYSIS OF THE IDENTITY DEVELOPMENT OF SUNNY BAUDELAIRE IN A SERIES OF UNFORTUNATE EVENTS

Presenter: Iliana Cosme-Brooks
Category: Humanities
Time Slot: 10:15 AM
Room Location: Meeting Room B
Number: 1908
Mentor: India Plough

The study of fictional discourse by sociolinguists is a relatively new concept, with arguments against it surrounding the "validity" of studying scripted speech and actions using the strategies and terminology defined by the traditional sociolinguistic research of "real-world" discourse. This research argued that the study of fictional discourse is not invalid, since it is created and

portrayed by those whose lived experience and identity is defined by "real-world" discourse and sociolinguistic norms. The case study explored here is the Netflix TV adaptation of Lemony Snicket's children's book series A Series of Unfortunate Events. Specifically, analyzing the sociolinguistic identity development of the youngest character in the show, the baby Sunny Baudelaire, who mainly speaks via babbling that is translated into subtitles for the audience. The analysis focused on how the world of the show subverts "real-world" sociolinguistic norms in order to describe the universe to the audience, and how the show's norms compare and contrast to Sunny's characterization as both comic relief and an independent person with as much agency as any adult.

ESTABLISHING A MULTIMEDIA & ARCHIVAL HUB FOR THE RCAH CENTER FOR POETRY

Presenter: Celeste Rubino
Category: Humanities
Time Slot: 10:30 AM
Room Location: Meeting Room B
Number: 1909
Additional Student Presenters: Rachel Eyre
Mentor: Lauren Russell, Laurie Hollinger

RCAH's Center for Poetry has the following mission: "to encourage the reading, writing, and discussion of poetry and to create awareness of the place and power of poetry in our everyday lives." Since 2007, the RCAH Center for Poetry has hosted guest poets and community events captured across a variety of mediums and platforms. This has fragmented our online resources and made it harder to find past event information. During COVID-19, the Center's community engagement has become more reliant on the internet, the lack of in-person events caused gaps in the Center's website to be more glaring. We have developed a platform of available poetry resources and a database archive for poetry readings and other events hosted by the Center. Using other poetry websites as examples, we focused on streamlining content and have created a database that consolidates event material to one multimedia events archive webpage. Here, audiences have access to all the published media on hosted events. We have also developed and expanded our resources page, giving our users access to writing resources organized geographically. We suggested contacting experts at MSU Libraries initially as a method of research on event archives. This quickly evolved into a collaboration with the Vincent Voice Library which will house recordings of RCAH Center for Poetry past and future events. Through our work, we have made poetry resources more accessible to local, national, and international communities, expanding the reach of the RCAH Center for Poetry' mission.

INTEGRATIVE & ORGANISMAL BIOLOGY
Poster Presentations

HISTOLOGICAL ANALYSES OF DRIED PLUM PREVENTION OF GLUCOCORTICOID INDUCED OSTEOPOROSIS

Presenter: Morgan Roegner
Category: Integrative & Organismal Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2101
Mentor: Nick Chargo, Narayanan Parameswaran, Laura McCabe

Osteoporosis is a disease of low bone density that causes bone to become predisposed to fractures. The Bone Health and Osteoporosis Foundation estimate that at least 54 million Americans suffer from osteoporosis or are at very high risk for developing the disease. Glucocorticoids (GC) are excellent anti-inflammatory drugs used to treat a variety of inflammatory conditions. However, a feared side effect of prolonged glucocorticoid use is a reduction in bone density, leading to glucocorticoid induced osteoporosis (GIO). This study examines the effectiveness of dietary dried plum (DP) supplementation, a dried fruit that has shown previous benefits in other models of osteoporosis, in the prevention of a subcutaneous pellet mouse model of GIO in intact female mice. The project duration was 8 weeks and the treatment groups included Placebo pellet +/- 25%DP diet and GC pellet +/- 25%DP diet (n=10/group). Micro-computed tomography (uCT) of the distal femoral trabecular bone shows that 25%DP in the diet prevents GIO and also leads to a 3-fold increase in bone density in placebo treated mice. To determine the role of osteoblasts/osteocytes in the increase in DP-induced bone density, I examined femur histomorphometry to see if their were changes. I measured both osteoblast and osteocyte numbers and programmed cell death (apoptosis) after TUNEL staining. We are currently working on the histological analysis of the TUNEL stained femur sections.

THE STRUCTURAL DIFFERENCE BETWEEN DOG FUR AND HUMAN HAIR

Presenter: Morgan Jones
Category: Integrative & Organismal Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2102
Mentor: Carl Boehlert, Per Askeland

Every animal has its own built-in way of keeping itself warm and protected; for mammals this is hair, while for canines it is fur. Both hair and fur have similar color and texture, and both are made up of keratin. Within my research, I am going to compare the structural make up of dog fur to that of a human. I hope to figure out how similar the structure of dog fur is to human hair, then to understand the reasons why. Using SEM images, I will compare fur and hair to find their similarities and differences.

INVESTIGATING HYENA-REPTILE INTERACTIONS

Presenter: Megan Krawczyk
Category: Integrative & Organismal Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2103
Mentor: Olivia Spagnuolo, Sabrina Salome, Kay Holekamp

There is abundant literature about the relationships among carnivores, but there is a prevalent gap in knowledge regarding the interactions between mammalian carnivores and reptiles. We explored the close interactions between spotted hyenas (Crocuta crocuta) and reptiles and aimed to inform about the nature of trophic interactions between the two. To better understand these two taxonomic groups' relationships, we examined all encounters between spotted hyenas, an abundant large carnivore in East Africa, and reptiles that reside in the same geographic area. We extracted data from field observations of hyena-reptile interactions in Kenya's Masai Mara National Reserve from 1988 to 2021. We analyzed the data focused on predation and scavenging behavior between hyenas and reptiles. This work is important as it bridges a gap in our knowledge of ecology and contributes to our behavioral understanding of the relationship between two common African taxa.

A COMPARISON OF THE PERFORMANCE AND SURVIVAL OF COLORADO POTATO BEETLES ON RESISTANT AND SUSCEPTIBLE POTATO PLANTS

Presenter: Olivia Jeris
Category: Integrative & Organismal Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2104
Mentor: Luke Zehr, William Wetzel

We analyzed the effect of two potato varieties on the growth and survival of the major potato pest, Colorado potato beetle (Leptinotarsa decemlineata, CPB). The study conducted at Kellogg Biological Station examined differences in CPB success throughout various life stages. A total of 40 CPB larvae were placed into each of 200 caged plots. Each plot contained 4 potato plants of either 'King Harry' (Solanum tuberosum x berthaultii), a resistant variety bred to have glandular trichomes, or 'Atlantic' (Solanum tuberosum) as a susceptible control variety. CPB larva were censused twice for growth and survival; following in situ pupation, adult beetles were collected every other day as they emerged from the soil. Preliminary data analysis indicates that CPB growth and survival decreased on the resistant variety. These findings present valuable information for future research on pest control and management of negative implications of herbivores on agriculture.

THE INFLUENCE OF COOPERATIVE BREEDING STRATEGIES ON REPRODUCTIVE HEALTH IN THE MEERKAT

Presenter: Heather Sayles
Category: Integrative & Organismal Biology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2105
Mentor: Dalen Agnew

Meerkat behavior is unique in that they belong to the <1% of mammals that participate in cooperative breeding. A dominant pair breeds and produces offspring, while the subordinate members provide altruistic care for the pups. The reproductive health in this species has not been comprehensively assessed, particularly in light of the effects of dominance and subordinance among females. Previous research has suggested that nonbreeding females have higher rates of reproductive senescence and lower potential fertility than their dominant counterparts. We hypothesize that there is more uterine and ovarian degeneration and reproductive senescence among subordinate females than dominant females. Initial review of archived uterine and ovarian specimens identified multiple morphological variations between animals. Among these, variations in both the quality and quantity of ovarian follicles as well as the presence of uterine lesions were identified for more detailed investigation. Histological examination of uterine and ovarian tissues was conducted on 17 females varying in agefrom 0.5 - 17 years. Age, contraceptive status, stage of the reproductive cycle, and social status information at the time of sampling was also collected Significant lesions included hyperplasia, endometrial cysts, hemorrhage, and follicular atresia. Statistical analysis is pending to determine the correlation of lesions with social dominance and other potential risk factors. By understanding the role of reproductive suppression on the overall reproductive health of captive meerkats, we can enhance conservation efforts both in zoological institutions and in thewild.

HATCHING ENZYME EVOLUTION AND EXPRESSION IN SPOTTED GAR, A MODEL ORGANISM FOR VERTEBRATE EVOLUTIONARY DEVELOPMENTAL GENOMICS

Presenter: Daniel Do
Category: Integrative & Organismal Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2111
Mentor: Ingo Braasch

Hatching is an essential process for every vertebrate. The purpose of the experiment was to identify enzyme that spotted gar uses for hatching and locate the hatching gland. Teleost fishes such as Japanese medaka use highly derived metalloproteases as hatching enzyme to break down the egg envelope. Hatching enzyme candidates of spotted gar were found by comparing to other vertebrate metalloprotease genes to the gar genome. A phylogenetic tree was made using all metalloprotease genes identified in previous studies as well as 18 gar sequences we identified to be members in this gene family. We compared these 18 sequences to gar transcriptomes to identify metalloproteases expressed in the gar embryonic pre-hatching stage. We identified 5 key gar genes closely related to teleost hatching enzymes for spatio-temporal characterization using in situ RNA hybridization to reveal the location of the spotted gar hatching gland.

INVESTIGATING HOW LIVESTOCK GRAZING IMPACTS CARNIVORE BEHAVIOR

Presenter: Rebecca Fisher
Category: Integrative & Organismal Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2112
Mentor: Olivia Spagnuolo, Julie Jarvey, Sabrina Salome, Kay Holekamp

Apex carnivores and mesocarnivores are able co-exist in the same ecosystems without intense competition for resources through a phenomenon called niche partitioning. Although the effects of human disturbance on wildlife behavior, such as space use and activity pattern, have been documented extensively, relatively little work has been done to investigate how anthropogenic activity impacts interspecies interactions, such as niche partitioning. The goal of this study is to explore how lions (Panthera leo) and cheetahs (Acinonyx jubatus) alter their space use and activity patterns in response to livestock grazing. We used observational ecological data collected in the Talek region of the Masai Mara Nation Reserve, Kenya during times of fluctuating livestock grazing intensity. We determined species-specific habitat preference and distance from the park boundary across times of day and investigated how these spatiotemporal patterns changed with livestock grazing intensity. This study is important for the conservation of large carnivores by contributing to the understanding of anthropogenic effects on behavior in two African carnivores. Increased anthropogenic activity may compromise the balance required for niche partitioning in an ecosystem, resulting in a higher risk of extinction. With every species playing a critical role in ecosystem balance, the loss of one species, especially a carnivore, can result in a top-down trophic cascade.

THE IMPACTS OF CLIMATE CHANGE ON GOLDENROD - GALL MIDGE INTERACTIONS

Presenter: Emily Parker
Category: Integrative & Organismal Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2113
Mentor: Phoebe Zarnetske, Mark Hammond, Moriah Young, Kara Dobson

While the effects of warming and drought are well studied in plants, less is known about how these stressors-which are becoming more prevalent with climate change-affect plant-insect interactions. The goldenrod bunch gall midge (Rhopalomyia solidaginis) is one of several gall- inducing insects that use Canada goldenrod (Solidago canadensis) as its host. Using the Rain Exclusion eXperiment (REX) in the Kellogg Biological Station's (KBS) Long Term Ecological Research (LTER) site, drought and warmer temperatures were simulated. Throughout the summer, plants with and without galls were measured for their height, and if a gall was present, for their gall diameter and height. After harvest, the internal larval chambers were measured as a proxy for larvae size. Plants undergoing warming conditions were taller than those in ambient and drought conditions, and plants with galls were shorter than non-galled plants. Gall size was smaller in warmed plots, but larval chamber number and size were unaffected by either treatment. Investigating how extreme environmental stressors alter life cycles and fitness of these midges may help predict their survivorship and resilience in future climatic conditions. These midges serve as a food source for numerous birds and are

also parasitized by wasps. If climate change disrupts this tri-trophic interaction, it may have serious implications for all three organisms, and could further alter community dynamics.

BIRD SPECIES DISTRIBUTIONS ACROSS SEASONS IN RURAL, URBAN, AND SUBURBAN GREENSPACES

Presenter: Annaliese Singer
Category: Integrative & Organismal Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2114
Mentor: Catherine Lindell

The rapid increase of urbanization across the globe has led to changes in avian biodiversity. One of the most pressing problems associated with urbanization is the homogenization of bird communities. Homogenization of bird communities often occurs in urban locations due to landscape uniformity and reduced seasonal differences compared to non-urban areas. Our study attempted to determine if the number of individuals and species of two classifications of bird species (urban adapters and urban exploiters) varied across urban, suburban, and rural landscapes by season. We predicted that detections of urban exploiter and urban adapter species and individuals that are year-round residents would be significantly greater in urban and suburban areas during the winter and spring when compared to rural areas, and significantly greater in rural areas in summer and fall when compared to urban and suburban areas. We selected nine greenspaces in the Lansing, Michigan area as our study locations using Hotspot data from the citizen science database eBird. Three greenspaces were in urban landscapes, three in suburban, and three in rural. From the chosen sites, we obtained a sample of checklists containing year-round resident bird species from 2018 to 2020. The results of our study suggested that the numbers of individuals and species of adapters and exploiters did not vary in the different landscapes between seasons. Small sample sizes were used in the study, which may have impaired our ability to obtain more accurate results. Future research should investigate more urban areas in a similar framework.

HOW CROP ROTATIONS IMPACT BUTTERFLY ABUNDANCE AND RICHNESS

Presenter: Cameron Brown
Category: Integrative & Organismal Biology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2115
Mentor: Lindsey Kemmerling, Nicholas Haddad

Butterflies play an essential role within ecosystems worldwide. Butterflies and plants co-evolved alongside each other as pollinators and pollinated. This co-evolution led to the creation of mechanisms within plants, allowing them to feed on nectar, bypassing the plants' defenses against other herbivores. Because of the closeness between plants and butterflies, with their decline, plants and the overall environmental health will also. Large-scale agriculture is one factor that has caused a decrease in overall environmental health. As the world's population increases, so will the overall demand of food. By implementing less intensive farming practices, its impact on the environment will be lessened. One way to help would be the use of crop

rotations and prairie strips. Implementing crop rotations has shown to increase the biodiversity of above-ground arthropods and prairie strips are shown to improve biodiversity. In this study, we plan on looking at the change in butterfly abundance and richness between the different crop rotations: corn, soy, and wheat at KBS LTER in Southwest Michigan. We found that the type of crop has no impact on butterfly richness or abundance within the crop fields. However, within the prairie strips, there is a greater abundance and richness of butterflies compared to farming fields.

KINESIOLOGY
Poster Presentations

THE EFFECTS OF ACUTE RESISTANCE EXERCISE ON ARTERIAL STIFFNESS

Presenter: Hayden Stauffer
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2201
Additional Student Presenters: Ethan Kulaszewski, Veronica Hindle
Mentor: Katharine Currie, Amy Boettcher

Arterial stiffness is characterized by the rigidity of the arterial wall and is assessed using pulse wave velocity (PWV). Increased arterial stiffness, or PWV, can lead to an increased risk of cardiovascular disease. While aerobic exercise can reduce arterial stiffness, previous research is unclear on the effect of resistance exercise on arterial stiffness; both increases and decreases in PWV have been observed following a single session of resistance exercise. Determining if the arterial stiffness responses to exercise are consistent is an important first step in clarifying the effect of resistance exercise on arterial stiffness. PURPOSE: To assess the test-retest reliability of pre- and post-resistance exercise on PWV in young healthy females. METHODS: Eight non- resistance trained females (23±3 years) participated in two resistance training sessions which involved a 60-minute whole body workout with a 7-minute aerobic warm-up and cool-down. PWV measurements were collected at rest (pre-exercise) and for 60-minutes post-exercise (PE) in 15-minute intervals. Test-retest reliability of pre- and PE PWV measurements from the two sessions were assessed using intraclass correlation coefficients (ICC) with an ICC >0.60 considered substantial reliability. RESULTS: PWV at pre-exercise (ICC=0.863, P=0.09) and PE15 (ICC=0.602, P=0.123), PE45 (ICC=0.626, P=0.109) and PE60 (ICC=0.717, P=0.059) had substantial reliability, while PE30 (ICC=0.596, P=0.127) did not. DISCUSSION: Our preliminary findings suggest PWV after a single bout of resistance exercise are reliable at most time points. Future studies could measure PWV after different resistance exercise prescriptions to help further our understanding of how this type of exercise affects arterial stiffness.

CONSTANT OR VARIABLE PRACTICE: EXPLORING EARLY VS. LATE VARIABILITY IN A NOVEL MOTOR TASK

Presenter: Amanda Lopez
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2203
Additional Student Presenters: Taylor Altergott, Emah Cassidy, Georgia Berger
Mentor: Mei Hua Lee, Jennifer Burns

Can variable practice early in skill learning have a greater benefit on performance than uniform practice? When learning to hit a baseball, it is common practice to repeatedly hit a ball off a static tee before advancing to a moving ball. However, it is possible that introducing variability earlier in practice could enhance learning and optimize long-term performance. Therefore, the purpose of this study is to examine if encouraging exploration through practice variability enhances learning. To assess this aim, exploratory behaviors were observed for a group with variability added early in practice against a second group with variability added later. Participants' movements were recorded using internal measurement units (IMUs) on the upper body to control movement of a cursor to different targets shown on a screen. Participant performance was evaluated at the beginning, middle, and end of the session to understand the impact of variability on learning. The findings of the study show there was an increase in movement time for both groups when variability was added. However, the group that had variability later in practice displayed higher movement times compared to the group that were exposed to variability earlier. These results indicate that encouraging exploration early in learning could be more beneficial to the overall learning by helping find more optimal coordination patterns.

IDENTIFYING MULTIPLE MODES OF MUSCULAR MOTION

Presenter: Mahima Parulekar
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2204
Additional Student Presenters: Annalise Groll, Zane Abdel
Mentor: Chunqi Qian

Many people suffer from traumatizing injuries that lead to amputation or loss of limbs. Prosthetics are a vital part of rehabilitation, especially in helping people regain independence after such an injury. For this reason, it is important to explore the ways in which prosthetic movements can be enhanced. This is especially important when it comes to hand prosthetics. Movements of the hands are complex and often impacted by multiple muscles, and for this reason developing prosthetics that can function similarly to a real hand is difficult. Electromyography (EMG) sensors measure the small electrical signals generated by muscle movement. Our research looks into the amount of energy generated by muscle movement, and how that value can be used to determine muscle use in certain gestures. This would involve determining the baseline signal from a certain individual and then testing specific hand movements and certain muscles involved for the possibility of application to prosthetics.

CARDIOVASCULAR RESPONSE TO EXERCISE AT DIFFERENT TIMES OF THE DAY

Presenter: Allie Lumberg
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2205
Additional Student Presenters: Hannah Penfold, Sydney Deblander
Mentor: Katharine Currie

Cardiovascular health can be assessed during exercise by measuring the peak volume of oxygen our body is using (VO2peak), the highest systolic blood pressure reached (peak SBP), and the decrease in heart rate during recovery (HRR). These measures have been shown to predict one's future risk of heart disease and death. A circadian rhythm describes how our body's cellular activity fluctuates throughout the day; it is unknown if this rhythm affects these measures. This study's purpose was to determine if there is a difference in VO2peak, peak SBP, and HRR measured at different times of the day. Understanding this will help us to establish whether these measures should be taken at a specific time of day. We hypothesized peak SBP would be higher in the morning and lower in the evening, while VO2peak and HRR would be similar across time points. Ten participants (23±5 years; 80% female; 80% white) completed three identical study visits in the morning, afternoon and evening in randomized order on separate days. Each visit included an aerobic exercise test on a treadmill during which VO2peak, peak SBP and HRR were measured and compared between time points using repeated-measures analyses of variance and Friedman tests for normally and non-normally distributed data, respectively. There was no difference in VO2peak (P=0.47), peak SBP (P=0.90), and HRR (P=0.11) between time points. These preliminary findings suggest that these measures of cardiovascular health are not affected by circadian rhythms and could be assessed at any time of day.

BODY COMPOSITION AND VO2MAX OF INDIVIDUALS WITH AND WITHOUT ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Presenter: Albertas Klugas
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2206
Additional Student Presenters: Nathan Sprick
Mentor: Ashley Triplett

Limited evidence suggests that individuals with anterior cruciate ligament reconstruction (ACLR) have reduced physical activity and higher body fat (%BF) when compared to uninjured peers. However, it is unclear how these factors may impact cardiorespiratory fitness (CRF), which is an established risk factor for cardiovascular (CV) disease. PURPOSE: The purpose of this ongoing study was to compare CRF and %BF between individuals with ACLR and uninjured controls. METHODS: 17 individuals with ACLR (months since surgery = 35.3±18.8; age = 21.2±3.2yr, 7 male) and 9 uninjured controls (age = 22.7±3.3yr, 3 male) participated. CRF was assessed via graded treadmill test to measure time to exhaustion and VO2peak and %BF was estimated using air displacement plethysmography. Groups were compared for all variables using Mann-

Whitney U tests. RESULTS: Individuals with ACLR had greater BMI (ACLR: 24.2±3.8 kg/m2, Con: 21.6±2.9 kg/m2; p=0.03) compared to uninjured controls, but no differences were observed for %BF (ACLR: 26.3±8.1%, Con: 21.5±4.8%; p=0.14) between groups. Individuals with ACLR also had a shorter treadmill time to exhaustion (ACLR: 22.1±2.6min, Con: 24.9±2.4min; p=0.01), but there were no differences observed between groups for relative VO2peak (ACLR: 44.6±7.6ml/kg/min, Con: 47.7±6.7ml/kg/min; p=0.11). CONCLUSION: Individuals with ACLR displayed similar fitness and body composition characteristics as their uninjured peers, but those with ACLR had greater BMI and terminated their exercise test sooner. Clinical care following ACLR presents an opportunity for clinicians to promote healthy behaviors to ensure patients with a history of knee injury maintain healthy weight and have adequate CRF to prevent CV risk factors.

THE INFLUENCE OF CONCUSSION HISTORY ON BASELINE NEUROCOGNITIVE PERFORMANCE FROM THE SPORT CONCUSSION ASSESSMENT TOOL-5

Presenter: Savanna Frick
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2207
Additional Student Presenters: Sam Cartier
Mentor: Allie Tracey

The Sport Concussion Assessment Tool - 5th Edition (SCAT-5) is a standardized instrument designed to assist with the clinical and sideline assessment of concussion. The purpose of the study was to determine if there is a difference in SCAT-5 component scores between individuals with and without reported concussion history. A cross-sectional study of NCAA Division I athletes from Michigan State University was conducted. Participants completed demographics, medical history, and a baseline SCAT-5 prior to the start of the season. Independent samples t- tests were used to make group comparisons for the SCAT-5 immediate memory, concentration, and delayed recall composite scores, along with symptom severity and total number of symptoms. Statistical significance was set a priori at $p<0.05$. Four hundred nine collegiate student athletes (Mean age=19.68, M=50.9%, F=47.2%) were included, 126 (30.8%) with concussion history, 272 (66.5%) with no concussion history, and 11 (2.7%) did not report concussion history. The concussion group scored higher on immediate memory (concussion history $\mu=20.16$, $SD=3.45$; no-concussion history $\mu=19.41$, $SD=3.53$; $p=0.049$). However, there were no other significant differences between groups on any other portion of theSCAT- 5. Concussion history did not have an impact on components of the SCAT-5. While immediate memory scores were higher in the concussion history group, the difference was negligible and may not be clinically meaningful. Future research should examine the impact of concussion history on varying baseline testing administration techniques.

THE INFLUENCE OF COVID-19 DIAGNOSIS ON BASELINE NEUROCOGNITIVE PERFORMANCE FROM THE SPORT CONCUSSION ASSESSMENT TOOL-5

Presenter: Hope Koester
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2208
Additional Student Presenters: Parker Selby, Andrew Vaniddekinge
Mentor: Megan Loftin

We currently lack an understanding of the impact of COVID-19 on collegiate athletes. Therefore, the purpose of this study was to assess differences in Sport-Concussion Assessment Tool-5 (SCAT-5) symptoms, immediate memory, concentration, balance, and delayed recall scores between those with and without a positive COVID-19 diagnosis. NCAA Division I athletes from Michigan State University completed demographics, medical history, and the SCAT-5 at baseline. Independent samples t-test were performed to compare the mean scores between the two groups for all SCAT-5 outcomes. Of the 409 athletes (Male=208, Female=193, Mage=19.68) enrolled, 220 (53.8%) had no prior COVID-19 diagnosis, 162 (39.6%) had a prior COVID-19 diagnosis and 27 (6.6%) participants were unreported. Athletes with prior COVID-19 diagnosis (M=6.43, SD=1.81) scored higher on delayed recall than those with no previous COVID-19 diagnosis (M=6.01, SD=1.77; p=.022). Additionally, athletes with a previous COVID- 19 diagnosis reported fewer total symptoms (M=0.73, SD=1.79) and lower symptom severity (M=1.09, SD=2.79) than those without a previous COVID-19 diagnosis (total symptoms: M=1.29, SD=2.46; p=.015 symptom severity: M=2.43, SD=6.52; p=.014). There were no significant differences between groups in any of the other components of the SCAT-5. This may indicate that a positive COVID-19 diagnosis does not impact scores on the SCAT-5 at baseline. If athletes were to sustain a concussion and see differences in SCAT-5 scores from baseline, it is likely that a prior COVID-19 diagnosis did not contribute to these differences. Future research should prospectively investigate how a prior COVID-19 diagnosis affects other concussion measures and recovery in athletes with concussions.

PHYSICAL ACTIVITY COULD HELP FOSTER HEALTHY EMOTIONAL WELL-BEING AMONG LOW-INCOME PRESCHOOLERS DURING A GLOBAL PANDEMIC

Presenter: Lizzie Kompus
Category: Kinesiology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2209
Mentor: Jiying Ling

The current global pandemic has negatively affected children's emotional well-being, especially in young children from low-income families. However, it is not clear how their physical activity may help with decreased emotional well-being. Therefore, this study examined how preschoolers' physical activity was related to their own emotional well-being (sadness, fear, anger, and positive affect). A cross-sectional study was conducted with 408 low-income parents recruited from Michigan Head Start programs and the online Qualtrics Panel. Parents

completed an online survey measuring their families' sociodemographic characteristics and their preschoolers' emotional well-being with the National Institutes of Health Toolbox. The parents included 17% Hispanic, 21% Black, 49% separated/single, 44% unemployed, and 39% with ≤ high school education. Around 41.4% (n=169) of the preschoolers were active seven days a week. After controlling for parents' demographic characteristics and lifestyle behaviors, preschoolers' physical activity was negatively correlated with fear (B=-1.00), sadness (B=-1.56), and positively correlated with positive affect (B=1.76). Moreover, preschoolers with Black parents had a significantly lower level of anger (B=-3.62) and higher level of positive affect (B=5.78) than those with White parents. Additionally, the number of children in households was negatively related to preschoolers' fear (B=-1.28) and sadness (B=-1.10). Given the positive relationships between physical activity and emotional well-being, daycares and public schools should consider increasing structured and unstructured school-based physical activity opportunities to mitigate the long-term negative effects of the global pandemic on preschoolers' emotional development.

LINGUISTICS, LANGUAGES, & SPEECH
Poster Presentations

GENDER AND FAMILIARITY: THE PERCEIVED NATURALNESS OF SINGULAR 'THEY'

Presenter: Samantha James
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2301
Additional Student Presenters: Antonio Lia
Mentor: Alan Munn, Daniel Greeson

In modern English, many speakers are avoiding the use of 'he/she' and are instead opting to use a neutral pronoun: singular 'they.' This phenomenon is not new and has been occurring throughout much of English-speaking history, although why singular 'they' has become more common is unclear, as are the contexts leading to its selection. In this study we ask the following question: What are the factors that influence speakers' use of singular 'they'? We hypothesize that the acceptability of singular 'they' is affected by whether the gender of the referent is known to the listener. Previous studies have suggested that people may be more accepting of singular 'they' if the gender of the referent remains unknown to the listener, even if the speaker knows the gender, but contexts they use to test the effect were not very controlled and natural. Our study furthers this research by providing an experimental design that creates a natural scenario in which the gender of the referent may be known to the speaker, but unknown to the listener. We designed an online acceptability test in which participants judge mock Instagram posts. Each post is paired with a photograph that either provides a clear image revealing the referent's gender, or not. This allows us to test the effects of gender in a more natural environment and will give us a better understanding of the factors that influence speakers' use of singular 'they'.

GOIN' THROUGH COVID CHANGES: THE FORMALIZATION OF SPEECH PATTERNS WHEN DISCUSSING THE COVID-19 PANDEMIC

Presenter: Alexis Behnke
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2302
Mentor: Betsy Sneller

Since April 2020, the MI Diaries project at the Michigan State University Sociolinguistics Lab has been collecting audio entries from Michiganders. The audio entries are stories that relate to, and diverge from specified prompt, and share stories t. Contributors to the endeavor vary from senior citizens to school age children, includes representations of various races and ethnicities, and cities throughout Michigan. The collection of these audio files has provided a unique opportunity to evaluate, the evolving speech patterns of people throughout the COVID-19 pandemic. A similar sociolinguistic project based in Scotland collecting only COVID narratives found that participants used high rates of formal speech, leading researchers to hypothesize that COVID narratives in particular are a formal register of speech (Hall-Lew, 2021). The MI Diaries audio submissions offer an opportunity to test this hypothesis because of the COVID-19 related and non COVID-19 related narratives. This paper will investigate if adult participants in the MI Diaries research project formalize their speech when discussing COVID-19 related narratives; in comparison to their other audio files where COVID-19 is not discussed. The token being evaluated throughout the audio submissions is (ing). The amount of possible (ing) instances in an audio entry will be tallied and then analyzed into one of two categories: the informal alveolar nasal pronunciation (as in runnin'), and the formal velar nasal pronunciation (as in running). With data collected and probability of these various pronunciations projected in COVID-19 and non-COVID-19 narratives this research will support or refute the formalization of speech hypothesis.

EXPLORING THE RELATIONSHIP BETWEEN STUTTERING AND ADHD

Presenter: Savannah Kendra
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2303
Mentor: Bridget Walsh

Anecdotal reports suggest higher rates of attention-deficit hyperactivity disorder (ADHD) in children who stutter (CWS). While it is known that CWS often present with concomitant speech and language disorders, few empirical studies have examined the prevalence of ADHD. These studies have included small sample sizes and/or focused narrowly on adult or preschool-age CWS. This leaves open questions about the prevalence of ADHD diagnoses across the developmental spectrum in CWS. In this presentation, we will consider: What is the prevalence of ADHD diagnoses in CWS? What are the levels of inattention and hyperactivity-impulsivity characteristics in CWS without an ADHD diagnosis? Exploring these ideas will enhance understanding of how neurodevelopmental disorders co-occur in CWS. To address these questions, the Developmental Speech Lab created a survey, as part of a longitudinal study

exploring the development of stuttering and its adverse impact in CWS. Participants were 158 CWS ranging in age from 3 to 18 years. Caregivers completed the age-appropriate version of the ADHD Rating Scale-5 that probes inattention and hyperactivity-impulsivity characteristics for their child using a 4-pt Likert frequency scale. Results revealed higher rates of ADHD in CWS. Specifically, 16.46% of CWS in our sample are diagnosed with ADHD, compared to 7.2% in the general population (Thomas et al., 2015). In this presentation, we elaborate on our methods and results and discuss the theoretical and clinical relevance of our findings. The presence of hyperactivity or inattention in many CWS may have a crucial impact on the efficacy of their stuttering treatment.

THE EFFECT OF PRIMING ON SPEECH PRODUCTION

Presenter: Sarah Knappenberger
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2304
Mentor: Karthik Durvasula

Research shows that subsequent iterations of a word have shorter durations than words that are introduced for the first time in the context of the communication. Fowler (1987) attributes this to speakers? inclination for communicative efficacy. She concludes that speakers shorten second iterations because there is no loss of intelligibility. An alternate approach to explaining this phenomenon is in terms of lexical retrieval. After the first utterance of a word, the activation threshold is lower. Consequently, it can be accessed and processed more easily. This in turn could allow for the word duration to be shortened. This question was probed through a lexical priming paradigm. In an experiment, participants produced a series of unprimed stimuli and a series of primed stimuli. A comparison of the durations of primed and unprimed utterances showed no observable effect of priming on word production.

BESIDE THE POINT: THE ROLE OF NARRATIVE RELEVANCE IN VERBAL SHADOWING AND FALSE BELIEFS

Presenter: Nate Chevalier
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2305
Mentor: Alan Munn

Linguistics and language acquisition research have used the dual-task experiment of verbal shadowing (repeating sentences while performing some other task) to examine language as a prerequisite for Theory of Mind in children and adults. Theory of Mind describes the ability of a person to attribute thoughts, beliefs, and feelings to someone else. These beliefs may or may not be in line with what the assigner knows to be factually correct and are hypothesized to be connected with various aspects of language, such as embedding one clause inside another. In fact, language is proposed to be integral to thought itself, especially when considered as the vehicle for the storage and retrieval of beliefs contrary to reality - comprehension of which underlines Theory of Mind (J.G. de Villiers & P. de Villiers, 2000). De Villiers and Newton (2007) found that English-speaking participants' performances on a false belief task were impaired when participants shadowed language (poetry, or Swahili) but not when performing a

rhythm shadowing task that didn't involve language. The present study aims to test the hypothesis that the content of the shadowed speech might affect decision-making performance on the false- belief task. It will compare shadowing of a narration of the video stimuli content with shadowing of an unrelated monologue text. If the content of the shadowed speech matters, then participants who shadow the narration text should show improved performance on a false- belief task.

COVID-19'S IMPACT ON PEOPLE WITH A LARYNGECTOMY

Presenter: Alyssa Fritz
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2306
Mentor: Jeffrey Searl

This study examined how people with a laryngectomy were impacted during the early part of the SARS Coronavirus (COVID-19) pandemic. The primary method was an online survey that was distributed to the patient population across the United States. 173 people with a total laryngectomy completed the initial survey between July 5 to August 10, 2020. Possible adaptations - either clinician recommended or self-implemented - were identified that the patient population experienced regarding communication, tracheostoma care, and heat-moisture exchange (HME) use. Results indicated people with a total laryngectomy will continue to need in-person care, even during a pandemic. Best clinical practices will also need to be reviewed so that during the next pandemic, patient populations like this one are still being seen by clinicians and receiving the most up to date care guidelines.

WHEN DOES TWO CUPCAKES BECOME THREE?: PRAGMATIC EFFECTS ON TELICITY INTERPRETATIONS

Presenter: Sophie Cleland
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2307
Additional Student Presenters: Newt Kelbley
Mentor: Jingying Xu

This study investigates the pragmatic effect of an authoritative spectator on adult's interpretations of verb telicity. The linguistic concept of 'telicity' is generally defined as whether an event encodes a natural final endpoint or not. Telic events have a natural endpoint (e.g., 'The man ate two sandwiches'), while atelic events have an arbitrary endpoint (e.g., 'The man carried two bags'). The telicity of an event depends on the interaction between the verb and properties of its object. In this study we examine to what extent pragmatic information alters a speaker's judgements of descriptions of telic and atelic events. Previous work found that participants sometimes produced a 'yes' answer to a question such as 'Did he eat the cookies?' even in a context where the character had not finished eating them. Participants were sensitive to the presence of quantity-sensitive verbs (e.g., 'build'); and the presence of a cardinal number in direct objects (e.g., 'two houses'). These factors prompt telic readings while verbs such as carry do not prompt telic readings independently from the object. Interestingly, 'eat/drink''s telic

interpretation counterintuitively depended greatly on the type of determiner in the object. Recently, Grigoroglou and Papafragou (2018) found pragmatic considerations may also affect event descriptions. In our experiment we test the pragmatic effect of having an authority figure (such as a policeman) make the statement to be judged. We hypothesize that statements made by such figures will make participants more sensitive to the factors that control telicity judgements.

INVESTIGATING CHILDREN'S ACQUISITION OF 'PERFECT' ADVERBIALS

Presenter: Dan Le
Category: Linguistics, Languages, & Speech
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2308
Additional Student Presenters: Callista Lupa
Mentor: Alan Munn

'Before', 'since', and 'never' adverbials typically combine with the present perfect tense in their main clause. For example, in a sentence such as "I have lived in East Lansing since 2019", the presence of the 'since' clause usually requires the perfect ('have lived') in the main clause. However, we've seen in acceptability studies that adults use the past tense in the main clause more than we would expect, being able to say "I lived in East Lansing since 2019". This data suggests that the past tense and the perfect tense compete with each other. Our research aims to examine the degree to which these adverbials appear with past and present perfect tenses in adult speech directed to children. This research will help us to better understand how children may acquire the present perfect and the English tense system in general.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
Poster Presentations

A STUDY OF CHANGES IN MICROBIAL ABUNDANCE AND DIVERSITY FROM SOURCE TO SINK ON THE MSU CAMPUS

Presenter: Tai Brass
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2401
Mentor: Osama Alian, Matthew Schenk

Groundwater is an important supply of water for agricultural and household uses in Michigan. This applies to MSU's campus, which uses 16 wells to access the clean water that lies beneath our feet. What makes this water so clean? Layers of soil and minerals act as a filter for many organic particles, trapping most of the "food" needed for life. The additional lack of sunlight and oxygen make underground water reservoirs an extreme environment for microbes; but, like other extreme environments, they still find ways to survive. This is where

water treatment can come in handy, removing the larger bacteria, cells, and debris. It is thanks to this process that we can achieve the safe and clean water we use regularly on-campus. These differences in cell abundance and variety can be visualized using microscopy; however, most microbial studies tend to focus only on pathogenic cells or other contaminants. Instead, this study uses fluorescence microscopy to analyze the cell density of well and tower water at MSU's water treatment facility. Samples were collected from the south MSU wells, MSU's water treatment plant and tower, and fresh from the tap in multiple campus buildings. Afterward, samples were fixed with formaldehyde and prepared for epifluorescence analysis. The decrease in cell abundance and diversity is visible as we examine the shift from well water to tap water. Furthermore, this approach to microbial ecology allows us to understand how microbial diversity is impacted by the water treatment process.

PENICILLIUM-RELATED HYPERSENSITIVITY PNEUMONITIS

Presenter: Stephanie Cicci
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2402
Mentor: Martha Mulks

The purpose of this study is to determine if there exists a common reactive antigen among Penicillium isolates collected from the environments of HP patients1. In order to do this, sterile media was made and poured into plates, the plates were inoculated and stored for growth, Penicillium was harvested and made into antigen preps, and was sonicated as needed. The antigen preps were then used in a Bradford assay and will be tested against patient sera in western blots. While the results of the study are not complete, there is promising evidence from a preliminary western blot that patients are reacting with Penicillium found outside of their own environments.

SLAMF7 DEFICIENCY FROM CD8+ T CELLS ALTERS THE BREADTH AND POTENCY OF AD VACCINE-INDUCED MEMORY RESPONSE

Presenter: Samuel Tennant
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2403
Mentor: Yasser Aldhamen

We previously demonstrated that signaling lymphocytic activation molecule family member 7 (SLAMF7) regulates T cell exhaustion in the tumor microenvironment (TME) by influencing the expression of inhibitory receptors and T cell exhaustion-promoting transcription factors. We have also previously shown that expression of the SLAMF7-associated protein EAT-2 can enhance T cell memory responses by enhancing Th1 immune responses, such as DCs maturation and NK cells activation. Together, these past findings implicate SLAMF7 as a promising target for enhancing T cell immune responses. To understand the molecular mechanism, we generated a conditional knockout (SLAMF7flox/floxCD8Cre mice) mouse model that lacks SLAMF7 on CD8+ T cells. These mice were used to evaluate the magnitude and the breadth of T cell responses during vaccination. A mouse model with a global deletion of

SLAMF7 (SLAMF7-/-) was also included as a control. Mice were immunized intramuscularly (IM) with an adenovirus vaccine that expresses a truncated version of clostridium falciparum toxin A (TA) antigen, and TA-specific T cell memory responses were quantified using ELISPOT assay. We observed increased magnitude and breadth of TA-specific memory T cell responses in splenocytes derived from SLAMF7-/- mice as compared to WT and SLAMF7flox/floxCD8Cre mice. Interestingly, we noted decreased T cell responses to TA in cells derived from SLAMF7flox/floxCD8Cre mice, compared to both WT and SLAMF7-/- mice. These findings indicate that SLAMF7 deficiency in CD8+ T cells alters their memory responses and suggest that SLAMF7 deficiency from other immune cells increase the magnitude and the breadth of the induced T cell response.

INVESTIGATION OF ANTIBIOTIC RESISTANCE GENES IN HUMAN ESCHERICHIA COLI ISOLATES FROM WYOMING, 2002-2020

Presenter: Bailey Bowcutt
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2404
Mentor: Shannon Manning

Shiga toxin-producing Escherichia coli (STEC) are linked to ~265,000 illnesses per year in the United States. STEC infections can cause enteric symptoms and, in some cases, hemolytic uremic syndrome (HUS), especially in vulnerable populations like children under 5. Unlike other enteric infections, antibiotic treatment is not recommended because it is associated with enhanced production of the Shiga toxin, which is encoded by genes found on bacteriophages that incorporate into the genome. Antibiotics and other stressors trigger the phage's entry into the lytic phase, resulting in toxin production and cell lysis. Antibiotic treatment increases the risk of HUS and the chance of major negative health effects including death. Despite the guidance against antibiotic treatment, antibiotic resistance has been reported in STEC strains. This indicates the acquisition of resistance genes due to selective pressure. Therefore, it is important to increase understanding of circulating antibiotic resistance genes in STEC and define factors that may increase the chances of infection. Herein, we used whole genome sequencing and the genomic processing pipelines Terra.bio and bactiopia to analyze 270 STEC isolates from Wyoming patients between 2002-2020. All data have been extracted and genomes have been quality checked, assembled, and annotated to detect antibiotic resistance and virulence genes as well as genes that dictate the serotype. An analysis of gene frequencies and trends over time is ongoing, while future analyses will examine trends by geographic location and cattle density, as cattle are an important STEC reservoir and ranching/farm work is a major Wyoming industry.

MISMATCH REPAIR FACTORS HELP CONVERT NICKS TO DOUBLE STRAND BREAKS AT IMMUNOGLOBULIN SWITCH REGIONS

Presenter: Em Segraves
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2405
Mentor: Kefei Yu

Immunoglobulin class switch recombination (CSR) is the process by which B cells switch from producing IgM antibodies to IgG, IgE, or IgA, allowing for better clearance of infection. During a physiological CSR reaction, activation-induced cytidine deaminase (AID) deaminates cytosine bases in DNA switch regions to convert them to uracils, generating uracil-guanine mismatches that can trigger the base excision repair (BER) and/or mismatch repair (MMR) pathways. If BER occurs, uracil DNA glycosylase (UNG) removes the uracil base, creating an apurinic site where apurinic/apyrimidinic endonuclease (APE) then generates a nick. These nicks, if generated on opposite strands and directly adjacent to each other, can lead to the formation of a double strand break (DSB), a key CSR intermediate. However, the mechanism that converts distal nicks to DSBs is poorly understood. Using a CRISPR technology that can generate nicks at precise locations, it has been previously shown that distal nicks (up to 250 bp away) can induce a "CSR-like" reaction. Utilizing that system, we tested the hypothesis that the MMR pathway plays a role in converting distal nicks to DSBs. We used flow cytometry to compare the efficiency of the "CSR-like" reaction mediated by CRISPR-induced nicks in genetically engineered CH12F3 mouse B cells that are deficient in BER and either proficient or deficient in MMR. We found that MSH2, an essential MMR factor, substantially increases the "CSR-like" reaction efficiency. This suggests that strand excision during MMR converts nicks to DSBs in immunoglobulin switch regions, triggering the chromosomal deletion event in CSR.

OPTIMIZATION OF SPIRAL GRADIENT DILUTION PLATING METHOD FOR FUSARIUM VIRGULIFORME

Presenter: Soli Bennett
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2406
Mentor: Ryan Hamilton, Martin Chilvers

The fungus Fusarium virguliforme is a pathogen that causes sudden death syndrome in soybean crops and has a large negative impact on crop yield. Fungicides such as fluopyram are used to control the spread and impact of this pathogen. The effectiveness of fluopyram can be determined using traditional poison plating as well as a relatively new method called spiral gradient dilution plating. F. virguliforme growth was assessed for the most optimal method to use this species with spiral plating. Tenfold dilutions were made of different F. virguliforme isolates at different culture ages for calculating CFU per mL. Different concentrations were streaked on spiral plates to determine which combination of isolate suspension concentration and fluopyram concentration produces the best response for estimation of EC50 values. A finalized set of spiral plates using the optimal concentrations were compared to traditional poison plating.

ISOLATING AND CHARACTERIZING ANTIBIOTIC SUSCEPTIBILITY OF ENVIRONMENTAL VIBRIO CHOLERAE STRAINS FROM SIERRA LEONE WATER SAMPLES

Presenter: Elise Trost
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2407
Mentor: Christopher Waters, Soo Yoon

Cholera, a gastrointestinal diarrheal disease caused by the bacterial pathogen Vibrio cholerae, is a major public health concern in developing countries. The El Tor biotype is the cause of the current 7th pandemic, in contrast to the classical biotype that was the major pathogen of the previous 6 pandemics. Cholera is endemic to Sierra Leone, where information regarding the prevalent Vibrio cholerae strains has not been updated since 2014, in a study that examined patient stool samples. We have obtained water samples from Sierra Leone to characterize whether Vibrio cholerae can be isolated from the environment and determine how their susceptibility to antibiotics differs from clinical isolates. I performed multiplex PCR to differentiate isolates based on strain specific genes and virulence factors. I then determined the antibiotic susceptibility profiles of unique isolates using minimum inhibitory concentration assays. Our updated antibiotic susceptibility data may inform future treatment options for cholera patients in Sierra Leone amidst the rising antibiotic resistance seen across the Sub-Saharan region of Africa.

DEVELOPING RNA INTERFERENCE - BASED SEX SORTING SYSTEM FOR MOSQUITOES

Presenter: Krishna Gogineni
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2408
Mentor: Zhiyong Xi

A variety of diseases that cause considerable risk to human health such as Dengue, West Nile, and Zika rely on the mosquito as a critical vector to transmit the pathogens to humans. To break this vector step in the chain of infection, innovative techniques including Wolbachia-based replacement and suppression of mosquito vector populations are currently under development. Wolbachia is a maternally transmitted intracellular symbiotic bacterium that naturally infects over 65% of insect species, as well as many other arthropods. It also induces a phenotype called cytoplasmic incompatibility, in which embryonic death occurs when infected males mate with either uninfected females or infected females carrying different a type of Wolbachia. An artificial Wolbachia infection can be generated in mosquitoes via embryonic microinjection. Through release of these Wolbachia-infected males to induce incompatible mating with wild-type mosquitoes, successful population suppression/ elimination has been accomplished in the field trials. However, it requires a highly effective sex separation system to produce males on a large scale for area-wide implementation on disease control. By targeting Transformer-2 (Tra-2), a key gene in the mosquito sex determination pathway, we attempt to develop a genetic approach to induce female-specific killing. Our results show silencing of Tra-2 using RNA

interference at the larval stage induced 87% male bias. Knockout of Tra-2 using CRISPR-Cas9 was lethal for females but not males. Our results provide a potential new avenue to translate Wolbachia-based population suppression for disease control.

FACTORS INFLUENCING DESICCATION TOLERANCE OF SALMONELLA AND ENTEROHEMORRHAGIC E. COLI

Presenter: Ashley Deaton
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2411
Mentor: Teresa Bergholz

A series of outbreaks of Salmonella and Enterohemorrhagic Escherica coli (EHEC) in low-moisture foods has spurred interest in evaluating how these pathogens respond to drops in moisture otherwise known as desiccation. Low-moisture foods are not commonly thought of as the source of foodborne outbreaks due to their lack of unbound water that bacteria can utilize in metabolic processes. Previous studies found that EHEC and Salmonella have varying desiccation tolerance, but there is limited data on the impact of prior growth conditions on desiccation tolerance in an osmolyte-free environment. The goal of this study was to quantify how various Salmonella and EHEC strains respond to desiccation in an osmolyte-free environment and compare tolerance over liquid vs agar media. A total of 33 strains belonging to EHEC serotypes O121, O157, O111, O121, O45 and O103 and Salmonella serotypes Agona, Enteritidis, Montevideo, and Tennessee were evaluated in triplicate. After an initial incubation period at 37°C in LB broth and agar, cells were placed on a plastic plate at a density of 8 log CFU/mL and stored at 22°C and 40% RH for 48 hours. At 0, 24, and 48 hours, viable cell counts were performed and differences calculated. Salmonella strains were found to be significantly more tolerant than EHEC. Salmonella Agona strains grown in broth were found to be significantly more tolerant compared to agar. E.coli 0111:H8 grown in broth displayed a much higher tolerance than 045:H2 also grown in broth. Results from this study demonstrate that desiccation response among pathogens is non-uniform.

GENOMIC DETERMINANTS OF STREPTOCOCCAL COMMENSALISM AND PATHOGENESIS IN THE MIDDLE EAR

Presenter: Emma Boismier
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2412
Mentor: Gemma Reguera

The periodic opening of the Eustachian tube in the nasopharynx introduces into the middle ear space air with saliva aerosols carrying oral bacteria and selects for a commensal community of streptococci and syntrophic partners in the middle ear mucosa. We sequenced the genomes from 11 streptococci isolated from otic secretion and identified genome adaptations of the otic lineages from the closest oral ancestors. We reconstructed from the genomic data pathways for the degradation of host substrates (mucin glycoproteins and proteins) and their fermentation to lactate, a key metabolic intermediate in the otic trophic webs. Comparative genome analysis with the otopathogen Streptococcus pneumoniae also identified genes that distinguish otic

commensal strains from the pathogenic relative. These genes, which represent genomic determinants of streptococcal commensalism, are important to identify strains with probiotic traits suitable for prophylactic treatments.

ANTIMICROBIAL COATED PLASTICS EFFICACY TO REDUCE LISTERIA MONOCYTOGENES STRAIN TB001

Presenter: Elle Brickles
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2413
Mentor: Teresa Bergholz

The question I am researching is how to evaluate the efficacy of antimicrobial coatings on plastic surfaces using Listeria monocytogenes strain TB001 and PLA. I will be using one strain of Listeria with three biological replicates. I hope to determine the overall log reduction of Listeria, which will help determine the efficacy of antimicrobial coatings on PLA. There are five different types of PLA, each with a different type of antimicrobial coating, such as starch-iodine. The antimicrobial coating, starch-iodine, is effective in reducing gram positive bacteria, so we are testing a gram-negative bacterium.

ENTEROBACTER DESICCATION RESISTANCE AND PERSISTENCE ON FOMITES

Presenter: Dylan Luce
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2414
Mentor: Beth Ottosen, Victor DiRita

Enterobacter cloacae is a Gram-negative, opportunistic pathogen that is the cause of serious infections in clinical settings. Frequently the cause of hospital-associated infections, E. cloacae can be transmitted between patients through contaminated hospital surfaces. To survive on fomites, E. cloacae must overcome the stress of desiccation as well as treatment with disinfectants. We have demonstrated that E. cloacae remains viable after up to 24 days of desiccation, suggesting that persistence on hospital surfaces could facilitate transmission between patients. We then tested the effectiveness of multiple disinfectants such as ethanol, bleach, and quaternary ammonium compounds against planktonic E. cloacae cells. Finally, we are evaluating the bactericidal activity of these compounds against desiccated E. cloacae to determine if desiccation enhances resistance to disinfectants. Our work will elucidate the molecular mechanisms underpinning desiccation resistance. It will also provide insights into the development of better decontamination procedures to break the transmission cycle between patients in hospital settings.

PREDICTIVE BIOMARKERS OF COVID-19 SEVERITY

Presenter: Shay Ladd
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2415
Mentor: Christina Chan

COVID-19 cases range in severity from asymptomatic to fatal, with symptoms affecting the whole body and lasting long after the initial infection. Risk factors for severe illness have been identified, but do not necessarily predict the outcome of infection. Being able to identify which patients are likely to deteriorate would allow for more effective and efficient care. Using proteomic data from OLINK and RNA-seq data from lung tissue of COVID-19 patients, 15 biomarkers were computationally mapped as having expression patterns that contributed to changes in disease severity. Of these biomarkers, IL6 and IL15 were investigated for their effects on apoptosis and their implications in lung fibrosis as related to COVID-19. While there has been much research over the past year and half on the COVID-19 pandemic, much remains unclear about the disease progression. Further research into specific markers that could contribute to cell death or fibrosis would aid our understanding of the influences of the virus on the lungs and in developing improved and targeted treatments.

DETECTION OF AFRICAN SWINE FEVER VIRUS IN SWINE FEED USING A NANOPARTICLE-BASED BIOSENSOR

Presenter: Vedi Patel
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2416
Mentor: Chelsie Boodoo, Evangelyn Alocilja

African swine fever virus (ASFV) is an easily transmitted virus within domestic and wild pigs, which results in substantial economic and product loss within the swine industry. This disease currently has no vaccine or treatment, and due to its high mortality rate, affects millions of pigs each year. This study aims to develop a field-operable detection method for ASFV to allow for preventive measures of further spread. This rapid low-cost biosensor uses gold nanoparticles (GNP) to produce a colorimetric response that indicates if the sample is positive or negative for ASFV. This can be used to detect ASFV extracted DNA and have future applications to test DNA within swine feed as well as swine saliva. This biosensor can provide positive results of ASFV within a minute and with concentrations as low as 5ng/μL. Specificity tests with Escherichia coli, Salmonella spp., and Staphylococcus aureus show that the biosensor is specific to ASFV demonstrating that the biosensor can still effectively detect ASFV in the presence of other bacteria. This early detection procedure provides time to cull any infected pigs and limit any further spread, thus limiting production loss and improving biosecurity.

INVESTIGATING FUNGAL CULTURES TO FILTER SYNECHOCOCCUS ELONGATUS PCC7942 FROM FRESHWATER

Presenter: Shannon Townson
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2417
Mentor: Gregory Bonito

Cyanobacteria grows from excess nutrients in water and has major environmental impacts, creating oxygen-depleted dead zones in a process called eutrophication. Cyanobacterial blooms affect open water systems, and can be induced by agricultural runoff, which can have major impacts on the health of ecosystems. Because of their impact on lake water quality, a way to filter out cyanobacteria from aquatic ecosystems in a sustainable way is an important issue. Using fungal mycelium to undergo mycoremediation, meaning to use fungi to break down environmental waste, is a sustainable method to filtering out pollutants. These cultures are a renewable resource and can be grown up anytime. This project assesses the ability for fungi to filter out harmful cyanobacteria to simulate the effects of excess nutrients in the water supply through eutrophication. It is hypothesized that Mortierella 55mL of Synechococcus elongatus is back diluted with a 1:5 dilution of BG-11 media and grown up in flasks on a light incubation with a shaker. Morchella, Mortierella and Pleurotus are grown up in MEA broth media and harvested. Fungal cultures are combined with the cyanobacteria solution using a mesocosm experiment, simulating a nutrient rich lake system. Cyanobacterial concentration levels are assessed using absorbance and fluorescence measurements at 650 and 700 nm wavelengths of the cyanobacteria solution. A positive control of Pleurotus will be measured to test the validity of past research for the genus to filter out cyanobacteria.

IDENTIFYING CBASS ACTIVITY WITH RESULTING PHAGE DEFENSE SPECIFICITY

Presenter: Ram Sanath Kumar
Category: Microbiology, Immunology, & Infectious Disease
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2418
Mentor: Kaylee Wilburn, Christopher Waters, Soo Yoon

Cholera is a serious threat causing 1.4 to 4.3 million cases every year worldwide especially in developing countries. Vibrio cholerae El Tor differs from the previous pandemic causing classical biotype through its two pathogenicity islands VSP-1 and VSP-2 that offer an advantage in virulence and its epidemiological success. Within VSP-1, our lab has been studying the abortive cyclic-oligonucleotide based antiphage signaling system or CBASS. From prior transposon mutagenesis three uncharacterized ancillary proteins have been hypothesized to regulate CBASS response. CBASS is not unique to Vibrio cholerae, with it being a well-conserved system in all bacteria phyla and found near 65.5% of other microbial defense systems. Better understanding the mechanism and gene relationships may reveal novel bacteria control methods amide rising drug resistant microbes. In addition, as a conserved phage defense mechanism further exploitation of this system may prove imperative in growing areas such as phage therapy. To determine the role of these uncharacterized ancillary genes in

phage defense I made various mutant strains of CBASS with its native promoter. The mutants were tested against T2 and T5 phages which were seen to be affected by CBASS, the sensitive strains prove the loss of phage defense of CBASS thus indicating the importance of the uncharacterized ancillary genes.

NEUROSCIENCE
Poster Presentations

THE INFLUENCE OF PROBIOTIC TREATMENT ON PREGNANCY STRESS AND POSTPARTUM SOCIOEMOTIONAL BEHAVIORS

Presenter: Aneeqa Hasan
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2501
Mentor: Joseph Lonstein

High levels of maternal care and response after birth is pertinent to the survival and normal development of offspring. Investigating the maternal brain using a rodent model allows for a greater understanding of neurobehavioral changes influenced by postpartum depression in human mothers and how it affects their infants. Motherhood causes dramatic neurobiological and behavioral changes, including altering brain size, neurochemistry and the affective state. Using a probiotics treatment, this study aims to determine how Lactobacillus rhamnosus HN001 used in rodent models can regulate effects of pregnancy stress, caregiving behaviors and gut microbiome caused by perinatal depression. This was conducted by using groups of female laboratory rats exposed to pregnancy stress to induce postpartum depression (PPD) behaviors and also treated with the probiotics treatment to reduce PPD behaviors. After giving birth, depressive-like and maternal caregiving behaviors are assessed, such as grooming and nursing, and fecal samples are collected after sacrifice to examine gut microbiome. The expected outcomes include strong correlations between the effects of HN001 on the maternal brain and reduced pregnancy stress, increased maternal caregiving after birth and production of healthy maternal gut microbiota. Potential applications related to findings include developing psychobiotic treatments to improve maternal mental health and understanding how gut microbiomes may affect neurochemistry within the maternal brain and associated postpartum socioemotional behaviors.

THE EFFECTS OF TRAUMATIC BRAIN INJURY ON SLEEP/ WAKE PATTERNS, RECOGNITION, AND MEMORY IN MINIPIGS

Presenter: Sumer Pakray
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2503
Mentor: Galit Pelled

Traumatic brain injury (TBI) is a leading cause of death and disability in children and young adults in the U.S. Affected individuals often experience emotional, cognitive, and physiological complications as a result of impact. These effects include memory deficits, disturbed sleep cycles, increased irritability, and more. Our study investigated behavioral, cognitive, and anatomical changes in a yucatan minipig model prior- and post-TBI. To do so, various tasks were performed to test short-term, long-term, and spatial memory, observational behavioral and herd hierarchical changes were noted, and TBI-related vision disturbances, serum and blood biomarker level changes, and blood oxygen level dependent (BOLD) changes were analyzed using an ophthalmic test, blood test, and functional magnetic resonance imaging (fMRI). Differences in these measures were compared between controls and injured porcine. We hypothesize that injured porcine will display decreased performances in behavioral and memory tasks as well as having changes in neuroanatomy and biomarker levels indicative of injury.

EFFICIENCY AND SPECIFICITY OF DESIGNER RECEPTORS EXCLUSIVELY ACTIVATED BY DESIGNER DRUGS IN THE PARAVENTRICULAR HYPOTHALAMIC NUCLEUS AND SUPRAOPTIC NUCLEUS OF JUVENILE RATS

Presenter: Adelina Tatone
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2504
Mentor: Samantha Bowden, Alexa Veenema

Recent technological advances have permitted increasingly specific manipulations of neural circuits, changing the outlook of behavioral neuroscience research. One such technique is called Designer Receptors Exclusively Activated by Designer Drugs (DREADDs). These DREADD viruses insert a "designer receptor" within the membrane of neurons, which can only be activated by the "designer drug", Clozapine-N-oxide (CNO). Overall, this allows for direct manipulation of neurons infected with this virus. Though these techniques are powerful, validation of these viruses is often overlooked or vaguely reported. In this study, we aimed to validate an excitatory DREADD that is under the control of the oxytocin (OXT) promotor, which should allow for cell-type specific manipulation of only OXT producing cells tagged with the red fluorophore mCherry. To accomplish this, we first calculated the efficiency and specificity of the virus. Efficiency refers to the percentage of the total OXT cells infected by the virus as calculated by the total amount of OXT with mCherry expression, while specificity refers to whether this virus infects only OXT-producing cells as calculated by the amount of mCherry co-expressed in OXT cells. Additionally, we quantified overall activation of mCherry cells following CNO administration using c-Fos, a marker of neuronal activation. Overall, this study highlights the importance of validation of research techniques prior to beginning experiments. Finally, we are currently identifying behavioral correlates with the efficiency and specificity of the virus, focusing on social play in the juvenile rats, to determine these parameters' effects on behavior.

THE ROLE OF OXYTOCIN IN JUVENILE SOCIAL PLAY

Presenter: Anna Luxhoj
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2505
Mentor: Samantha Bowden

Juvenile social play is a highly rewarding behavior and is critical for the development of typical social skills in adulthood. Deficits in social play are seen in autism spectrum disorder (ASD). Currently, the neuropeptide oxytocin (OXT) is being tested in clinical trials for its efficacy to alleviate social deficits in ASD, but how OXT modulates social play is unknown. To better understand how OXT regulates juvenile social play, we used Designer Receptors Exclusively Activated by Designer Drugs (DREADDs). This technique allowed us to selectively manipulate the activity of OXT neurons in the paraventricular nucleus (PVN) and supraoptic nucleus (SON), two brain regions that contain a majority of OXT neurons in the central nervous system. Via infusion of the DREADDs ligand clozapine-N-oxide (CNO), we were able to stimulate OXT neuronal cell bodies within the PVN and SON as subjects underwent social play testing. We found that stimulation of PVNOXT neurons via CNO modulates social play in a sex-specific manner, with males decreasing and females increasing duration of social play without affecting other social behaviors such as allogrooming and social investigation. Additionally, we found that stimulation of SONOXT neurons via CNO increased social investigation in both sexes, with no effect on social play. Overall, these studies demonstrate differential involvement of brain OXT, with the PVNOXT systems modulating social play and the SONOXT systems modulating social investigation in juvenile rats. This provides first evidence that the specific targeting of PVNOXT could serve as a potential, albeit sex-specific, therapeutic to improve social play in autistic children.

INVESTIGATING THE ROLE OF NEUROMEDIN S IN THE VENTRAL TEGMENTAL AREA IN MORPHINE BEHAVIORS

Presenter: Olivia Dodson
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2506
Mentor: Michelle Mazei-Robison, Cristina Rivera Quiles

The opioid crisis in the United States has become an increasing problem within the past few decades. Although we know that the ventral tegmental area (VTA) of the brain contributes to behavioral reward, the cellular heterogeneity within the VTA, including dopaminergic (DA) neurons, has limited our understanding of the role of specific types VTA neurons in opioid addiction. Here, we are focused on VTA DA neurons that express Neuromedin S (NMS) because we have found that NMS expression is increased in VTA DA neurons in mice following chronic morphine administration. To determine whether VTA NMS neurons play a role in opioid behavior, we stereotaxically injected viral vectors into the VTA of mice that allowed us to activate or inhibit VTA NMS neurons (hM3Dq or hM4Di) via clozapine-n-oxide (CNO) administration. Our preliminary data suggest that VTA NMS neuron activation increases, and VTA NMS inhibition decreases, morphine-induced locomotor activity. Following behavioral

analysis, we are conducting immunohistochemical (IHC) studies. Specifically, we are validating that CNO treatment of hM3Dq and hMR4Di mice causes neuronal activation or inhibition using c-fos as a marker for cell activation. Additional IHC studies seek to characterize the cells in the VTA that express NMS and their activation by morphine. We hope that by better understanding the changes in the brain induced by opioids, such as the role of VTA NMS neurons, we will gain insight that may lead to better diagnosis and treatment of opioid use disorder.

NEUROPEPTIDE ACTIVATION IN A MODEL OF OVERCONSUMPTION: HOW OBESOGENIC CUES INFLUENCE NEURAL ACTIVITY AND MAY CONTRIBUTE TO OBESITY

Presenter: Kate Sapkowski
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2507
Additional Student Presenters: Dorothy Zhao
Mentor: Alexander Johnson, Lauren Raycraft

Obesity prevalence in the United States has steadily increased, including a rise in the percent of adults (age 18 and older) who are obese from 27.4% in 2011 to 31.9% in 2020 (CDC). Obesity is a significant risk factor for comorbidities that can lead to preventable, premature death, including complications from COVID-19. Ideally, the body maintains homeostasis by balancing caloric intake and expenditure. However, in our current environment, easily accessible and affordable foods tend to be high in sugar and fat and are frequently paired with food advertisements to signify their availability. Together, these variables contribute to an obesogenic environment, promoting overconsumption, weight gain and obesity. In the lab, the capacity of these food-paired cues to promote overeating behavior can be modeled in Cue Potentiated Feeding (CPF). In this study, we tested both lean and diet-induced obese (DIO) mice and examined activation of lateral hypothalamic area (LHA) cells that produce the neuropeptide feeding signals Melanin-Concentrating Hormone (MCH) or Orexin (ORX). This was achieved by labelling cells in the LHA with the putative marker for neuronal activity, FOS. Subsequently, dual-immunofluorescence microscopy was used to quantify FOS with either MCH or ORX colocalization in the LHA. Given that both MCH and ORX promote feeding behavior, we expected that these cells would be active during CPF, particularly in DIO mice. These findings will provide insight into how brain feeding signals are activated in response to food-cues and the extent to which dietary obesity may influence this activation.

DETECTION OF VOLATILE CANCER BIOMARKER MOLECULES PRESENT IN EXHALED HUMAN BREATH VIA A BIOLOGICAL OLFACTORY SENSORY SYSTEM

Presenter: Sydney Miller
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2511
Additional Student Presenters: Noel Lefevre
Mentor: Elyssa Cox, Debajit Saha

Cancer is one of the leading causes of death globally, killing nearly 10 million people in 2020. Current treatments for cancer will benefit significantly from early detection and patient-friendly, periodic, noninvasive screening of cancer. Here we explore a novel cancer detection technology using live biological olfactory neurons that can be incorporated into a closed, compact brain- based gas sensing device. We expect this technology to be more sensitive than currently available tools and produce results real-time. Breast and lung cancers have been known to cause measurable changes in the concentrations of endogenous volatile organic compounds (VOCs) in exhaled breath compared to those without cancer. Honeybees, like many other insects, have highly sensitive gas sensing abilities through their antennae and complex olfactory sensory system, and have been extensively studied with neural recordings; therefore, this model was chosen to develop this breath sensing technology. It is hypothesized that honeybees can distinguish between healthy biomarker concentrations and those that indicate different types of cancer in the body. We investigated honeybee olfactory neural responses in vivo by multichannel neural recordings during presentation of putative breast and lung cancer VOCs to the antennae. Our results show that honeybee olfactory neurons can distinguish between putative breath and lung cancer biomarkers both individually and as a population. This detection technology is also very fast (~ 0.5 sec detection time). Next, to determine the detection limit of this technology, we plan to decrease the concentrations of the cancer VOCs systematically to biologically relevant ppb to sub-ppb ranges.

IDENTIFYING THE INHIBITORY CIRCUIT ELEMENTS MEDIATING MOTOR INTEGRATION IN DEEP LAYERS OF SOMATOSENSORY CORTEX

Presenter: Claire Jones
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2513
Mentor: Shane Crandall

Normal sensory experience depends on distinguishing between self-generated and externally generated sensory input. In many sensory regions of the brain, motor-related signals are used to suppress sensory processing before and during ongoing movements. In mammals, inter-areal signaling between the primary motor and primary somatosensory cortex are thought to play a critical role in active sensation and sensorimotor integration, yet the specific inhibitory elements by which input from the motor cortex influence somatosensory processing remain poorly understood. Here we combined in vitro electrophysiology and optogenetic strategies with a single-cell labeling technique and anatomical reconstruction to show that the mouse motor cortex strongly recruits a specific subtype of parvalbumin-expressing inhibitory interneuron in the somatosensory cortex. These GABAergic inhibitory cells are found exclusively in the lower half of the deepest cortical layer, layer 6, and have axons that arborize locally, remaining confined within the infragranular layers (layer 5 and 6). Next, we will analyze these neurons and compare them to other parvalbumin-expressing interneurons in layer 6 to determine if they possess unique electrophysiological properties. These results reveal a previously unknown inhibitory circuit element by which the motor cortex may selectively modulate the responsiveness of only neurons located in the deeper layers of the somatosensory cortex.

ONLINE COMMENTS ABOUT DBS FOR OPIOID ADDICTION: PUBLIC PERCEPTIONS AND CONCERNS

Presenter: Jack Koczara
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2514
Mentor: Robyn Bluhm, Laura Cabrera*

Deep brain stimulation (DBS), a type of brain implant which delivers therapeutic electrical stimulation, has been proposed as a potential treatment for opioid addiction. The use of DBS in psychiatry comes with ethical considerations, in addition to concerns specific to its use for addiction (Carter et al., 2011). However, no studies have specifically evaluated public perception and concerns related to the use of DBS for opioid addiction. Our goal is to address this gap in the literature, by examining public comments on two online newspaper articles covering the story of a man who undergoes experimental DBS, one pre- (2019) and one post-treatment (2021). Our sample consisted of 292 total comments. This included all 146 comments from a 2019 article piece, and 146 randomly selected from a 2021 piece. Comments were coded using qualitative content analysis to identify commenters' main perceptions and concerns. Common themes in both articles included hopes and expectations, and optimism. In the first piece, scientific validity, cautionary realism, and resource allocation were more dominant in the comments. In the later piece therapeutic need and what counts as a mental disorder were more prevalent. Overall, our results suggest that some members of the public are reluctant to trust technology that is not yet fully understood, and which might exacerbate social justice concerns; however evidence of therapeutic effectiveness shapes these concerns. Our results are important to help understand concerns around the use of DBS for opioid addition and to inform the responsible use of DBS in psychiatric disorders.

FACE AFTEREFFECTS: A WINDOW INTO THE PREDICTION-BASED PERCEPTUAL SYSTEM IN SCHIZOPHRENIA

Presenter: Anjali Desai
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2515
Mentor: Katharine Thakkar

Individuals with schizophrenia often recount anomalies of the visual system, such as distressing hallucinations. While there is limited knowledge on the underlying neurophysiological mechanisms that lend in these processes, compelling theories characterize the brain as a powerful computational machine that amalgamates experience-based predictions with sensory input. These ideas could partially explain the processing abnormalities that occur in schizophrenia that are confounded by one's lived experiences, and how these may coincide with severity of emergent symptoms. In fact, visual system abnormalities are particularly useful in observing this linkage, and our current study investigates this by quantifying visual aftereffect strength. Aftereffects are an illusion of the "opposite" of some visual stimulus that arise after the subject has fixated attention on the image for a prolonged period. Particularly, this study measured higher-order aftereffect strength using facial stimuli. "Anti-faces" of celebrities were

contrived using face morphing software and study participants were instructed to identify a relatively neutral face (an average of many faces shifted slightly toward the features of a celebrity) after focusing on the anti-face. The face aftereffect strength was defined as the difference between a participant's perception of a neutral face versus what an actual neutral face is. Correlations will be drawn between symptom and aftereffect strength with the goal of better understanding how our past experiences and beliefs can distort visual perception, especially in individuals living with schizophrenia who are highly susceptible to these variances from reality.

EFFECTS OF GENERAL ANESTHESIA AND GUT MICROBIOME COMPOSITION ON MYELINATION IN MICE

Presenter: Charlotte Best
Category: Neuroscience
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2516
Mentor: Rebecca Knickmeyer

Myelination is an important neurodevelopmental process in which brain cells known as oligodendrocytes surround axons with an insulating sheath, thereby increasing the speed of neural signals. Previous studies show that the absence of a typical gut microbiome leads to hypomyelination of the prefrontal cortex of mice. However, it is unclear if variation in human microbiomes influences myelination. To address this question, the Knickmeyer lab generated four groups of mice, specific pathogen free mice, germ free mice, mice inoculated with human infant microbiomes rich in Bifidobacterium, and mice inoculated with human infant microbiomes rich in Bacteroides. Myelin phenotypes for 28 mice were assessed using electron microscopy. 18 of these mice underwent MRI scanning prior to sacrifice, the other 10 did not. Axons in the prefrontal cortex, amygdala, nucleus accumbens, and hippocampus were assessed for myelin decompaction level, axonal diameter, myelin sheath thickness, and number of myelin lamina using ImageJ software. Preliminary results show that MRI status may impact myelin decompaction level. This may be due to the anesthetic protocol the mice receive, which involves administration of isoflurane and Dexmedetomidine. Prior studies show that early postnatal exposure to general anesthetics, including isoflurane, disrupts myelination, but to our knowledge, this is the first study showing that this particular protocol may induce demyelination in adult animals. In subsequent analyses, this relationship will be further explored, and ANOVA and multiple comparison tests will be used to compare measurements between the 4 microbiome groups controlling for MRI status.

FASTER RESOLUTION OF INFLAMMATORY PAIN IN MALE MICE COMPARED TO FEMALES IS ASSOCIATED WITH HIGHER PRODUCTION OF INTERLEUKIN (IL)-10

Presenter: Karli Monahan
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2522
Mentor: Geoffroy Laumet

Chronic pain is an extreme burden on society and impacts women more than men. Epidemiological studies showed that the prevalence of chronic pain is 20% higher in women than in men. Therefore, to reduce the inequality of pain management and optimize treatment, it is important to understand the mechanisms underlying this sex difference. Previous work from our lab demonstrated that IL-10 is critical for the resolution of pain, but whether a sex difference in IL-10 production exists and contributes to pain resolution has yet to be determined. To induce inflammatory pain, female and male mice received an injection of Complete Freund's adjuvant (CFA) in one hind paw. In both females and males, CFA caused pain hypersensitivity. The intensity of pain is similar in both sexes. Pain resolved in male mice after 10 days, while it took almost twice as long for pain to resolve in female mice. In paw skin, IL-10 expression was drastically increased in response to CFA, but analysis revealed that males had much higher levels of IL10 in their paws. To determine whether the expression of IL-10 is regulated by sex hormones, female mice were ovariectomized and implanted with placebo or dihydroxy-testosterone pellets. Critically, the lack of estrogen and the addition of testosterone in female mice hasten the resolution of inflammation and pain. Taken together, these data indicate that the higher production of IL-10 contributes to faster resolution of pain in males. Monitoring the IL-10 levels may help to identify women at risk for chronic pain.

ALTERED PAIN AND TACTILE BEHAVIORS IN THE VALPROIC ACID MOUSE MODEL OF AUTISM

Presenter: Daaren Bukhari
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2523
Additional Student Presenters: Petra Johnson
Mentor: Joseph Beatty, Charles Cox, Bronson Gregory

Fetal-valproate syndrome in humans is a developmental condition caused by in utero exposure to valproic acid (VPA), an anti-seizure drug. The condition is characterized by behavioral delays and show a high prevalence of autism spectrum disorder (ASD). ASD is a neurological disorder that can exhibit different impairments in behavior, one of which includes altered sensitivity of tactile and pain stimuli. In order to test whether these sensitivities are altered in response to prenatal VPA exposure, we used a mouse model of the condition and ran two behavioral tests. A VPA mouse model was induced by giving pregnant dams in utero injections of VPA or saline as a control. We tested male and female offspring and chose three different age groups: adolescence (P30-45), early adulthood (P60-75), and late adulthood (P90-P150). We used a Von Frey test to measure sensitivity to non-painful stimuli by measuring the response to a thin filament applied to the hind paw. In a second test, we measured their pain response to being placed on a hot plate. We found age- and sex-dependent differences in VPA exposed mice in both Von Frey and hot plate tests consistent with ASD. Overall, we demonstrate that the VPA exposed mouse model can induce ASD-like alterations in sensory processing and sensitivity, specifically in pain and tactile behaviors.

CHARACTERIZING MIDBRAIN DOPAMINE PROJECTIONS TO INSULAR CORTEX IN DISRUPTED-IN-SCHIZOPHRENIA-1 MICE

Presenter: Toria Fex
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2524
Additional Student Presenters: Toria Fex
Mentor: Ben Fry, Alexander Johnson

Disrupted in Schizophrenia 1 (DISC-1) is a gene involved in early neural development, perturbations of which have been shown to increase the risk of neuropsychiatric illnesses, including schizophrenia. Studies suggest that in transgenic mice in which DISC-1 signaling is disrupted throughout the brain leads to aberrant dopamine signaling, which reproduces one of the core biological disturbances seen in humans with schizophrenia. We sought to further explore DISC-1 dependent changes in dopamine circuitry by characterizing ventral tegmental area (VTA) dopamine cell projections to the insular cortex (IC) in DISC-1 transgenic mice. To achieve this, DISC-1 transgenic mice were crossed with mice expressing Cre-recombinase selectively in cells with the dopamine transporter (DAT-Cre). DISC-1DAT-Cre and wild-typeDAT- Cre controls received bilateral IC injections of a retrograde Cre-dependent virus that contained Flp recombinase. This infected all dopamine cells that project to the IC with Flp recombinase. Additionally, mice received a Flp-dependent inhibitory DREADD that was tagged with a red fluorescent marker into the VTA. Through this dual-viral intersectional approach, we were able to fluorescently label all VTA dopamine cells that project to the IC in both transgenic DISC- 1DAT-Cre and wild-typeDAT-Cre controls. Subsequently, we used immunofluorescent microscopy to characterize the localization and degree of expression of VTA dopamine cells that project to IC and establish whether DISC-1 disruptions lead to anatomical changes in this circuit. These studies have the potential to yield new information about differences in neuroanatomy that arise from perturbations of the DISC-1 genetic locus.

OBSERVING TBI EFFECTS WITHIN A LARGE ANIMAL PIG MODEL

Presenter: Lexi Zydeck
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2525
Mentor: Lauren Wade

In the United States, there are approximately 610 traumatic brain injuries (TBIs) reported daily. From both reported and unreported accounts of TBI, the outcomes can be substantial. Specifically, the potential effects post-TBI can have life lasting consequences. Long-term behavioral effects such as mood disorders, anxiety, attention deficit disorder (ADD), and more can arise as a result from a TBI. Once developed, these disorders can persist years after the initial injury. In the current study, pediatric concussion and their long-term outcomes are modeled using mini Yucatan pigs. The pigs are housed for one month pre-injury and five months post-injury. Over the course of these months, differences in behavior, ranking of social hierarchy, and performances in several long- and short-term memory tests are documented to allow for the analysis of changes in behavior and memory pre- and post-injury. Dominance tests

reveal changes in emotion and social position therefore displaying alterations in thehierarchy. To observe these changes, the duration each pig spends actively eating from the bowl of food is measured, along with the number of head or shoulder throws made, and noting which pigs only root the food that falls out of the bowl. Observational noting of individual and group behavior allows for the investigation of changes in social behavior before and after injury. This includes aggressive behaviors, lack of interest in activities, social occlusion, changes in appetite, and more. Lastly, three varying memory tests are performed. Memory based on color, location, and novel objects all test different aspects of the pigs' long- and short-term memory. It is predicted through this project that pigs who receive a TBI will display more severe changes in behavior, emotion levels, and order of social hierarchy.

MAPPING THE NEUROTRANSMITTER POPULATIONS ACROSS DEVELOPMENT AND SEX IN THE BRAIN'S CENTRAL TIMEKEEPER, THE SUPRACHIASMATIC NUCLEUS

Presenter: Krystal Jang
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2526
Mentor: Hanne Hoffmann, Alexandra Yaw, Lorenzo Sempere

The suprachiasmatic nucleus (SCN) is the brain's central pacemaker. The SCN is important for synchronizing circadian clocks in the brain and peripheral tissues, allowing correctly timed sleep-wake cycles, activity patterns, and metabolic function, among others. The SCN subdivides into different specialized areas based on neurotransmitter expression. The SCN core consist of Vasoactive Intestinal Peptide (VIP) and the shell expresses Arginine Vasopressin (AVP). Neuromedin S (NMS) is co-expressed with VIP and AVP. VIP expressing neurons receive light input from the eye, and maintains synchronization in SCN neurons, whereas AVP functions to couple SCN neurons. The role of NMS is less studied but is thought to contribute to SCN circadian rhythmicity. An increased understanding of how the neurons in the SCN develop, and possible sex differences will help increase our understanding of sex differences in SCN control of physiological functions. We hypothesize that there are differences in the population of the neurotransmitters in the SCN between males and females. To understand when SCN neurons in the core and shell start to express VIP, AVP, and NMS, we examined the SCN from male and female mice aged P2 (Postnatal Day 2), P20 (pre-puberty) and P60 (adult). We analyzed SCN sections using RNAscope, a technique used to detect mRNAs within cells. SCN sections were labeled with fluorescent markers, followed by quantification using a microscope and ImageScope software. These data will inform our understanding of sex differences in the developmental relationships between neurotransmitters between the core and shell of the SCN.

CHRONIC STRESS INCREASES SGK1 GENE EXPRESSION IN THE VENTRAL TEGMENTAL AREA (VTA)

Presenter: Tushya Mehta
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2527
Mentor: Michelle Mazei-Robison

Psychiatric disorders comprise significant health and financial burden in the US, costing billions in lost production and wages. Two of the most prevalent psychiatric disorders, depression and addiction, affect millions of adults, and current therapeutic options offer limited relief. Despite the prevalence of these disorders, little is known about their underlying molecular mechanisms. Our lab is particularly interested in the role of mesocorticolimbic dopamine (DA) neurons in the ventral tegmental area (VTA) that project to the nucleus accumbens and prefrontal cortex. Our lab uses mouse models of depression like social defeat stress (SDS) and subchronic variable stress (SCVS) to identify novel molecular changes in the VTA that contribute to behavior. We have found that serum- and glucocorticoid-inducible kinase 1 (SGK1) expression is increased in the VTA following SDS and SCVS. The goal of this project is to determine the cells in the VTA that are responsible for the stress-induced increase of SGK1. Using a floxed-SGK1 transgenic line, we generated mice that lacked SGK1 in DA neurons, or in all neurons of the VTA and then performed SDS or SCVS. We then isolated RNA from VTA and performed qRT-PCR. Our preliminary data suggest that stress is still able to increase VTA SGK1 levels in both SGK1-DA and SGK1-VTA knockout mice. This suggests that the source of SGK1 in VTA may not be neurons, but glia. Future studies will address whether stress mediates expression of SGK1 in non-neuronal cells.

ORGANIZATIONAL AND ACTIVATIONAL EFFECTS OF ESTROGEN ON FEMALE BINGE EATING BEHAVIOR

Presenter: Ainsley Caldwell
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2531
Mentor: Jenna Lee

Binge eating is a maladaptive eating behavior characteristic of several major eating disorders, yet the neurobiological underpinnings are poorly understood. Binge eating is more prevalent in females than males after puberty, during which ovarian hormones play a crucial role. To examine the influence of developmental estrogen on adulthood binge eating, we are developing a model in which rats will receive ovariectomies before puberty. Using intermittent access to palatable food (PF), adult female rats will be identified as binge eating prone (BEP; consistently high PF intake), resistant (BER; consistently low PF intake), and neutral (neither BEP nor BER). We will compare PF intake of rats that will be ovary-intact, rats that will undergo ovariectomy before puberty (pre-pubertal OVX), and rats that will undergo ovariectomy in adulthood (adult OVX). If pubertal ovarian hormones program BE proclivity, we anticipate observing increased adulthood BEP phenotypes in pre-pubertal OVX rats relative to rats with intact ovaries during puberty. Additionally, although adult ovariectomy is expected to generally increase food intake,

the proportion of BEP rats within this group is predicted to be consistent with that of ovary-intact rats. Upon completion of these studies, we seek to demonstrate that pubertal estrogen modulates the physiological circuitry of female adolescent rats which predisposes for risk of adulthood binge eating. A paucity of research has explored this mechanism of sex difference in binge eating; Therefore, this inquisition will provide significant insight into the organizational and activational role of female gonadal hormones in influencing biological mechanisms associated with binge eating behavior.

INTRINSIC PROPERTIES AND SYNAPTIC ACTIVITY OF STRIATAL SPINY PROJECTION NEURONS IN A MOUSE MODEL OF AUTISM

Presenter: Ariana Zimmerman
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2532
Mentor: Charles Cox, Joseph Beatty, Megan McGrath, Bronson Gregory

Autism spectrum disorder (ASD) is characterized by a range of behavioral and neurological deficits. In utero exposure to the antiseizure drug valproic acid (VPA) has been associated with several teratogenic effects including developmental delay and ASD. Here we evaluated saline and VPA prenatal exposed mice in a marble burying behavioral test to determine if there are alterations in repetitive behaviors. VPA exposed mice displayed an increased number of marbles buried compared to the saline treated mice. This suggests that the VPA exposed mice possess increased repetitive behaviors, a common finding in ASD. These results led us to investigate whether or not the basal ganglia, a circuit involved in motor control, is altered in VPA exposed mice. Specifically, we focused on the striatum, the input nucleus of the basal ganglia, and its principal neurons, spiny projection neurons (SPN). Whole-cell recordings were obtained to investigate if there are alterations in intrinsic properties or synaptic activity of SPNs in VPA exposed mice. Measured intrinsic properties included: resting membrane potential, input resistance, time constant, membrane capacitance, and action potential properties. Synaptic input was investigated by recording spontaneous excitatory postsynaptic currents from saline and VPA exposed mice. These data will provide insight into changes in the synaptic input, action potential output, or the neurons themselves in the striatum of VPA exposed animals.

ROLE OF NTSR1 EXPRESSION IN DA NEURONS FOR FEEDING AND DA- DEPENDENT BEHAVIORS IN OBESE MICE

Presenter: Pooja Menon
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2533
Mentor: Gina Leinninger, Jariel Ramirez-Virella

Understanding the brain's function in regulating feeding and physical activity is essential to address the alarming rates of obesity. Neurotensin Receptor 1 (NtsR1) agonists administered into the ventral tegmental area (VTA) of the brain restrain feeding and promote dopamine (DA)-dependent locomotor activity. Mice lacking NtsR1 expression throughout the body eat normal amounts of regular chow but overconsume palatable (high fat/sucrose) food. However,

it still remains unclear if NtsR1 expression in the VTA is sufficient to modulate feeding and body weight. Here the role of NtsR1 expression in DA neurons for feeding and DA-dependant behaviors in obese mice was studied. To examine this, mice with germline NtsR1 deletion from DA neurons (DAR1null) and control mice were given an ad libitum palatable high fat diet and weekly food intake and body weight was measured. Amphetamine-induced locomotor activity of diet-induced obese mice was also used for examination. There were no significant differences between control and DAR1null mice for food intake or locomotion. However, there was a significant difference between DAR1null and control mice for body weight, with DAR1null mice gaining less weight. Overall, these data suggest that NtsR1 expression in dopamine contributes to control of body weight but not via interruptions in homeostatic feeding.

MOVEMENT VIGOR AND MOTIVATION IN SCHIZOPHRENIA AND BIPOLAR DISORDER

Presenter: Zeeba Ali
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2534
Mentor: Katharine Thakkar

Schizophrenia is a debilitating psychiatric disorder. Along with hallucinations and delusions, individuals with schizophrenia often experience profound amotivation and anhedonia-the inability to seek out activities and derive pleasure. These so-called negative symptoms are gravely impairing and are predictive of social dysfunction and unemployment, even more so than psychosis. Individuals with bipolar disorder may also experience these debilitating negative symptoms in the euthymic state (outside periods of severe mania and depression). The mechanisms underlying negative symptoms in both schizophrenia and bipolar disorder are largely unknown, impeding treatment development. One promising notion is these motivational symptoms reflect a failure in allocating effort to obtain rewards. This effort may be represented by simple, quantifiable movements: for example, we walk more quickly to people we love, or more broadly, we move more vigorously the more we want something. Data from humans and primates imply that saccades (rapid shifts of gaze) to more rewarding stimuli are more vigorous and are associated with more dopaminergic activity- a neuromodulator associated with reward. Thus, measuring saccade vigor provides a precise, quantitative measure of motivated behavior. We hypothesize reduced saccade vigor in individuals with schizophrenia and bipolar disorder, particularly those with more severe negative symptoms. To investigate this, we will calculate saccade vigor from tasks where patients and healthy controls made rapid saccades to visual stimuli. We will compare saccade vigor across groups and relate measures of saccade vigor to negative symptom severity. These findings may provide insights into mechanisms of motivational symptoms in schizophrenia and bipolar disorder.

INVESTIGATING THE EFFECTS OF CHILDHOOD TRAUMA AND OPIOID USE ON THE REWARD FUNCTION OF THE ANTERIOR MIDCINGULATE CORTEX

Presenter: Marissa Cortright
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2535
Mentor: Travis Baker*

Previous research has shown abnormalities in reward functioning in individuals with opioid use disorder (OUD) and in individuals with a history of childhood trauma. While current OUD treatments tend to focus on cessation of opioid use, individuals with reward and decision-making dysfunction are more likely to drop out of treatment programs as well as relapse. Due to this, newer treatments should begin to incorporate neurocognitive deficits and trauma profiles for people struggling with OUD. The anterior midcingulate cortex (MCC) plays an important role in reward valuation when initiating goal-directed behavior and has also been implicated in trauma and addiction. An event-related brain potential, the reward positivity, can be used as a biomarker of the reward function of the MCC. While previous research has shown a blunted reward positivity in substance use disorder, little is known whether trauma compounds this disorder. Here we present preliminary results of the effects of trauma on the reward positivity in both controls and opioid users. The reward positivity was measured using electroencephalography (EEG) as participants (n = 45) navigated a virtual T-maze to find rewards. We plan to conduct several statistical tests to identify the inter-relationships between trauma, opioid use, and the reward function of the MCC. It is our hope that our results will provide a better understanding of the relationship between trauma and reward functioning in drug addiction and illustrate how future interventions might be individually tailored for specific trauma and neurocognitive profiles.

ROLE OF TUMOR-RELEASED SMALL EXTRACELLULAR VESICLES IN CANCER PAIN

Presenter: Christine Evans
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2536
Mentor: Geoffroy Laumet

Reported by about 80% of patients, pain is the most common and earliest symptom of head and neck cancer (HNC). The underlying mechanism isn't fully understood, and discoveries could aid in analgesic drug developments to better the quality of life for cancer patients. Small extracellular vesicles (sEVs) are membrane particles released by cells for intercellular communication. We hypothesized that cancer-derived sEVs communicate with neurons and contribute to pain. To model HNC in mice, oropharyngeal epithelial cells from C57Bl/6 male mice were isolated and transformed into cancer cells (mEERL cells). Immunocompetent mice implanted with mEERL cells developed tumors and quickly developed cancer pain, characteristics true to those of human HNC. Control mice received saline injection. Pain testing involved von Frey (VF) and the Mouse Grimace Scale (MGS). VF responses were noted after

the application of filaments gradually increasing in force to the hind paw. MGS involved observed facial appearances. To test sEVs' contribution to cancer pain, genetically modified mEERL cells unable to release sEVs (mEERL Rab27a-/+ and Rab27b-/- cells) were implanted in mice. These were generated by using CRISPR-cas9 to knock out RAB27a and RAB27b genes involved in sEV release. Injection of these cells resulted in a reduced sensitivity to cancer pain. SEVs themselves injected into healthy mice induced pain hypersensitivity. Our results showed that isolated exosomes induce pain and blocking sEVs release reduces cancer pain. Taken together, our data indicate that cancer-derived sEVs are critical mediators of cancer pain and therefore appear as new therapeutic targets for cancer pain.

ADVANCED DIFFUSION MRI METHODS REVEAL UNIQUE AND COMBINED EFFECTS OF AGE AND HYPERTENSION ON CEREBRAL WHITE MATTER MICROSTRUCTURE IN NON-DEMENTED OLDER ADULTS

Presenter: Chris Pytel
Category: Neuroscience
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2537
Additional Student Presenters: Jacob Surma, Krishna Devulapalli
Mentor: Andrew Bender

Essential hypertension is highly prevalent in older adults. Neuroimaging studies using diffusion magnetic resonance imaging (dMRI) show hypertension is associated with microstructural alterations in cerebral white matter (WM), even when medically controlled. However, better methods are needed to separate WM changes associated with older age alone from those conferred by elevated vascular risk. We used state-of-the-art dMRI data processing methods to estimate voxelwise measures of fiber density (FD) and extracellular cerebral spinal fluid (CSF); we expected these would be more sensitive to older age and diagnosed hypertension than other common dMRI measures. Study participants included 156 nondemented older adults from the University of Michigan Memory and Aging Project with MRI data including multi-shell dMRI acquisition. DMRI data processing and analysis used MRtrix3 software to estimate voxelwise FD and CSF, as well as measures from other dMRI models. We applied general linear models on dMRI measures to evaluate voxelwise differences by hypertension diagnosis, with additional sensitivity analyses controlling for age. The initial model revealed a widespread pattern of significant FD reductions associated with diagnosed hypertension, including both posterior anterior regions. In contrast, controlling for differences in age limited the effects of hypertension on lower total FD to more constrained patterns manifest in posterior and periventricular WM regions. In addition, age but not hypertension was associated with widespread increases in CSF. The present findings highlight the unique and combined negative influences of chronic treated vascular risk on WM microstructure in older adults and highlight the value of newer dMRI methods.

NEUROSCIENCE
Oral Presentations

IMPACT OF INFANT GUT MICROBIOTA ON TEMPERAMENT IN LATE INFANCY

Presenter: Dana Nzerem
Category: Neuroscience
Time Slot: 3:45 PM
Room Location: Meeting Room D
Number: 2541
Mentor: Sarah Comstock, Tengfei Ma

There is an association between the brain and the gut, formally known as the gut-brain axis, but little has been examined on the relationship between temperament and the microbiota. This study analyzes the relationship between the infant microbiota at 3 months with temperament at 9 months. Microbial data was collected from 157 infants in the Michigan Archive for Research on Child Health Cohort. Temperament was determined with scores from Rothbart Infant Behavior Questionnaire-Revised Very Short Form. The questionnaire, completed based on the observations of the child's parents/guardians, measured the children's scores on the three main scales: negative emotionality, surgency, regulatory control. The microbiota profiling with 16S rRNA gene sequencing was completed and three clusters of bacteria were identified: cluster A was characterized by a higher abundance of Bacteroides; cluster C was characterized by a higher abundance of Bifidobacterium, Veillonella, and Escherichia shigella; cluster B is intermediate between the other clusters. Cluster C was associated with negative emotionality (coefficient = -0.58, p-value=0.02) in a fully adjusted multivariate linear regression analysis. Nonetheless, no associations were made between the clusters and temperament after false discovery rate correction. MaAsLin analysis identified various microbes that are associated with temperament, showing negative relationships between Lachnospiraceae and negative emotionality as well as Clostridioides and regulatory control. This study demonstrates a strong correlation between the microbiota and temperament. Future studies should determine the impact of these specific taxa on infant temperament with a larger sample size so additional covariates can be considered in the model.

INVESTIGATING THE ROLE OF CANDIDATE GENES IN REGULATING NEURONAL DIFFERENTIATION IN THE ZEBRAFISH ENTERIC NERVOUS SYSTEM

Presenter: Christina Liu
Category: Neuroscience
Time Slot: 4:00 PM
Room Location: Meeting Room D
Number: 2542
Mentor: Julia Ganz

The enteric nervous system (ENS) is the largest branch of the peripheral nervous system, regulating gut functions including motility, fluid transport, and nutrient absorption. The ENS is derived from hindbrain-level neural crest cells- a migratory cell population that gives rise to specialized cells, including neurons. Once neural crest cells reach the gut, they colonize it and

migrate to the distal end. During migration, enteric progenitor cells (EPCs) differentiate into neurons and glial cells. Abnormal ENS development can cause diseases like Hirschsprung Disease. Little is known regarding regulation of differentiation and specification of ENS neurons. This project aims to understand the function of candidate gene jarid2a in regulating ENS neurogenesis. We hypothesize that jarid2a inhibits EPC proliferation, thereby affecting differentiation in zebrafish. As a result, we predict functional loss of jarid2a results in increased proliferation and reduced differentiation. Preliminary data using CRISPR/Cas9 genome editing shows that functional loss of jarid2a reduces neuron numbers, suggesting that jarid2a controls neurogenesis. We have isolated three mutations in jarid2a that cause premature stop codons, truncating the Jarid2a protein before its functional domains, leading to likely loss-of-function. To test if functional loss of jarid2a affects differentiation, I will perform an intestinal transit assay in jarid2a mutant larvae. This intestinal transit assay will assess how jarid2a mutant larvae clear fluorescently labeled food from their guts compared to wildtype siblings. If they cannot clear food, this indicates abnormal ENS differentiation. These results will help uncover novel regulators of ENS neurogenesis and develop approaches to remedy ENS diseases.

MOLECULAR CONTROL OF NEURONAL DIFFERENTIATION AND SPECIFICATION IN THE ENTERIC NERVOUS SYSTEM

Presenter: Sara Cook
Category: Neuroscience
Time Slot: 4:15 PM
Room Location: Meeting Room D
Number: 2543
Mentor: Julia Ganz

The enteric nervous system (ENS) is part of the peripheral nervous system, which innervates the gut, controlling gut functions. Although little is known about ENS developmental genes, several transcription factors were proposed to control neuronal differentiation, including jarid2a. I aim to determine the impact of jarid2a loss of function on zebrafish ENS development. Preliminary data demonstrate that functional loss of jarid2a reduces neuron numbers in the ENS. I hypothesize that jarid2a regulates the proliferation of enteric progenitor cells (EPCs), thus affecting neuronal development in the ENS. To test this, I have established stable mutant lines for jarid2a. For this, I have identified heterozygous carriers of three mutant jarid2a alleles and established stable F2 generations. To test the role of jarid2a in ENS neurogenesis, I am quantifying changes in neuron numbers in jarid2a mutant larvae. I am performing a migrational assay to determine the relative rate of EPC migration along the gut of mutant larvae compared to wildtype siblings. Slower relative EPC migration will show an ENS developmental delay that could explain the reduction in neuron numbers. To determine effects on ENS function, I am performing a feeding assay in jarid2a mutant larvae. This intestinal transit assay will demonstrate the ability of mutant larvae to clear their guts of fluorescently labeled food compared to wildtype siblings. Reduced clearance indicates abnormal ENS function, likely due to fewer ENS neurons. These results will illuminate functions of ENS neurogenesis regulatory genes and will develop a better understanding of human ENS diseases.

ADENOSINE RECEPTOR ANTAGONIST REDUCES CHEMOTHERAPY SIDE EFFECTS IN MICE SUCH AS CISPLATIN-INDUCED KIDNEY TOXICITY AND PAINFUL NEUROPATHY

Presenter: Hari Ramakrishnan
Category: Neuroscience
Time Slot: 4:30 PM
Room Location: Meeting Room D
Number: 2544
Mentor: Geoffroy Laumet, Jaewon Sim

Cisplatin is an incredibly powerful chemotherapy drug used to treat a variety of cancers. However, its side-effects such as kidney toxicity and painful neuropathy may result in dose reduction or termination of treatment increasing patient mortality. Physicians must closely monitor patient's kidney function during chemotherapy, due to high risk of kidney failure, and the patient's sensitivity, due to severe pain from peripheral neuropathy. Therefore, there is an urgent medical need for novel therapeutics that limit cisplatin's side-effects. Adenosine receptors are involved in several kidney diseases and neuropathic pain pathophysiology. We hypothesize that blocking adenosine receptors (AR) using Istradefylline, an FDA-approved AR antagonist, will alleviate kidney toxicity and pain from cisplatin. To test this, we treated mice with cisplatin (3 mg/kg for 5 days) and found that they developed pain hypersensitivity, measured through the von Frey method, and kidney toxicity, measured by high gene-expression of kidney injury marker (KIM-1). Since pain and kidney toxicity are often associated with inflammation, we also collected tissue samples from the spinal cord, peripheral nervous ganglion, and kidney to measure the gene-expression of inflammatory cytokines through quantitative PCR. Mice treated with cisplatin had higher levels of expression of these inflammatory mediators in all tissues compared to mice treated with saline (control). We found administration of Istradefylline reduces both the pain hypersensitivity and kidney toxicity induced by cisplatin as well as the associated inflammation. Since Istradefylline is already approved by the FDA for the treatment of Parkinson's disease, it can be quickly clinically applied to cancer therapy.

NUTRITION & FOOD SCIENCE
Poster Presentations

THE GREENACRES PROJECT: IMPACT OF SUPPLEMENTAL FEEDS ON THE FATTY ACID AND NUTRIENT PROFILE OF GRASS-FINISHED BEEF GRAZING ON MICHIGAN COMPLEX PASTURE

Presenter: Selin Sergin
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2601
Additional Student Presenters: Rachel Vanduinen
Mentor: Jenifer Fenton

A recent national survey of grass-finished beef (GFB) observed significant nutritional variation among GFB from different producers; the omega-6:omega-3 ratio ranged from 1.8 to 28.3. The purpose of this study was to determine if commonly utilized feed supplements (hay, baleage, soybean hulls (SH)) allowed in grass-finishing beef protocols have an influence on the beef fatty acid and nutrient value. A two-year study with four grass-finishing supplement groups was conducted 1) fresh grass, hay; 2) fresh grass, SH; 3) fresh grass, baleage; 4) SH, baleage. Beef fatty acids were determined using microwave-assisted fat extraction, acid-base methylation, and gas chromatography-mass spectrometry analysis. Vitamin A, Vitamin E, and mineral content were assessed by a commercial laboratory. No difference was observed in Vitamin A content among beef; however, Vitamin E content was higher in beef from all cattle fed fresh grass regardless of supplement group compared to the SH/baleage group. Total SFA was lower in the grass/hay compared to the SH/baleage group. No differences were observed in total MUFA, PUFA, or omega-6 content. However, omega-3 and CLA content were significantly higher in the grass/hay group compared to the other groups. The omega-6:omega-3 ratio was higher in the grass/SH group compared to the grass/hay and grass/baleage groups (2.22 ± 0.30vs. 1.12 ± 0.21 and 1.72 ± 0.33, $p < 0.001$). These differences were not as drastic as observed in the previous survey, but they demonstrate differences in nutrient profiles of beef due to different diet compositions and contribute to better understandings of GFB.

IMPROVING HEALTHY EATING AMONGST COLLEGE AGED STUDENTS

Presenter: Lasya Marla
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2602
Mentor: Katherine Alaimo, Nicholas Bartholomew Drzal

Two thirds of diseases are chronic diseases such as heart disease, hypertension, and diabetes1. These diseases develop across the lifespan and are influenced by diet. Americans often fail to consume nutrient dense diets, consisting of vegetables, fruits, and whole grains2. Fruit and vegetable intakes decline through adolescents and into early adulthood and are still low in middle age. University students can be effective at teaching, reinforcing, and modeling behaviors among their peers3. This research will evaluate a class assignment given during a college course that asked students to act as agents of change to improve dietary choices among their family and friends. Approximately 700 students were enrolled in the Fall 2021 MSU Introduction to Human Nutrition course and were asked to send personalized nutrition videos to their friends and family members. A survey was distributed to friends and family members of students at the end of the course. 51 friends and family members of students completed the survey. The survey included questions from validated instruments including the Food Attitudes and Behavior (FAB) survey4, the Dietary Screener Questions survey (DSQ)5 , and a survey regarding barriers to whole grains consumption. In addition, the survey assessed family and friend satisfaction with the nutrition videos and perceived changes resulting from receiving the videos in nutrition knowledge, skills, confidence, motivation, and general barriers to consumption of healthy foods. Results from this study will describe the feasibility of working with college students as agents of change and provide insight regarding healthy eating motivators and barriers among family and friends of college students. The study can inform future nutrition interventions by better understanding the impact of working with individuals to share nutrition information and encouragement for healthy eating with members of their social network.

THE RELATIONSHIP BETWEEN PERCEIVED STRESS AND DIETARY INTAKE AMONG LOW-INCOME PARENTS

Presenter: Ashleigh Strong
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2603
Additional Student Presenters: Serena Bush
Mentor: Jiying Ling

Stress can affect various aspects of one's life, such as amount of exercise, eating habits, and productivity within a day. Since fruits and vegetables are expensive and stress plays a factor in food choices, low-income parents tend to not purchase fruits and vegetables frequently. Therefore, this project evaluates the relationship between fruit and vegetable intake and stress levels among low-income parents. To study this relationship, data was taken from a population of 109 parents of young children who attended Head Start Centers in the fall of 2021. To test stress, The Perceived Stress Scale (PSS-10) was used, a 10-item questionnaire to assess stress levels in young people and adults aged 12 and above. Parents were also given a Block Test to report their eating habits over the past year and the number of fruits and vegetables they consumed throughout a given week. Although it was found that parents with low or moderate levels of stress tended to consume higher amounts of fruits, vegetables, and fiber, the degree of perceived stress was not statistically associated with healthy eating ($p>.05$). About 19.4% of parents in the low-stress group and 8.3% of parents in the moderate-stress group met the recommendation of at least five servings of fruit and vegetables each day. Out of the 109 participants, only 10.1% met the daily fruit and vegetable recommendation. Based on these findings, there should be an emphasis placed on the importance of healthy eating through the intake of proper servings.

EXPLAINING PARTICIPATION FLUX IN A DETROIT GARDENING PROGRAM

Presenter: Veronica Wirth
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2604
Mentor: Katherine Alaimo

Community and urban gardening can improve community health, food security, and food sovereignty. Keep Growing Detroit is an organization in Detroit that supports family, community, school and market gardens through the Garden Resource Program. In 2021, they served 24,088 Detroiters in 2,020 gardens. Although there is a high level of participation, a recent study in 2020 found that there is a lot of churning in the program with members dropping out of the program, or drop out and rejoin after a period of time; less than 60% of participants return to the program the following year. The goal of this research is to investigate this phenomenon: why members drop out, how members can be encouraged to stay in the program, and what services members need to remain in the program. Using existing data provided by Keep Growing Detroit, key characteristics of members who have dropped out or have gaps in membership will be described. In addition, a survey will be conducted with

participants who have left the program to assess reasons for leaving the program and the resources needed to remain in the program. We hypothesize that members drop out of the Garden Resource Program for financial or social issues. This project will help the Keep Growing Detroit organization provide their members with the support and resources that they need to remain in the program and experience the various benefits of urban and community gardening.

OPTMIZED BEAN FLOURS FOR USE IN COMPOSITE FLOURS FOR IMPROVED PROTEIN AND IRON BIOAVAILABLITY IN LOW-INCOME POPULATIONS IN MICHIGAN, SOUTH AFRICA, AND JAMAICA

Presenter: Veronica Shin
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2605
Mentor: Sharon Hooper

There is a global issue of malnutrition and nutritional deficiencies in South Africa, Jamaica, and the United States. Vitamin A deficiency is a common nutrient deficiency in South Africa. Anemia caused by iron deficiency, is prevalent in South Africa, Jamaica, and the United States. In Africa, the main cause of malnutrition is due to the insufficiency of protein with adequate essential amino acids. This international project will address the global nutritional problems prevalent in the three countries by the creation of a nutrient dense composite flour. The formulation of the flour consists of dry bean flour from the United States, fermented maize flour from South Africa, and cassava and sweet potatoes flour from Jamaica. The raw ingredients will be optimized and combined to create a composite flour that is high in bioavailable iron, vitamin A, and protein with complimentary amino acids. Dry bean flours are nutrient dense with high protein and mineral concentrations. Several treatments were used to optimize bean flour to reduce and/or deactivate phytohemagglutinins (lectins). Lectins are toxic proteins and can trigger digestion issues in humans. Dark red kidney beans were short soaked for 15 minutes, heat treated, and lectin activity determined. Results indicate that the higher temperatures reduced lectin activity significantly more than the lower temperatures but also impacted flour quality for product use.

IMPACT OF CHOCOLATE COATING ON THE SURVIVAL OF SALMONELLA ON DRIED NUTS AND FRUITS

Presenter: Andrew Kearney
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2606
Mentor: Ian Hildebrandt, Bradley Marks

The majority of research on Salmonella survival in low-moisture foods has focused on select single-ingredient products. Less is known about Salmonella survival in multi-ingredient low-moisture foods, or whether single-ingredient-based research is applicable when incorporated

into a multi-ingredient product. The objective of this study was to investigate Salmonella survival on low-moisture foods (nuts and dried fruits) that are subsequently chocolate coated. Almonds and dried cherries were spot inoculated with 50 µl of a 5-serovar cocktail of Salmonella and air-dried for 1 h. Half of the samples were immersed in a milk chocolate coating (tempered/maintained at 37°C prior to and during use) and allowed to set on wax paper. Samples were then stored (~20°C up to 25 d), homogenized, serially diluted, plated on differential media, and survivors enumerated after incubation (48 h, 37°C). The experiment was performed in triplicate and mean Salmonella survivor data were analyzed via analyses of variance. Salmonella populations on almonds and chocolate-coated almonds did not decrease from initial population levels of 8.4 and 7.8 log CFU/g ($p > 0.05$), respectively. Salmonella populations on cherries and chocolate-coated cherries, initially at 7.3 log CFU/g, decreased during storage at different rates ($p < 0.05$) resulting in day 25 Salmonella levels below the limit-of-detection and at 5.9 log CFU/g, respectively. The persistence of Salmonella on products subsequently coated in chocolate depended on the initial product. This complicates the application of existing Salmonella survivor research to more complicated products.

IDENTIFICATION OF CROSS-REACTING SALT-SOLUBLE ALLERGENIC PROTEINS IN AN ANCIENT WHEAT (AEGILOPS TAUSCHII) USING ANTI-DURUM WHEAT IGE ANTIBODIES

Presenter: Rajsri Raghunath
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2607
Mentor: Venugopal Gangur

Wheat is a crop grown and consumed worldwide. It is an important component of various processed foods, including commercially sold bread, pasta, and cookies. Wheat allergy is an adverse immune reaction to specific wheat proteins known as allergens. Commercially grown and consumed wheats belong to AA, AABB, and AABBDD genotypes. The ancient DD wheat (A. tauschii) is not commercially available. Here we sought to identify the cross-reacting allergenic proteins present in the ancient wheat that would bind to IgE antibodies obtained from durum wheat (AABB genome) allergic mice. The A. tauschii wheat was grown in the MSU greenhouses. Salt-soluble protein extracts (SSPE) were prepared from the A. tauschii wheat and the commercial durum wheat. The SSPEs were characterized using SDS-PAGE analysis. Using a mouse model of durum wheat allergy, a plasma bank containing high levels of anti-durum wheat specific IgE antibodies was created. Using the plasma, an IgE-Western blot method was optimized to identify the cross-reacting allergens present in the A. tauschii wheat. The IgE- binding protein bands in A. tauschii were sequenced by the LC-MS/MS method, and the allergens were identified. There were 3 allergens present in the boiled/reduced SSPE. There were 8 allergens present in the raw SSPE, of which 5 were thermolabile.

COMPARISON OF ANTIOXIDANT CONTENT BETWEEN VARIOUS SUPPLEMENTS UTILIZED DURING GRASS-FINISHING BEEF ON MI COMPLEX PASTURE

Presenter: Shreya Chavva
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2608
Additional Student Presenters: Meghana Karumuri
Mentor: Jenifer Fenton

Grass-fed beef typically has a healthier nutritional profile than grain-fed beef as it has a lower n-6:n-3 ratio and greater concentration of antioxidants. However, a national survey of grass-fed beef showed wide variations in the nutritional value of these products. In some cases, the n- 6:n-3 ratio was four times less desirable than grain-fed beef. To understand this variability, the objective of this study was to determine the nutritional value of dietary ingredients allowed in grass-finished beef production. Four grass-finishing treatments were analyzed over a two-year period: 1) grass and dry hay, 2) grass and soybean hulls (SBH), 3) grass and baleage, and 4) SBH and baleage. Total carotenoids and chlorophyll A and B were?extracted in acetone and measured using UV-Vis spectrophotometry. Total phenolic content was quantified using a microplate reader and was compared to a gallic acid standard. SBH were lowest in every antioxidant profile category compared to the other supplements ($p<0.0001$). Grass had a significantly higher chlorophyll B content compared to the other supplements ($p<0.0001$) while baleage was significantly higher in chlorophyll A, total carotenoids, and total phenols compared to hay and SBH ($p<0.0001$). These variations confirm that supplements allowed in grass-finishing production have widely different nutritional profiles and future research should investigate the effects of these supplements on the nutritive profile of beef.

OMEGA-3 FATTY ACID SUPPLEMENTATION AND SOLUBLE EPOXIDE HYDROLASE INHIBITION SUPPRESS LIPOPOLYSACCHARIDE TRIGGERING OF GLOMERULONEPHRITIS IN LUPUS-PRONE NZBWF1 MICE

Presenter: Riley Spalding
Category: Nutrition & Food Science
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2609
Mentor: Olivia Favor, James Pestka

Repeated injections of lipopolysaccharide (LPS) in female lupus-prone NZBWF1 mice trigger early onset and accelerated progression of glomerulonephritis (GN), suggesting this model's applicability for studying interventions against lupus nephritis. Docosahexaenoic acid (DHA) is a long-chain omega-3 fatty acid that has been shown to inhibit inflammation in humans by displacing proinflammatory omega-6 arachidonic acid (ARA) from blood cell membranes. Soluble epoxide hydrolase (sEH) converts highly anti-inflammatory ARA-derived epoxy fatty acids (EpFAs) to less potent dihydroxy fatty acids (DiHFAs). Previously, the sEH inhibitor TPPU has demonstrated anti-inflammatory efficacy against LPS-induced inflammation by blocking EpFA metabolism. The purpose of the present study was to test the hypothesis that DHA and TPPU, two anti-inflammatory interventions, would jointly inhibit LPS-triggered GN.

Mice were fed DHA at 5 g/kg diet (low DHA) or 10 g/kg diet (high DHA) and/or the TPPU (23 mg/kg diet). GN triggering was accomplished by subchronic intraperitoneal (i.p.) injections (2x/wk for 5 wks) of 0.6 μg/g body weight LPS. LPS alone induced GN characterized by vigorous hypertrophy, hyperplasia, thickened membranes, and glomerular IgG deposition that was attenuated by the various treatment regimens. Relative rank order of GN severity among experimental groups based on proteinuria, hematuria, histopathologic scoring, and glomerular IgG deposition was: Veh/CON < LPS/high DHA ≈ LPS/TPPU <<< LPS/CON ≈ LPS/low DHA ≈ LPS/low DHA+TPPU ≈ LPS/high DHA+TPPU diet. Thus, LPS-induced GN was suppressed by increasing omega-3 tissue content via prophylactic DHA consumption or inhibition of sEH activity with TPPU; however, these preventative effects were diminished by combining treatments. The anti-inflammatory effects of DHA and TPPU suggest their therapeutic usefulness in conditions that involve chronic inflammatory responses, such as lupus.

NUTRITION & FOOD SCIENCE
Oral Presentations

ADEQUACY OF FIBER INTAKE DURING PREGNANCY: A CROSS-SECTIONAL ANALYSIS OF A LONGITUDINAL COHORT STUDY

Presenter: Lindsay Schwartz
Category: Nutrition & Food Science
Time Slot: 2:00 PM
Room Location: Meeting Room D
Number: 2611
Mentor: Sarah Comstock

According to the Institute of Medicine, during all stages of pregnancy, women should consume 28 grams of fiber per day. The average pregnant woman in the United States consumes 24.1 grams of fiber per day. High fiber intake during pregnancy provides numerous benefits and supports gastrointestinal health, but it is unknown if dietary fiber intake during pregnancy is associated with the gastrointestinal microbiota alpha diversity or specific members of the pregnancy gut microbiota. The objective of this research is to determine if pregnant women in a Michigan cohort are meeting recommendations and to determine whether dietary fiber is associated with specific members of the gut microbiota during pregnancy. To conduct this study, 57 pregnant women submitted dietary fiber surveys (NCI 5 factor screener) and stool samples for gut microbiota analyses. The questionnaires assessed fiber intake in the 3rd trimester of pregnancy. Reported levels will be compared to recommendations using the Chi2 test, t-test, and other types of data analysis to determine if dietary fiber intake is associated with specific members of the gut microbiota. It is expected that the fiber intake of participants in this Michigan cohort will be lower than the recommendation. A long-term goal of this project is to associate dietary fiber intake during pregnancy with infant health. However, in the short term, our understanding of fiber intake during pregnancy in this population will determine if a public health priority should be putting plans in place to increase fiber intake in pregnant women in Michigan.

INFLUENCE OF SUPPLEMENTING CHICKENS WITH GRASS-FED BEEF SUET AND LIVER ON PHENOLIC AND ANTIOXIDANT PROFILE OF EGGS

Presenter: Esha Garg
Category: Nutrition & Food Science
Time Slot: 2:45 PM
Room Location: Meeting Room D
Number: 2613
Mentor: Jenifer Fenton

The nutrient profile of chicken eggsncan be changed by altering the composition of chicken diets and adding supplements. To utilize grass-finished beef by-products to enhance the nutrient profile of eggs, a local free-range poultry farmer supplemented grass-finished beef suet and liver to chicken diets. The objective of this study was to quantify and compare the antioxidant content of three groups of eggs: 1) pasture-raised chicken eggs supplemented with grass-fed beef suet and liver (n=6), 2) pasture-raised chicken eggs fed a standard non-GMO layer hen feed (n=6), and 3) cage-free chicken eggs from a local grocery store (n=6). Eggs yolks were freeze-dried and antioxidants were extracted according to lab protocols. Total carotenoids were measured using UV-Vis spectrophotometry and total phenolic content was measured using a microplate reader and compared to a gallic acid standard. Total carotenoid content was significantly greater in the chicken eggs supplemented with grass-fed beef suet and liver compared to the eggs from the grocery store (93.07 ± 20.02 vs. 40.89 ± 7.93; $p<0.001$). Vitamin B1 levels also increased significantly in these eggs (48.58 ± 5.88 vs. 40.56 ± 3.91; $p = 0.001$). However, total phenolic content was significantly lower in the eggs supplemented with grass-fed beef suet and liver (1.38 ± .29 vs. 3.51 ± 1.73 vs. 4.04 ± 1.11; $p=0.0119$). These results indicate mixed effects of this feed on the antioxidant content of chicken eggs. Further research should be done to see how both carotenoid and phenolic content can be increased in chicken eggs.

EFFECTS OF GRASS-FED BEEF SUET AND LIVER SUPPLEMENTATION ON FATTY ACID PROFILE OF CHICKEN EGGS

Presenter: Viji Jambunathan
Category: Nutrition & Food Science
Time Slot: 3:00 PM
Room Location: Meeting Room D
Number: 2614
Mentor: Jenifer Fenton

The nutrient composition, specifically fatty acid (FA) profile, of chicken eggs can be manipulated by altering the composition of layer hen feeds and adding supplements to chicken diets. Current nutrition guidelines recommend consuming diets with less saturated fatty acids (SFAs) and a lower omega-6:omega-3 (n-6:n-3) ratio to mitigate the risk of cardiovascular disease. There has been interest in utilizing the byproducts of grass-fed systems to reduce the SFA content and n-6:n-3 ratio of eggs in a sustainable manner. The objective of this study was to quantify and compare the FA profile of pasture-raised chicken eggs supplemented with grass-fed beef suet and liver (n=6) to pasture-raised chicken eggs fed a standard non-GMO layer hen feed (n=6) and cage-free chicken eggs from a local grocery store (n=6). FA profiles of the layer hen feeds and the grass-fed beef suet and liver were also quantified and compared. Egg samples were

collected and lyophilized prior to analysis. Egg FA profiles were determined by microwave-assisted lipid extraction, acid-base methylation, and gas chromatography-mass spectrometry analysis. There was no significant difference in SFAs (g FA/100g fresh yolk) among the three groups of eggs ($p=0.787$). Conjugated linoleic acid (CLA) was significantly greater ($p<0.001$) and the n-6:n-3 ratio was significantly lower ($p<0.001$) in the chicken eggs supplemented with grass-fed beef suet and liver. These results indicate that supplementing chicken diets with grass-fed beef suet and liver can effectively increase the CLA content and decrease the n-6:n-3 ratio in eggs without increasing the SFA content.

PHYSICAL SCIENCES
Poster Presentations

TAKING A CLOSER LOOK AT HOW HAIR BLEACH DAMAGES YOUR HAIR

Presenter: Seoyeon Koo
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2901
Mentor: Carl Boehlert, Per Askeland

I have never bleached my hair before but am planning to do so soon. One of my concerns with bleaching my hair was the bleach damaging my hair. So, I wanted to examine how exactly my hair could get damaged, physically and chemically, from bleach. It is a widely known idea that hair bleach damages hair. People with bleached hair can feel how rougher their hair got but don't exactly know how their hair texture changed at the microscopic level. My project will examine the microstructure of hair follicles using a Scanning Electron Microscope (SEM) to compare the hair quality of bleached hair and natural hair. Secondary electrons will be used in producing my SEM images for a surface structure analysis. I hope to find breakages and tears in the cells of the hair follicle that was dyed while the control hair follicle shows a more uniform pattern of cells with little to no tears. In conjunction with the SEM, I will use Energy Dispersive Spectroscopy (EDS) to perform a chemical analysis of the hair follicles. I hope to find changes in chemical compositions between the bleached and the control hair follicle.

SYNTHESIS OF 2H-INDAZOLES VIA THE CADOGAN REACTION IN BATCH AND FLOW MODE

Presenter: Tilly Duffy
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2902
Mentor: Marcus Baumann*

2H-indazoles, common building blocks in many modern anti-cancer drugs, are synthesized primarily via the thermal Cadogan reaction. This reaction, when carried out in batch requires high temperatures, long reaction times, and excess amounts of hazardous reagents. The

uniformity and unique reaction environment provided by the system of peristaltic pumps and coils of thin tubing employed in continuous flow protocol provided optimal conditions for the Cadogan reaction to be carried out. Most notably, reaction times were reduced from days to hours, and the reaction itself was carried out under more mild temperatures. The success of the reaction in flow can be attributed to the contained reaction environment in combination with a back-pressure regulator which mitigated loss of the phosphite reagent due to boiling. Triethyl phosphite proved to be the most successful deoxygenation reagent in flow, providing high chemical yield. The flow process was successfully scaled on a 20 mmol scale and generated 4.8 g of the desired 2H-indazole product; seven other 2H-indazole analogs were also synthesized. Using a Vapourtec UV-150 flow photoreactor with a high-powered LED at 365 nm, the 2H- indazole scaffold underwent photochemical and regiospecific acetylation via a hydrogen atom transfer. This additional functionalization reinforces the medicinal potential of the 2H-indazoles and thus the importance of synthesizing these compounds in a more effective manner.

RENORMALIZATION GROUPS IN NUCLEAR PHYSICS

Presenter: Gabriel Sotelo Justo
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2903
Mentor: Heiko Hergert

Renormalization group (RG) transformations are a powerful tool for identifying the most important degrees of freedom in calculations of nuclear properties. By constructing microscopic theories of nuclei and their implementations on the basis of these degrees of freedom, we can greatly simplify and accelerate numerical simulations. Any practical applications of these techniques will require approximations that are often harmless but can sometimes lead to uncontrolled errors that cause the method to break down. Here, we apply a particular class of RG transformations, the so-called In-Medium Similarity Renormalization Group (IMSRG) to schematic models of nuclei that nevertheless capture essential features of the nuclear interactions. We explore the conditions under which the IMSRG treatment of these models breaks down, as well as possible mitigation strategies.

SEDIMENT CHARACTERIZATION OF MARTIAN SOIL BY THE PHOENIX MARS LANDER

Presenter: Josie Anderson
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2904
Mentor: Michael Velbel

In 2008, the Phoenix spacecraft landed on unconsolidated Martian granular material among hexagonal frozen-ground landforms. The spacecraft trenched samples from several different landforms and used an optical microscope (4 μm pixels) with combination with red, green, and blue LEDs to take color photos of particles. From the photos, Goetz et al. (2010) classified and described optical properties, magnetism, morphology, and size distribution of the brown and

black sand particles. Subsequent investigation subdivided the brown grains into at least four photometric groups (Velbel et al., 2022). This project re-examined the grain shape parameters of the brown sand. We examined the grain size, shape, and roundness of 34 black and brown grains. Careful measurements of length and width were used to calculate elongation and equantcy of individual grains for comparison within and among photometric and landform groups. We used the Teller (1976) method for elongation-equancty and classified each grain's elongation-equancty using both Barrett (1980) and Blott et al. (2008) threshold criteria. The new measurements were grouped by source trench-landform and by photometric group to determine whether grain shape varied with landform setting or photometric type. Grain shape did not differ between locations or photometric groups. A well-informed view of the Martian sediment is integral to the understanding of environmental hazards for future human exploration, sediment transport, and the distribution of liquid and solid surface water and groundwater. The Phoenix mission data continue to provide excellent insight into grain shape, size, texture, and sorting of Martian regolith.

QUANTITATIVE ANALYSIS OF THE COMPOSITION OF RUST USING SCANNING ELECTRON MICROSCOPY (SEM)

Presenter: Kirandeesh Kaur
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2905
Mentor: Carl Boehlert, Per Askeland

The element iron is the most abundant transition metal on Earth and has been used by mankind for over 5,000 years. Despite its invaluable benefits to mankind, the metal is prone to corrode. In my study of deposition of rust, I plan to trace the elemental composition of rust using a Scanning Electron Microscope and Energy Dispersive Xray Spectroscopy. I plan on using a washer and an iron nail placed in normal environmental settings to carry out my elemental analysis of rust. Additionally, I hope to collect high resolution pictures of deposition of different quantities of rust and quantitatively determine the differences in percentage composition of different elements that make up rust in these areas. I also hope to determine the reasons behind the loss in magnetic strength of iron as a result of rusting and subsequently explain the decay of materials of high economic value and huge economic implications posed due to the process. By the end of this study, I seek to quantitatively analyze the elemental composition of rust and formulate effective solutions, based on an element-specific approach, to combat its implications.

STUDYING THE STRUCTURE OF EXOTIC IRON NUCLEI

Presenter: Kyle Taft
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2906
Mentor: Artemisia Spyrou

One of the main goals in the field of nuclear physics is to understand how the cores of atoms act and are created. These centers of atoms, commonly referred to as nuclei, are made up of a

combination of small particles called protons and neutrons. Currently, we do not have a complete model of the different behaviors of nuclei, such as which extreme combinations of protons and neutrons create real nuclei that are bound. In order to combat this, we must utilize experiments to help us build these models. Luckily, at the Michigan State University's Facility for Rare Isotope Beams (FRIB) we can run these experiments to collect data to make new discoveries about nuclei. In my project, I looked at some experimental data to better understand the structure of an exotic iron isotope that has sparsely been studied before. To do this, I analyzed the gamma-rays that this isotope emits in de-excitation in order to build a rough energy level scheme.

QUANTIFYING UNCERTAINTIES IN CGM ABUNDANCES

Presenter: Evelyn Fuhrman
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2907
Mentor: Claire Kopenhafer, Brian O'Shea

For context, the Circumgalactic Medium (CGM) is an extended body of hot, low density and cold, high density gas that surrounds galaxies. The CGM mediates gas flow in and out of galaxies, making it important for controlling a galaxy's star formation. By studying the CGM, we can better understand the overall evolution of galaxies and the early universe. This can be done in one of two major ways: physically and theoretically. In physical observations, astronomers typically measure an absorption spectrum of a background light source. From this spectrum, astronomers can calculate the densities of the elements present in the cloud, allowing them to analyze the composition of the galaxy's CGM. While this is a very useful method, it does not give the whole picture, because we cannot place the backlight to our advantage. We can only use the background sources that nature gives us. Creating mock observations of the CGM through computer simulations allows us to overcome these limitations and make comparisons to physical observations by examining the simulations through an observer's perspective.

A MULTI-FACTOR MODEL FOR THE OPTICAL TRANSMISSION OF FILMS FOR THE SINGLE ATOM MICROSCOPE

Presenter: Joseph Noonan
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2911
Mentor: Jaideep Singh

Many of the elements on Earth, including those that are essential for life and our technology, are formed inside stars by the slow neutron capture process (s-process). To determine exactly how slow the s-process is, the Single Atom Microscope (SAM) was designed to detect single magnesium ions produced by the rate-determining step of the s-process, which is done by capturing the ions in a frozen noble gas film, shining light on the film, and measuring the fluorescent light given off by the ions. However, to understand the results of this process, we need to know what proportion of the light passes through the films. Based on our observations of the optical transmission of the films over a range of wavelengths, I developed a model that explains the major features of the data based on three factors: scattering of light by bubbles in

the films, reflection at the boundaries between media, and interference inside thin films on the back of the substrates on which the films are grown. This work is supported by Michigan State University and U.S. National Science Foundation under grant number #1654610.

OPTIMIZATION OF COPPER COMPLEXES FOR THE STUDY OF THE USE OF AMMONIA AS A FUEL

Presenter: Uran Iwata
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2912
Mentor: Timothy Warren, Josalyne Beringer

Ammonia has been identified as a potential carbon-free fuel due to its high energy density compared to other carbon-free fuels and its high accessibility regardless of the consumers' status and living place. Therefore, it is important to fully understand how ammonia can be used as a fuel. To do so, the most important reaction step when consuming ammonia as a fuel, the nitrogen-nitrogen bond formation, is studied using copper complexes that contain a nitrogen atom. The goal of my research is to optimize a copper complex by changing its substituents to enable the study of the nitrogen-nitrogen formation mechanism. In this project, the effect of the different substituents on the copper complex was investigated in terms of spin density on the nitrogen atom and the change in free energy of the nitrogen-nitrogen bond formation reaction. A computational modeling method called the Density Functional Theory was used to investigate this. In my poster presentation, I will review the previous studies of the optimization of the copper complex and how it led to my current project. I will also present the data collected, analyze it, and share my future research plans to further optimize the complex to achieve the research goal.

INVESTIGATION OF THE I-PROCESS TO DETERMINE THE ORIGIN OF ELEMENTS

Presenter: Kyler Barrette
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2913
Mentor: Hendrik Schatz

The elements present in the universe form in a variety of different ways, many of which involve neutron capture. Neutrons are subatomic particles that have a neutral electric charge and are found in some astral environments. When a nucleus captures a neutron, it will become unstable and decay into a new element. The neutron capture process occurs in different ways: slow and rapid. The rate of capture reflects how rapidly heavy elements are built up in the respective environment. This project focuses on a recent suggestion that there may be an intermediate form of neutron capture known as the i-process whose capture rate falls in-between the previously known slow and rapid processes. The goal of this project is to determine the sensitivity of the relative abundance of nuclei produced through the i-process to the various rates of neutron capture of the involved nuclei. Data was gathered using a simulation in a Jupyter Notebook coded in the Python programming language. When the simulation is

initialized, the neutron capture rate of some nuclei is altered. This simulation considers the initial conditions of constant neutron density and temperature and solves the differential equations that describe the production and destruction of nuclei through nuclear reactions. This will provide insight on how cosmic processes produce elements in nature, and which nuclear parameters need to be better understood using accelerator facilities, such as the new FRIB facility at MSU.

PROBING THE MAGMATIC DIFFERENTIATION SYSTEM OF MT. KENYA - GEOCHEMICAL CONSTRAINTS FROM X-RAY FLUORESCENCE ANALYSES OF LAVAS

Presenter: Jayli Husband
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2914
Additional Student Presenters: Kirsten Fentzke
Mentor: Tyrone Rooney

Mt. Kenya is a dominantly 2.6 to 3.1 million year (Ma) old stratovolcano located in the South-Central region of Kenya, adjacent to the Kenya rift that forms part of the East African Rift System. Mt. Kenya was formed from successive layers of lava derived from the mantle but subsequently processed in the crust beneath the volcano. Between 0.797 and 0.45 Ma, the "Thiba Basalts", which are compositionally primitive compared to other lavas in the region, erupted from Mt. Kenya. We hypothesize that the Thiba Basalts had limited processing in the crust beneath Mt. Kenya and therefore represent the composition from which evolved magmas derive. Here we present a study of the bulk composition of the lavas undertaken using X-Ray Fluorescence. Initial observations on major and trace element data show that there are two main compositions of lava in the Mt. Kenya: basalt and phonolite. Basalt lavas exhibit high MgO concentrations (up to 12 wt. %) with elevated concentrations of Cr (up to 680 ppm) and Ni (up to 220 ppm), which are consistent with a primitive magma that has experienced limited processing in the crust. The phonolite lavas are defined by elevated concentrations of alkali elements (Na2O + K2O is up to 11 wt. %) and are highly enriched with incompatible trace elements such as Ba, Zr, Sr, and Y. We interpret the geochemical characteristics of the phonolite lavas as indicating extreme fractional crystallization in the crust beneath Mt. Kenya.

MEASURING NUCLEAR EXCITED STATE LIFETIMES USING FAST RARE ISOTOPE BEAM

Presenter: Dave Lempke
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2915
Mentor: Hironori Iwasaki

Precise lifetime measurements of excited states provide valuable information for the structure of nuclei. Using Geant4 simulation software, we are able to analyze how different factors such as beam energy, beam composition, reaction target thickness, and others affect the sensitivity of lifetime measurements. In particular, we analyze the properties of fast heavy ion beams.

Simulation parameters are set to a single fixed target with Gretina γ-ray tracking HPGe detector measuring decays. The effects of varying thickness of a Carbon target are explored and ~1mm is determined to be optimal for lifetimes in the range of 0.5ps to above 5.0ps. Lifetimes are able to be determined using the Doppler Shift Attenuation method and a new advanced method with the use of diamond detectors is outlined that is sensitive to very short lifetimes (>0.2ps).

WHAT'S IN A DOLLAR?

Presenter: Decker Wasson
Category: Physical Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 2916
Mentor: Carl Boehlert, Per Askeland

As neighboring countries, the United States of America and Canada share many values and interests. Although there are plenty of international boundaries between them, they always seem to get along politically and economically. One of the boundaries that is constantly posed to citizens looking to travel between countries is the exchange of currency. This poses the question of what exactly is so different between these bills. In this project I will be using EDS imaging to analyze the chemical properties of both a Canadian and U.S. dollar. I will use backscattered electrons to determine each element the bills are composed of. Backscattered electrons are electrons that are repelled by the nucleus of an atom within the sample which will tell me the density of the atom and thus the element. I hope to find some interesting differences in each bill and in doing so discover what type of substance makes the Canadian dollar so unique.

A TASTE OF LONGITUDINAL DYNAMICS

Presenter: Collin Dobson
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2921
Mentor: Yue Hao

The goal of this project is to give an introduction to accelertator design and particle tracking as it applies to small accerators used for medical purposes. This project will include methods of computer modelling and an introduction to CERN's MadX coding language.

A NEW MYSTERY ASSOCIATED WITH MIOCENE VOLCANIC ACTIVITY IN THE CENTRAL TURKANA BASIN, EAST AFRICAN RIFT SYSTEM

Presenter: Shelbi Hughes
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2922
Mentor: Tyrone Rooney

The Kalakol Basalts are a sequence of lavas located in the East African Rift (Northern Kenya). These basalts are split into Upper (~28-27 million years old - Ma) and Lower sections (~24-18 Ma), separated by an important fossil-bearing sandstone - the Eragaleit Beds (24-27 Ma). While much attention is focused on primate fossils found in the sandstone, there exists a mystery in the basaltic lavas - there is a distinct change in magma characteristics between the Upper and Lower sections. We studied the petrographic textures of the lavas using microscope thin sections examined in optical light and by scanning electron microscopy. The lower Kalakol Basalts have aphanitic texture, dominated by plagioclase set in a fine-grained matrix. This texture is a result of a shallower magma chamber given the relative stability of this phase at lower pressures, followed by rapid cooling of a crystal-poor flow. In contrast, the upper Kalakol Basalts contain abundant and very large clinopyroxene crystals (mm to cm scale) that require a deeper magma chamber and a two-stage cooling process; the pyroxenes formed in deep magma chamber before eruption, while the finer grained matrix crystallized quickly upon eruption. In future research we will use our petrographic observations to obtain chemical compositions on the plagioclase and pyroxene crystals in order to test this polybaric magma chamber hypothesis.

BIOKINETIC MODELING OF ALPHA PARTICLE DOSE FROM PARENT DECAY OF INHALED RADON-211

Presenter: Lauren Gizinski
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2923
Mentor: Gregory Severin

Radon-211 is an isotope of radon that researchers at Michigan State University are looking to use in a laboratory setting. A biokinetic model of radon-211 must first be developed in order to determine the amount that can be utilized safely in the laboratory. The model presented here will lay the framework to determine the alpha particle dose from the parent decay to an average adult male when some amount of radon-211 is inhaled. This alpha particle radiation is of particular importance as it is much more likely to cause double strand breaks in DNA than gamma radiation. However, future research should seek to expand this model to include the doses from gamma radiation and daughter decay. This model was developed using differential equations to create time activity curves (TACs) for various tissues in the human body. These TACs were then integrated over and will be converted into radon-211 doses.

ACCURATE HIGH VOLTAGE MEASUREMENT FOR LASER SPECTROSCOPY

Presenter: Tanaka Chonyera
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2924
Mentor: Kei Minamisono

This project was performed at the BEam COoling and LAser Spectroscopy (BECOLA) facility at the Facility for Rare Isotope Beams (FRIB). BECOLA'a s main undertaking is to determine the

fundamental properties of radioactive nuclei such as charge radii (the proton distribution inside a nucleus) using laser spectroscopy techniques. This is essential in attempting to advance our understanding of nuclear forces and benchmark nuclear theories. Laser resonant fluorescence measurements are carried out on an ion beam of radioactive nuclei at an energy of approximately 30 keV. The accurate knowledge (at a few ppm level) of the beam energy i.e., the high voltage potential applied to the ion beam is critical to deduce very small nuclear structure information from the fluorescence spectrum. In this project, I built a high voltage divider, which scales down the high voltage applied to it, to accurately determine the high voltage. The high voltage divider is comprised of a long chain of high precision resisters connected in series between the high voltage and the ground. The small voltage drop (less than ~10 V) across the last resistor from the high voltage (30 kV) is read out using a typical voltmeter. The applied high voltage is then deduced by knowing the resistance ratio of the last resistor the entire resistor chain. I assembled the high voltage divider and performed the ratio measurement against a reference voltage divider. I will present details of the construction of this divider, and the ratio determination.

STUDY OF THE KEY RESONANCE FOR THERMONUCLEAR RUNAWAYS ON NEUTRON STARS

Presenter: Arian Andalib
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2925
Mentor: Christopher Wrede

During neutron star mass accretion from a hydrogen-rich binary companion, a thermonuclear runaway can occur producing X-ray bursts that are observed with space-based X-ray telescopes. When sufficiently high temperatures of 0.4 GK are reached, alpha-particle capture on the oxygen-15 isotope enables nucleosynthesis to proceed beyond the C, N, O elements. The unknown strength of a resonance in neon-19 at an excitation energy of 4034 keV has the strongest effect of any nuclear data on simulated light curves. To determine the resonance strength experimentally, we will measure the alpha-particle branching ratio, which is the fraction of decays of the resonance by alpha particle emission. We will do so by observing the proton-alpha emission following the beta decay of magnesium-20, provided by the FRIB (Facility for Rare Isotope Beams). The tools used to aid this research are GADGET (Gaseous Detector with Germanium Tagging) which is a gaseous radiation detector used to detect charged particles and SeGA (Segmented Germanium Array) which assists in clarifying the decay scheme by detecting gamma rays as well as being a useful diagnostic tool. This presentation will focus on simulations of the gamma-ray detection in SeGA.

TIME PROJECTION CHAMBER SCINTILLATION LIGHT SIMULATION

Presenter: Elias Taira
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2926
Mentor: Kendall Mahn

Over the course of this past summer and fall semester, I had the opportunity to work with members of the Deep Underground Neutrino Experiment (DUNE) and their work on the development of a device designed to detect incoming neutrinos known as a Time Projection Chamber (TPC). My work focused on a simulation of one of these TPCs, specifically, on the scintillation light that is produced from neutrinos passing through the detector. I was also involved in some hardware work in which I assisted in the development of parts for a prototype calibration module for these TPCs.

HIGH VOLTAGE STABILIZATION WITH PID CONTROLLER

Presenter: Adam Dockery
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2931
Mentor: Kei Minamisono

This project was performed at the Beam Cooling and Laser Spectroscopy (BECOLA) facility at Facility for Rare Isotope Beams (FRIB). At BECOLA charge radii of radioactive nuclei are determined, which is a useful measurement for understanding the nuclear force and testing nuclear theories. In order to determine a charge radius, laser spectroscopy is performed on an ion beam of the radioactive nuclei with approximately 30 keV of energy. The ion beam energy is given by a potential applied to the ions using a high voltage source, and is needed to be known precisely by less than 1 V. The fluctuation and long-term drift of this voltage is one of the main sources of the systematic uncertainty in the charge radius measurements. In this project, I made a feedback system to minimize such voltage fluctuation and drift. A voltage divider, which is a chain of highly accurate resistors, was used to measure the high voltage. Deviation of the voltage reading from a preset voltage value was fed back to a small voltage source attached in series with the main high voltage source. I developed a Python script and GUI to operate the feedback system as a proportional-integral-derivative (PID) controller. I will present the detail of the system, the improved voltage stability and associated reduction in uncertainty achieved with the PID controller.

USING NEUTRINOS TO SEARCH FOR WIMPS IN DWARF GALAXIES

Presenter: Brandon Pries
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2932
Mentor: Mehr U Nisa

Dark matter - a yet-to-be-directly-detected form of non-baryonic matter - is hypothesized to be five times more abundant in the universe than baryonic matter. One of the leading candidate particles for dark matter are Weakly-Interacting Massive Particles (WIMPs), which could potentially annihilate into Standard Model particles in astrophysical environments. Among a variety of annihilation outcomes is the production of neutrino/antineutrino pairs, which can be detected by neutrino telescopes like the IceCube Neutrino Observatory at the South Pole. IceCube consists of a cubic kilometer of Antarctic ice instrumented with optical detectors used to detect Cherenkov radiation from neutrino interactions within the ice. This study seeks to

constrain the dark matter annihilation cross-section from dwarf galaxies for WIMP masses up to hundreds of GeV using selected annihilation channels.

THE FUTURE OF PLATE TECTONICS

Presenter: Libby Ashby
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2933
Mentor: Danita Brandt

This project will compare and contrast four different proposed supercontinents that are estimated to form around 250 million years in the future. It will discuss common trends in each supercontinent, as well as variations between the four landmasses. Based on current knowledge of plate tectonics, this project will also analyze the most likely future supercontinent, using commonalities and differences between the four potential landmasses.

INVESTIGATING OPEN-ENDED RESPONSES TO THE PMQ USING NATURAL LANGUAGE PROCESSING

Presenter: Patrick Johns
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2934
Mentor: Rachel Henderson

Student understanding of measurement uncertainty is a common learning goal among introductory physics lab courses. In this study, we investigate the open-ended responses to the Physics Measurement Questionnaire (PMQ) from students enrolled in the two-semester Design, Analysis, Tools, and Apprenticeship (DATA) Lab course at Michigan State University. Using an unsupervised natural language processing technique, Latent Dirichlet Allocation (LDA), we were able to extract themes/topics from student responses to this assessment which were in line with the paradigms recently published by Pollard et al. The extracted themes from LDA were then compared to previously hand coded responses. Comparing the prevalence of the extracted topics to the frequencies of the hand-coded responses led to close agreement between the two analyses. Based on these results, topic modelling techniques may be able to provide insight into student understanding of measurement reasoning.

PROBING THE MAGMATIC DIFFERENTIATION SYSTEM OF MT. KENYA - PETROGRAPHIC CONSTRAINTS FROM OPTICAL AND ELECTRON BEAM ANALYSES OF CRYSTALS

Presenter: Kirsten Fentzke
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2935
Mentor: Sahira Cancelvazquez, Tyrone Rooney

Mt. Kenya is a large symmetrical cone adjacent to the East African Rift (EAR) that formed through successive eruptions dominantly between 2.6 Ma and 3.1 Ma. As one of the largest volcanoes in the region, it is uniquely positioned to provide information about the East African Rift. The Thiba basalts erupted from Mt. Kenya relatively following the main volcanic phase (0.797 - 0.45 Ma) and are characterized by primitive compositions, contrasting distinctly with the more evolved compositions that typically constitute the main edifice of Mt. Kenya. We use these basalts to probe the evolution of the recent magmatic system in this portion of the EAR. We have conducted a comparative petrographic analysis of the rocks in the region during the most recent eruptions and interpret the magmatic processes that formed the magmas. We find that although the composition of the rocks studied is ubiquitously basaltic, their textures vary. Most of the samples from Mt. Kenya are porphyritic with olivine and clinopyroxene phenocrysts set in a fine-grained matrix. Basaltic samples display either a glassy groundmass or an aphanitic intergranular plagioclase rich groundmass. Olivine and clinopyroxene phenocrysts exhibit dissolution textures, which indicates a magmatic system not at equilibrium. Several phonolite samples with consistent textures deviate from the basaltic samples, containing plagioclase and larger feldspathoid phenocrysts set in a fine-grained plagioclase rich-matrix. The petrographic interpretation of these Thiba basalts allows for a clearer understanding of initial magmatic activity within the Mt. Kenya system.

QUANTITATIVE RESEARCH USING DIGITIZED HISTORIC NUCLEAR EXPLOSION SEISMOGRAMS

Presenter: Josie Anderson
Category: Physical Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 2936
Mentor: Kevin Mackey

Seismic data is one of the best resources used to understand the location, timing, and source of seismic events. Different seismic techniques allow us to discriminate the type of seismic event that occurred, such as tectonic earthquakes and underground nuclear explosions. This study, modeled after Hartse et al. (1997), will compare amplitude ratios of different seismic phases from Peaceful Nuclear Explosions (PNEs) from the former Soviet Union, to understand how they differ from tectonic earthquakes from eastern Russia. Analog PNE seismograms were digitized from local and regional seismic stations near Lake Baikal and adjacent regions. Amplitude ratios of seismic phases, such as P/S, have been calculated in different frequency bands (e.g., 0.75 - 1.5 Hz) to find discrimination criteria for this region. One of the global challenges to discriminate seismic events is that differing complex local and regional geology affects the waveforms. Analysis of known nuclear explosions using local/regional seismic data establishes the discrimination criteria for the Lake Baikal region and its unique geology, which is crucial for nuclear monitoring efforts around the world.

PHYSICAL SCIENCES
Oral Presentations

SPATIOTEMPORAL VARIATIONS IN STREAM C:N:P RATIOS OF ARCTIC CATCHMENTS INDICATE SEASONALLY DYNAMIC NUTRIENT INPUTS AND PROCESSING

Presenter: Kat Hummer
Category: Physical Sciences
Time Slot: 12:00 PM
Room Location: Meeting Room C
Number: 2941
Mentor: Jay Zarnetske, Amelia Grose, Tanner Williamson

Carbon to nitrogen to phosphorus (C:N:P) ratios control biological processes in streams and change based on nutrient contributions from the landscape. In the Arctic, these ratios are highly impacted by nutrient release from thawing permafrost, and we may be able to detect areas of permafrost thaw in a catchment from decreasing C:N and increasing N:P ratios. Here, we study how C:N:P ratios change spatiotemporally across three Arctic catchments with varying landscapes - tundra, tundra with lakes, and alpine - on the Alaskan North Slope. We sampled 40-50 sites along each river five times across the 2016-2018 thaw seasons. We use dissolved organic carbon (DOC), total dissolved nitrogen (TDN), and total dissolved phosphorus (TDP) to calculate C:N:P ratios at each site. While average DOC concentrations decreased from early to late season for all rivers and overall from 2016 to 2018, TDN and TDP did not show consistent trends, resulting in highly dynamic ratios over time. Additionally, C:N:P ratios varied spatially between the rivers. The alpine catchment differed from the tundra catchments, likely due to increased N availability in the alpine catchment. Average C:N and C:P ratios showed general decreasing trends while average N:P ratios showed a general increasing trend over time in all catchments, suggesting an increase in N due to permafrost thaw. The dynamic C:N:P ratios through space and time documented here indicate that Arctic stream ecosystems are highly influenced by permafrost thaw and consequently climate warming.

THE DESIGN AND SIMULATION OF A NEW EXPERIMENTAL SETUP TO STUDY NUCLEAR REACTIONS IN STARS

Presenter: Brock Wallin
Category: Physical Sciences
Time Slot: 12:15 PM
Room Location: Meeting Room C
Number: 2942
Mentor: Artemisia Spyrou

Most of the elements that make up the universe are created in the cores of stars. Nuclear processes are the main driving factor behind forming elements. In experimental nuclear physics, we focus on the nucleus of atoms and study their properties using detectors. The most common type of nuclear process that happens in stars is beta decay, where one element transforms into another, and in doing so, emits different types of radiation like photons, electrons, neutrinos, neutrons, and others. For the current work, we focus on measuring the emitted photons (gamma rays). Electrons from a beta decay can interfere with our experimental results as a form of

background. To remove this background, I have been designing and improving new detector geometry such that the background electrons can be experimentally measured and removed from the results of the experiment. I have been running simulations using this new detector geometry in order to optimize the geometry before implementing it into actual experiments. In this presentation, I will show the results of these simulations and demonstrate the effective reduction of the background electrons.

SINGLE ATOM MICROSCOPE CALIBRATION

Presenter: Ben Mellon
Category: Physical Sciences
Time Slot: 12:30 PM
Room Location: Meeting Room C
Number: 2943
Mentor: Jaideep Singh

The expression: "we are made of star stuff" is true in the most literal sense. The heavy elements that are necessary for life and integral to our technologies are formed in stars-either in sudden violent explosions or passively throughout the course of a star's life. Our research is concerned with the latter; studying the nuclear reactions that facilitate this slower process of heavy element creation will allow us to better model the inner workings of stars and enable us to explain how heavy elements came into existence with greater detail. The main concern is the low probability of some of these nuclear reactions. With estimated reaction rates around one product atom per day, it is incredibly difficult to distinguish a reaction from background events. Some experiments have been conducted underground to suppress background events but this poses its own set of problems. We have instead developed a highly efficient, selective, and sensitive instrument. The Single Atom Microscope (SAM) utilizes a cryogenically frozen noble gas film to trap and count individual product atoms; a laser is used to excite the atoms, and their emissions are recorded as a fluorescence spectra. The SAM needs to be calibrated, and rubidium's well known fluorescence spectra makes it an ideal choice for this. This presentation focuses on data analysis techniques required to analyze the peaks of the measured rubidium fluorescence spectra and compare them to the known peaks.

UNDERSTANDING COLLECTIVE MOTION INSIDE A NUCLEUS

Presenter: Mickey Mumby
Category: Physical Sciences
Time Slot: 12:45 PM
Room Location: Meeting Room C
Number: 2944
Mentor: Vladimir Zelevinsky

Understanding motion in isotopes is an absolute necessity in many parts of nuclear physics. Further, the results of a study like this can prove incredibly useful for studying fundamental symmetries in nature. This project involved the use of a model to predict the energy of an isotope in a (3-) state based on its energy in a (2+) state. This is quite useful, as it gets us closer to a more perfect model for motion within an isotope. Using recorded data from the National Nuclear Data Center for isotopes of the elements Ruthenium, Palladium, Cadmium, Tin, Tellurium, and Xenon, 108 (2+) values of different isotopes were noted, as well as 54 (3-) values. Using that data, and putting it through an equation previously developed for the model, predicted values of (3-) were calculated, and then compared to the measured values from the

Data Center when applicable. The square deviations from the recorded answers were taken for each element to give an idea of the accuracy of the model with these specific numbers. This presentation will include the data, results, model, and more descriptive methodology for this project.

MEASURING LIGHT TRANSMISSION SPATIALLY THROUGH A NOBLE GAS FILM FOR THE SINGLE ATOM MICROSCOPE PROJECT

Presenter: Julia Egbert
Category: Physical Sciences
Time Slot: 1:00 PM
Room Location: Meeting Room C
Number: 2945
Mentor: Jaideep Singh, Erin White

The Single Atom Microscope project is developing a novel detector technique for measuring rare, low-yield nuclear reactions that are astrophysically important. This method involves cryogenically freezing noble gas on a substrate creating an optically transparent solid, or film, used to capture product atoms. Then the embedded atoms are counted using laser-induced fluorescence and optical imaging. The transparency of a film is currently illustrated by displaying the transmission across the entire film for each wavelength in the measured range, resulting in a wavelength-transparency band. Taking images with a charged-coupled device (CCD) camera provides information about the transmission spatially across the film, rather than the transmission versus each wavelength. Using python, CCD images were converted into data arrays which were used to calculate the transmission ratio of the film. The results were displayed as two-dimensional images using a color-coded plotting function to differentiate the highest regions of transmission from the lowest. It was hypothesized that the transparency would differ across the surface of a film. This will allow us to determine how the transmission varies spatially on a highly transparent film or a poor film, and to determine where on a film product of certain nuclear reactions should be deposited to accurately determine their fluorescence. Imaging the films will also allow us to determine the location of the fluorescence of product atoms. This work is supported by U.S. National Science Foundation under grant number No. 1654610.

PLANT SCIENCES
Poster Presentations

DROUGHT TOLERANCE AND PATHOGEN RESISTANCE IN TRANSGENIC WILLIAMS 82 SOYBEANS

Presenter: Marlana DeClaire
Category: Plant Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3101
Mentor: Brad Day, Brittni Kelley

Soybeans are grown on all continents, except for Antarctica, and are often subjected to drought conditions. Drought can cause soybeans to grow shorter, produce smaller leaves, stop flowering, and experience pod abortion. To begin investigating the potential for drought tolerance, Williams 82, a soybean cultivar, was previously transformed with a plasmid containing the NDR1 gene from model organism Arabidopsis thaliana at the Wisconsin Crop Innovation Center (WCIC). Overexpression of the NDR1 gene in Williams 82 individuals is hypothesized to lead to drought tolerance and increased immunity to pathogens, based on results previously observed in A. thaliana. The purpose of this study was to screen seeds produced by the WCIC and propagate confirmed lines for future drought studies. After initially germinating and planting transgenic seeds, the resulting plants were used for DNA extraction and PCR to confirm the presence of the plasmid containing NDR1. Leaves of the transgenic plants were also painted with Spectinomycin and observed for yellowing to screen for the plasmid. Plants containing the plasmid were then used for protein extraction and western blot analysis to confirm NDR1 overexpression. Plants with confirmed overexpression of NDR1 will be grown to seed and harvested for future drought studies. The findings from this study will provide an important tool for studying drought tolerance and pathogen resistance in soybeans and allow researchers to make connections between the laboratory setting and agriculturally relevant crop species.

ASSISTED MIGRATION OF TREE SPECIES IN RESPONSE TO CLIMATE CHANGE: EVALUATING PLANT-SOIL FEEDBACKS AS A CRITICAL CONSTRAINT

Presenter: Kya Sparks
Category: Plant Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3102
Mentor: Tyler Refsland

With climate change occurring faster than many native tree species can adapt, ecologists and resource managers are pursuing adaptive management techniques that may help mitigate climate change impacts on forests. One such technique is assisted migration, defined as the intentional movement of genotypes, populations, and species to new environments. Although a promising approach, the effectiveness of assisted migration will be severely limited by biotic constraints. Examining how biotic and abiotic factors, such as fungi colonization or light availability, affect plant soil feedbacks (PSFs), or the way a soil microbiome interacts with a tree's ability to grow, is a key component in assisting tree migration by relocating focal tree species in response to climate change. A meta-analysis of past studies, including field and greenhouse experiments, focused on how PSFs influence growth of tree species. Using data from this on-going meta-analysis, we asked the following question: How well is the observed magnitude and direction of PSFs on native tree species predicted by the species' shade tolerance and mycorrhizal association (i.e., arbuscular vs. ectomycorrhizal)? The exact effects of tree shade tolerance or AM versus EM colonization on PSFs is currently unknown. However, predictions can be made based on data collected on the treatment types of each experiment. Our findings shed light on how specific biotic and abiotic factors affect PSFs, and having a better understanding of PSFs will aid in mitigating climate change impacts on forests by informing an effective approach to assisted migration.

DISCOVERING AND ASSESSING NOVEL REGULATORS OF PETUNIA VEGETATIVE DEVELOPMENT RATE.

Presenter: Alyssa Mollema
Category: Plant Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3103
Mentor: Prabhjot Kaur

Development rate (the rate at which plants develop new nodes) directly affects crop production time and seasonality. The goal of this project is to identify novel regulators of vegetative development rate in petunia. Petunia is produced in greenhouses during winter and spring in Northern areas which requires considerable heating costs to provide optimal growing temperatures (18-24°C). Understanding the regulators of vegetative development rate in petunia could lead to manipulating crop production time in non-optimal temperature conditions and allow production at cooler temperatures. Twenty-six candidate genes were previously identified as possible development rate regulators. This project utilized Virus-Induced Gene Silencing (VIGS) to assess the candidate regulators of vegetative development rate in Petunia axillaris. This protocol involves Agro-infiltration of 2-3 true leaf stage seedlings with a Tobacco Rattle Virus (TRV)-based vector to silence the target gene and observe the effects on development rate. Development rate of VIGS-treated subjects was determined by counting the number of new nodes produced over designated periods of time and comparing to empty vector controls to determine the influence of each gene-of-interest on development rate. This project is ongoing and a list of novel regulators of vegetative development in Petunia axillaris is being compiled from the results so far. The results of this project could eventually be applied to accelerating crop timing of other crops of the Solanaceae family.

MEASUREMENT AND ANALYSIS OF CUCUMBER FRUIT CURVATURE

Presenter: Allison Frank
Category: Plant Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3104
Mentor: Rebecca Grumet

The shape and curvature of cucumbers is crucial when it comes to deciding if the product makes the shelves of grocery stores. Farmers look at the weight, shape, size, and defects when considering which cucumbers are the ideal fruit. It is important that the cucumbers are straight if farmers want to make the most profit off of their crops. Determining genetic markers that have an influence on curvature would be beneficial to breeders and farmers. Genome Wide Association Study (GWAS) can be used to help determine different regions in the genome that potentially have an effect on curvature. Using Genotyping by Sequencing (GBS), the full U.S. National Plant Germplasm Collection of cucumber accessions was genetically characterized and a core collection of 395 cucumbers was created that represents >95% of genetic diversity among the entire population. Using this collection, cucumbers were grown under field conditions at the MSU Horticulture Teaching and Research Center and photographs were taken of the cucumbers after 5-7 days post-pollination. The cucumbers were phenotyped based on curvature. Using the program ImageJ, height and diameter of the curve were

measured to determine the curvature of each fruit. GWAS analysis will be performed using the GBS data of the core collection to look for certain regions of the genome that could potentially contribute to the curvature shape of the cucumbers.

ANALYSIS OF GENE CONTENT VARIATION AND PRESERVATION OF DISEASE RESISTANCE GENES IN THE ROSE FAMILY (ROSACEAE)

Presenter: Jaclyn Melasi
Category: Plant Sciences
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3105
Additional Student Presenters: Mitchell Alekman
Mentor: Kevin Bird, Patrick Edger

The rose family (Rosaceae) contains a number of agriculturally and economically important crops, such as cherries, peaches, raspberries, and strawberries. Much of the current research on Rosaceae crops are contained within individual subfamilies. Here, we aim to utilize bioinformatic genomic analysis to examine variations in gene content across 8 Rosaceae subfamilies going back approximately 101 million years. Studies have found that one genome is not sufficient to capture the variation in a species, let alone a family. Pangenomic analysis allows us to examine this variation and identify which genes are shared by all individuals. We performed comparative analyses in order to identify core and dispensable genes across the different subfamilies and utilized functional enrichment analysis to compare differences in gene expression and function. Additionally, we bioinformatically identified NLR genes, which are involved in disease resistance, across these species. In this presentation, we will show the similarities and differences between Rosaceae crops with an emphasis on disease resistance genes. We hope this research helps provide insights into the evolution of disease resistance genes.

TESTING CUCUMBER ACCESSIONS FOR PHYTOPHTHORA FRUIT ROT RESISTANCE

Presenter: Chris Culp
Category: Plant Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3111
Mentor: Rebecca Grumet, Ying-Chen Lin

Young cucumber (Cucumis sativus) fruit are especially susceptible to the fruit rot caused by Phytophthora capsici resulting in major losses for cucumber producers in the midwestern and eastern United States. Currently, there are no commercially available resistant varieties. From previous research, one breeding line, MSU 109483-53, showing moderate young fruit resistance to P. capsici was released. Further research is required to discover additional sources of resistance and develop true breeding lines to be used in breeding programs. Screening of a cucumber diversity panel in 2019 identified five possible additional sources of resistance. To test whether the observed resistance is reproducible in the spring of 2021, eight S4 lines derived from PI 205995 were grown in the greenhouse in completely random design. In the summer of

2021, the three most resistant 052 lines along with (PI 105340, PI 357863, PI 481614, NSL 197095) were grown in the field of MSU Horticulture Teaching and Research Center. Six plants per line were grown in a complete random design. Five to ten young fruits (5-7 days post-pollination) were harvested from each plant and inoculated with two thirty microliter droplets of resuspended P. capsici zoospores with a concentration at 1x104 zoospores/mL. Growth of pathogen was recorded daily through photographs and symptoms were scored up to five days post inoculation. Results from this work will aid to discover more potential sources of resistance for breeding programs for Phytophthora fruit rot.

IDENTIFYING BENEFICIAL MICROBES IN THE SWITCHGRASS RHIZOSPHERE

Presenter: Lille Cunic
Category: Plant Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3112
Mentor: Ashley Shade, Keara Grady

The soil microbiome is extremely diverse and plays a significant role in plant health. The microbial community closely associated with plant's roots is known as the rhizosphere. Plants send signals to the microbial community within its rhizosphere via metabolic root exudates, which influences the composition and abundance of microbes in the rhizosphere to support the plant's needs. To gain insight as to how rhizosphere microbes affect the growth of the biofuel candidate switchgrass, a collection of bacteria was isolated from the rhizosphere of switchgrass plants grown at the Kellogg Biological Station in Hickory Corners, MI. Growth curve assays were performed to determine bacterial growth kinetics in the presence and absence of switchgrass root exudates. Preliminary results show several rhizosphere isolates with improved growth when supplemented with switchgrass root exudates as compared to growth in control condition, and in at least one of three key growth parameters: biomass (measured as maximum optical density at 600 nm), decreased lag time to exponential growth, or increased rate of exponential growth. 32 isolates had increased total biomass (measured as optical density). Of these, we targeted 15 isolates (14 proteobacteria, 1 actinomycetota) for follow-up studies of pairwise interactions with other isolates to construct non-inhibitive communities that could next be tested for positive plant outcomes in greenhouse studies. Ultimately, identification of beneficial switchgrass microbes can be used to treat switchgrass in the field, ideally resulting in increased biomass of switchgrass crops.

BUILDING A BACTERIAL CARBOXYSOME IN HIGHER PLANTS ONE SHELL PROTEIN AT A TIME

Presenter: Taylor Chambers
Category: Plant Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3113
Mentor: John Froehlich

A major challenge facing plant biologist today is to improve the growth and productivity of various crop plants. Unfortunately, many crop plants (C3 Plants) such as cowpea, soybean and

rice are very photosynthetically inefficient. The main reason for this inefficiency is that in C3 plants photosynthesis is limited by the poor activity of the carbon-fixing enzyme, Rubisco, which shows a low turnover rate and can react with O2 instead of CO2, leading unproductive photorespiration rather than productive carbon fixation. Thus, many attempts have been made to improve photosynthesis by modifying the behavior of Rubisco. This approach has unfortunately achieved limited success. Currently, many labs are pursuing an alternative approach in which attempts are being made to introduce a CO2-concentrating mechanism (CCM) into C3 plants that could potentially overcome many of the limitations stated above and thereby lead to increased crop yields. In cyanobacteria, bacterial microcompartments, known as "carboxysomes", improve the efficiency of photosynthesis by concentrating CO2 near the enzyme Rubisco. The structure of bacterial carboxysomes is composed of shell proteins called Hexamers, Trimers and Pentamers. These bacterial shell components self-assemble into a polyhedral structure (CCM) that contain the enzymes Rubisco and carbonic anhydrase. Because of these specialized structures, CO2 concentrations around Rubisco are increased thus enhancing CO2 assimilation rates in cyanobacteria. Given these benefits, we are currently attempting to engineer a bacterial CCM into a C3 plant. This poster will present the progress we have made in trying to engineer a CCM into C3 plants.

THE IMPACT OF PRATYLENCHUS PENETRANS ON THREE DIFFERENT CARROT VARIETIES

Presenter: Saniya Henderson
Category: Plant Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3114
Mentor: Ellie Darling

The United States Carrot crop industry is a $716 million dollar industry (USDA-NASS 2020) but is subject to damage by numerous pests and pathogens. Pratylenchus penetrans is a root lesion nematode that feeds on healthy cells within carrot taproots. Pratylenchus penetrans has a wide host range so farmers have a hard time finding proper resistance (Collins, 2016). In this study, we aim to determine how the root lesion nematode, P. penetrans, impacts the growth and development of three carrot varieties. In a 45-day experiment, we studied three varieties (cv. Cupar, Nantes half-long and Danvers 126) using 100 cm3 volume cone-tainers to compare non-inoculated plants and inoculated plants of each variety. We used 6 replicates to study the root lesion nematode impact on the carrot's total growth. In the conclusion of the experiment, we used 1g of roots and 100cm3 of processed soil to obtain nematode counts. In the end we collected the final root weight and measured the final plant height of the carrots to better determine the impact the P. penetrans had on carrot varieties.

EFFECTS OF VARIOUS TREATMENTS ON PRENYL LIPID CONTENT IN MAIZE

Presenter: Elizabeth Dubuque
Category: Plant Sciences
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3115
Mentor: Peter Lundquist, Sheng Ying

Various biostimulants and nitrogen treatments are commonly used to promote crop growth. Although maize growth as a result of treatment is evident, much of the plant physiology remains unknown. Characterization of prenyl lipids from maize tissue will help identify the modifications generated by treatment. Maize leaf samples were collected from five different hybrids with different treatments applied including varying nitrogen levels and biostimulants. The tissue was then lyophilized and ground so that it could be used for a prenyl lipid extraction. Through chromatography compounds in the tissue can be identified and compared to their phenotype and treatment. A MultispeQ, a tool used to collect a variety of photosynthetic measurements in the field, can be used in conjunction with chromatography data to determine how varying treatments affect the health of maize and alter its physiology.

PSYCHOLOGY
Poster Presentations

THE FIVE MAJOR PERSONALITY TRAITS, GENDER, AND COVID-19 IMPACT AS PREDICTORS OF LIFE SATISFACTION AND PERCEIVED STRESS

Presenter: James St Clair
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3202
Mentor: Jennifer Neal

Life satisfaction and perceived stress are important topics to consider for undergraduate students, especially during the pandemic. Understanding how different personality traits and Covid-impact are associated with both perceived stress and satisfaction with life in this cross-sectional analysis enables future researchers to fine-tune their surveys with larger samples for generalization. A survey of 235 students was used to examine the association of the five major personality traits and perceived stress, in addition to the association of the five major personality traits and satisfaction with life. Covid-impact scores were also included in the analyses to see if associations existed with either perceived stress or satisfaction with life. The Mini-IPIP scale was used to assess the five major personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness (Donnellan et al., 2006) and a COVID impact scale was used to assess the degree to which COVID-19 had impacted students' lives. The two dependent variables, perceived stress and satisfaction with life, were measured with scales. Perceived stress was measured using the 14-item Perceived Stress Scale, while satisfaction with life was measured using the 5-item Satisfaction with Life Scale. Linear regression statistical analyses were performed using JASP statistical software. Agreeableness, conscientiousness, and extraversion were positively associated with satisfaction with life whereas neuroticism was negatively associated with satisfaction with life. Covid impact was not significantly associated with satisfaction with life. Neuroticism and covid impact were both positively associated with perceived stress whereas conscientiousness was negatively associated with perceived stress.

STRESS DURING A GLOBAL PANDEMIC: THE EXPERIENCES AND IMPACTS ASSOCIATED WITH COVID-19 RELATED STRESS

Presenter: Matthew Rostker
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3203
Mentor: Christopher Webster, Jason Moser

The impact of the COVID-19 pandemic has been felt across many domains of everyday life and has led to significant COVID-related stress. Given that COVID stress is related to negative mental health outcomes, it is crucial to identify which COVID-related impacts are associated with high levels of COVID stress. Therefore, this study aimed to identify specific experiences related to the COVID-19 pandemic that were associated with COVID-19 related stress. In this study, 59 participants completed the Epidemic-Pandemic Impacts Inventory (EPII), which assessed ways in which the COVID-19 pandemic impacted participants across ten dimensions, and the COVID Stress Scale. To investigate which impacts were associated with greater COVID- related stress, we entered each EPII subscale into a multiple linear regression analysis predicting COVID stress scores. We hypothesized that experiencing quarantine and infection history related to COVID-19 would be associated with greater COVID stress. Our results did not support our hypothesis as only impacts to employment and social activities were associated with significantly higher COVID-19 related stress. Surprisingly, individuals who experienced impacts related to infection history reported lower COVID-19 stress; being impacted by quarantining was also not associated with COVID-19 related stress. These findings contribute to the growing knowledge of the impacts of the COVID-19 pandemic on stress and well-being. We believe this information can assist in managing our national mental health crisis by addressing impacts that are the greatest source of COVID-19-related stress. Additionally, future studies should further probe why ti might be that infection history is associated with lower COVID- stress.

GREATER COVID FEAR IS ASSOCIATED WITH INCREASED PTSD SYMPTOM SEVERITY

Presenter: Bre Lind
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3204
Mentor: Jason Moser, Christopher Webster

The COVID-19 pandemic is a global event that has provoked fear and stress due to social disruptions and the risk of death. Given that pandemics have been associated with increased PTSD symptoms, it may be important to explore the association between COVID stress and fear and PTSD symptomology to develop interventions within the context of the pandemic. Thus, the purpose of this study was to examine the associations between COVID-19 related stress and fear and posttraumatic stress symptom clusters (i.e., Intrusive Thoughts, Avoidance, Negative Cognitions, Hyperarousal). This study was part of a larger investigation that explored the effects of an exercise and emotion regulation intervention on COVID-related stress and emotional well- being. Prior to receiving the intervention, 59 participants completed baseline

measures assessing COVID-19 related stress (COVID Stress Scale), fear of COVID-19 (COVID Fear Scale) and PTSD symptoms (Posttraumatic Stress Disorder Checklist). We predicted that greater COVID stress would be associated with higher hyperarousal symptom severity and greater COVID fear would be associated with higher avoidance symptoms. Our results did not support our hypothesis as COVID stress was unrelated to any PTSD symptom cluster and COVID fear was only associated with intrusive thoughts. Although these findings were surprising, a possible explanation for this association may be that individuals' fear of COVID may present similarly to intrusive thought symptoms typically seen in PTSD (e.g., nightmares). Thus, individuals experiencing increased COVID fear may benefit from interventions typically used to reduce intrusive thoughts in PTSD such as Cognitive Processing Therapy or Prolonged Exposure Therapy.

THE ROLE OF NARRATIVE IN MUSIC PROCESSING AND ITS CULTURAL IMPLICATIONS

Presenter: Jacob Okulewicz
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3205
Additional Student Presenters: Khushi Kapoor, Jethro Sarmiento Olivares
Mentor: Natalie Phillips

This presentation discusses parts of an NSF-funded interdisciplinary study conducted at the Digital Humanities and Literary Cognition Lab and Timing, Attention and Perception Lab at MSU called "The Role of Narrative Listening in Music Perception." The study explored how participants imagine or hear stories when exposed to musical stimuli. One of the experiments had participants from the U.S. and Dimen, China listen to instrumental music and describe any narratives they may have imagined. Many of the narratives had incredible similarities. They contained the same topics, themes, and even exact words. The observed reactions to the stimuli revealed narrative convergence across cultures. One pattern we observed was that Western listeners often connected instruments they heard in the music with specific cultural events. These listeners tended to associate Chinese instruments with similar sounding Western instruments, and then produce narratives depicting traditionally Western themes, such as cowboys or Native Americans. The responses suggest a reliance on cultural learning and also speak to the culture-dependent semantic nature of instrumental music. We are also preparing a branch study that examines narratives generated from various pieces of instrumental music containing just one instrument. We hope to be able to compare this data with that of our original study and identify any new or recurring narrative trends. Through this presentation, we attempt to provide a new perspective on when and why instrumental music yields culture- influenced narrative listening and how to continue studying this phenomenon in the future.

SPEECH UNDERSTANDING IN DIFFICULT LISTENING CONDITIONS

Presenter: Kyle Oliver
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3206
Additional Student Presenters: Frank Dolecki
Mentor: J Devin McAuley, Toni Smith

Understanding speech-in-noise (SIN) is an important ability for communication in everyday life. Dynamic Attending Theory (DAT) states that people entrain their attention based on rhythmic events (Jones & Boltz, 1989). A DAT-based Selective Entrainment Hypothesis posits that people's perception of speech is facilitated by temporal expectations they form from normal speech rhythm. To investigate predictions of this hypothesis, we conducted two experiments using the Coordinate Response Measure (CRM) Paradigm (Bolia et al., 2000). Participants listened to the phrase "Ready [call sign] go to [color] [number] now" spoken by a target talker with the call sign "Baron" and reported the Color and Number they heard. While the target talker spoke, a background talker interjected with a different color-number pair at varying onsets, either before or after the onset of the target talker's "color". In Experiment 1, half of the participants were presented with normal target sentences and the other half with rhythmically altered sentences. Background talker onsets closer to the target talker onset worsened participant performance in identifying the correct color-number pair; however, there was no performance difference between normal target speech and altered target speech conditions. Experiment 2 uses the same CRM paradigm, along with the same varying onsets and a within-participants target rhythm manipulation. However, speech-shaped noise was added to the background to investigate its impact of noise on the impact of target rhythm at varying onset asynchronies. Preliminary results suggest that altering target speech worsens participant performance at background speech onsets closer to the target speech onset.

THE PUPIL LIGHT REFLEX IN INDIVIDUALS WITH VARYING LEVELS OF SCHIZOTYPAL TRAITS

Presenter: Pelli Mechnikov
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3207
Mentor: Jessica Fattal, Katharine Thakkar

The pupil light reflex refers to the change in pupil size in response to light. This is a process controlled by the autonomic nervous system, where sympathetic activity is responsible for pupil dilation and parasympathetic activity is responsible for pupil constriction. Abnormal pupil responsivity in schizophrenia has been documented in a growing body of psychophysiological work dating back to the early 1900's. More recently, a connection between abnormal pupil dynamics and symptom severity has been demonstrated as well. These findings have been interpreted as reflecting an imbalance in the autonomic nervous system. Thus, the pupil light reflex has the potential to provide insight into the brain processes in schizophrenia using a simple and non-invasive measurement, which may have implications for understanding illness mechanisms and may even be useful in a clinical setting. However, it is still unclear whether

abnormal pupil dynamics in individuals with schizophrenia have been confounded by other factors such as medications or the psychosocial effects of having a mental illness. Investigating the pupil light reflex as a function of schizotypal traits in healthy individuals avoids these confounds, while also exploring the connection between schizotypy and schizophrenia. College undergraduates completed the Schizotypal Personality Questionnaire. Additionally, dark-adapted pupil diameter, as well as the velocity and magnitude of pupil constriction and dilation were measured using a hand-held Pupillometer. Analyses were done in Matlab. Pupil dynamics were related to schizotypy measures. These results and their implications for interpreting altered pupil dynamics in schizophrenia will be discussed.

DO PARENTS' EDUCATIONAL EXPECTATIONS FOR THEIR CHILDREN PREDICT THEIR HOME LITERACY AND NUMERACY PRACTICES?

Presenter: Emily Cartier
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3211
Additional Student Presenters: Esin Ural
Mentor: Lori Skibbe, Nicholas Waters, Anabela Dillgomes, Morgan Titus, Tanner Hickman, Sammy Ahmed

A large body of research has demonstrated that parents/caregivers' educational expectations are predictive of their children's academic achievement, with these associations being mediated by achievement-supportive behaviors (Pinquart & Ebeling, 2020). However, most studies conducted to date have examined links between parents/caregivers' educational expectations and the home literacy environment, while much less attention has been paid to whether these beliefs are also related to the home numeracy environment. Therefore, in the current investigation, we examined associations between parents/caregivers' educational expectations for their children and their home literacy and numeracy practices in a sample of 268 low-income families with preschool-aged children. Consistent with prior research (e.g., Davis-Kean, 2005), we found that parents/caregivers' educational expectations were related to the home literacy environment ($r = .18$, $p = .003$). However, associations between educational expectations and the home numeracy environment were not statistically significant ($r = .08$, $p = .224$). These findings suggest that parents/caregivers who hold greater educational expectations may engage in more literacy-related activities to help foster their children's academic achievement, but that these expectations may not impact their home numeracy practices. Given the relative scarcity of research in this area, future studies would benefit from replicating and extending these findings in more diverse samples and across various age ranges.

PARENTAL CONTROL AND CHILDHOOD EXTERNALIZING PROBLEMS IN FAMILIES EXPERIENCING NEIGHBORHOOD DISADVANTAGE

Presenter: Megan McShane
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3212
Mentor: Elizabeth Shewark, Alex Burt

Disadvantaged neighborhoods predict a number of deleterious outcomes for youth, including externalizing problems. Prior work indicates parenting can buffer against, or further exacerbate, detrimental neighborhood effects. I will examine the association between positive and negative parental control and children's oppositional defiance and conduct problems and how this relation may differ for families experiencing neighborhood disadvantage. I hypothesize higher levels of negative parental control will be associated with higher levels of externalizing problems in children, and that higher levels of positive parental control will be associated with lower levels of externalizing problems. I further hypothesize the magnitude of effect for these associations will be larger in children experiencing neighborhood adversity. Participants will be from the TBED-C (N= 1,030 families). Of the participating children, 48.7 % identified as female. Most participants identified as White (81.7%), but 9.5% identified as Black, 5.9% as mixed race, and less than 3% as Asian, Native American, Latino/Latina, or Pacific Islander. Just over half (58.1%) of families reported household income below the living wage in Michigan. I will examine parent reports of children's behaviors and observations of parent-child interactions. Trained coders used a computer joystick to rate interpersonal warmth and control. To test my hypothesis, I will use a linear regression model to examine associations between positive and negative parental control and child externalizing problems and evaluate whether and how these associations vary with neighborhood disadvantage. This study will offer insights into how parental control impacts children's externalizing problems among youth experiencing neighborhood adversity.

SPECTRUM-DEPENDENT AROUSAL IN A DIURNAL RODENT MODEL

Presenter: Emma Beaver
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3213
Mentor: Lili Yan

Humans generally feel more awake and energetic on a bright, sunny day than on a dark, gloomy day. However, the underlying mechanisms and the contribution of different photoreceptors are poorly understood. The objective of this study is to determine the role of a novel photoreceptor, melanopsin, and short-wavelength sensitive cones (S-cones) in mediating the arousal/wakefulness promoting effects of light, using a diurnal rodent model, Nile grass rats (Arvicanthis Nilocotis). 12 male grass rats were housed under 12:12 hour light/dark cycle with dim fluorescent light during daytime. Animals received 3-hour light exposure from 10am to 1pm every other day. A total of 4 different types of light were administered, i.e., 480nm, 480nm+360nm, full-spectrum/daylight, and daylight-360nm, in which 480nm and 360nm specifically stimulates melanopsin and S-cone, respectively. In-cage locomotor activity and

sleep/wakefulness were monitored and were all compared against the no exposure days (baseline) under dim fluorescent lighting between pulses. A significant increase in locomotor activity and wakefulness were observed during each 3-hour light exposure compared to the baselines. 480nm+360nm condition had a greater wakefulness promoting effect than 480nm alone, and the full-spectrum daylight was also more effective than daylight-360nm light exposure. The results collectively suggest that in addition to pRGCs, S cone also plays an important role in mediating the light-induced arousal. Also grass rats are diurnal, sharing similar daily rhythms and light responses to humans, thus the results found in this study are applicable to humans.

EMOTION REGULATION AS A MEDIATOR BETWEEN CHILD MALTREATMENT AND ADULT POSTTRAUMATIC STRESS SYMPTOMS DURING PREGNANCY

Presenter: Jewelian Fairchild
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3214
Mentor: G Bogat

Child maltreatment is accompanied by many long-term psychological effects, including increased emotion dysregulation and possible posttraumatic stress symptoms in adulthood (Jennison et al., 2016); however, the relationship is rarely studied during pregnancy. Pregnancy is a unique point in a women's life that can retrigger past childhood trauma an individual has experienced, which then can affect her mental health (Do et al., 2021) and the attachment relationship she begins to form with her unborn child (Stigger et al, 2020). The present study explores emotion dysregulation as a mediator between five types of childhood maltreatment (physical abuse, emotional abuse, sexual abuse, emotional neglect, and physical neglect) and posttraumatic stress symptoms. The sample consists of 381 women between 15 to 17 weeks pregnant who participated in a larger longitudinal study. Participants completed a laboratory assessment and answered a broad range of questions and surveys, including measures of child maltreatment, posttraumatic stress, and emotion dysregulation. There are four hypotheses: (1) each type of child maltreatment will be associated with posttraumatic stress symptoms during early-stage pregnancy, (2) emotion dysregulation will partially mediate the relationship between child maltreatment and posttraumatic stress, (3) the number of maltreatment subtypes an individual experiences (0-5) will increase posttraumatic stress symptoms, with emotion dysregulation as a mediator, and (4) women who experience more frequent abuse will have the highest rates of emotion dysregulation and posttraumatic stress symptoms.

THE EFFECT OF PITCH ON FINGER HEIGHT DURING SENSORIMOTOR SYNCHRONIZATION

Presenter: Cynthia Sridhar
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3215
Additional Student Presenters: Jess Truong
Mentor: J Devin McAuley, Carrie Kroger

Pitch is primarily perceived by its frequency, yet people tend to associate it with spatial positions such as "high" and "low." As shown in Rusconi et al. (2006), when participants responded whether a probe tone was higher or lower pitch than the reference tone, reaction times were faster in conditions where the higher-positioned button was assigned to the higher-pitch response and the lower-positioned button was assigned to the lower-pitch response. This supports the idea that pitch involves a multidimensional spatial representation. The present study will expand on these findings by examining whether changes in pitch affect motor performance during sensorimotor synchronization (SMS). Participants will synchronize tapping their finger to a series of isochronous tones. In half of trials, there will be one oddball tone that is higher or lower in pitch than the rest of the tones. Continuous motion-tracking will be used to record movement dynamics. We will examine changes in finger height following pitch changes. We predict that changes in finger height will be in the direction of the pitch change; following an unexpected high pitch, finger height will increase, but following an unexpected low pitch, finger height will decrease. Results of this study will advance our understanding of how pitch influences motor action during SMS.

DATA INTEGRITY AND ONLINE DATA COLLECTION WITH TRANSGENDER COMMUNITIES

Presenter: Megan Wertz
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3216
Additional Student Presenters: Belle Hoke
Mentor: Jae Puckett

The internet has provided a wealth of opportunities for studies with marginalized communities through targeted advertisements, coordinating shared calls through community organizations, and other such efforts. Still, there are many challenges to online data collection, such as ensuring that participants are legitimate, not repeat participants, and detecting bots. We are implementing an online study to validate a series of measures the research team has created to assess unique forms of minority stress experienced by transgender individuals. To protect the integrity of the data, we developed a thorough process for screening and enrolling participants into the study. This poster details those methods and provides an overview of the challenges and benefits of using them. The screening method included participants completing a questionnaire with their demographic and contact information. This information was reviewed to identify duplicate submissions, suspicious email addresses, or duplicate IP addresses who completed the survey consecutively. Demographic information was also reviewed to be consistent with the study criteria (e.g., that gender identity would differ from sex assigned at birth). Only the individuals who appeared to be legitimate respondents and who met inclusion criteria were contacted with a text message where researchers explained the purpose of the study and answered questions. Respondents also received a personalized link and code that allowed them to participate in the study, which included a variety of attention checks and survey protections. This study is ongoing, and we will review the number of participants enrolled and removed according to each step in our protocol.

DAILY VARIATION IN CHILD EMOTION

Presenter: Syd George
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3217
Additional Student Presenters: Trevor Sheehan
Mentor: Catherine Durbin

Parents often have trouble keeping up with the unpredictable nature of their child's emotional fluctuations throughout the day. These emotional changes can commonly cause some problem behaviors in children that parents find difficult to understand and manage. Having a better understanding of these daily emotional variations may go a long way in helping us to solve this issue. Prior research on this topic has identified patterns in daily emotional variation in adults, such that adults exhibit normative patterns of changes in positive and negative affect across the day. However, very few studies have examined whether these same patterns are evident in children to test whether mood variation is general or developmentally specific. Thus, our research seeks to better understand and identify the patterns in daily emotional variation in children. We collected data on emotional fluctuations their children experience throughout the day using parents as informants on their children's emotions. Parents provided repeated measures of their child's emotions over the course of several days. They were prompted to provide these reports via text messaging so that we could collect information on child emotion at different times of day. Our presentation lays out some of the patterns we identified in daily emotional variation in children, as well as how they associate with factors such as personality, temperament, age and gender. The analyses of these data will hopefully provide some possible answers as to how we can predict emotional fluctuation and therefore decrease the problem behaviors they are liable to cause.

NARRATIVE PROCESSING OF MUSIC: HOW CULTURE INFLUENCES OUR PERCEPTION OF MUSIC

Presenter: Grace Bonnema
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3221
Additional Student Presenters: Tushya Mehta, Sydney Logsdon
Mentor: Natalie Phillips

This presentation explores parts of a larger NSF-funded interdisciplinary study conducted at Michigan State (McAuley, TAP Lab; Phillips, DHLC lab), Princeton University (Lisa Margulis), and the Chinese University of Hong Kong (Patrick Wong). The study investigated if and when people imagine and/or hear stories when they listen to musical stimuli. One of the experiments had participants from across the US, Dimen, and China listen to instrumental music and asked them to give a narrative to their story, if they heard one; a surprising number of people did. Many of the narratives had incredible similarities, such as the same topics, themes, and even specific words. The similarities in participant answers were often startling, and so were the cultural perceptions of different themes, like war. In many narratives, we observed that Western and Chinese listeners have contrasting stories around these themes and also reveal powerfully

different moods while writing their narratives. For example, in two excerpts, western listeners wrote narratives that portray wars in the name of remorse (Keywords: battle, violence, sadness, fear) while Chinese listeners portrayed wars in the name of national pride (Keywords: Excitement; Nationalism; victories). As we investigate these moments of cultural alignment and divergence in music inspired stories, we point toward an innovative model for linking specific structures and time-points in music to the kinds of stories people hear. Through this presentation, moreover, we aim to provide an understanding of when and why instrumental music yields culture-influenced narrative listening.

HOW ASSOCIATING REWARD WITH A SPATIAL LOCATION IMPACTS WORKING MEMORY

Presenter: Jordan Bross
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3222
Additional Student Presenters: Lisa Lipin
Mentor: Susan Ravizza, Eric Chantland

Working memory, also known as short-term memory, is a critical cognitive system that allows us to retain information for a short period of time. Its functions include decision-making, information processing, and problem solving. Working memory has a limited capacity and it is important to use it effectively by prioritizing information that is most task-relevant. In our study, we investigated the relationship between working memory and reward based on spatial location. Do people remember information better when they have learned that its location is associated with a positive reinforcement? We predicted that, in associating higher rewards with a certain quadrant of a computer monitor, individuals would prioritize that quadrant in their working memory. Participants were asked to perform a search task with varying monetary rewards for the four quadrants. Search targets were equally likely to appear in each quadrant but, if the target appeared in the high-reward quadrant, participants could win more money if found. This search task was followed by a working memory task in which participants performed a delayed-estimation task with four colors with one color presented in each quadrant. We then calculated the distance, in degrees, on the color wheel between the correct color and the participant's choice. Contrary to our predictions, participants were unable to associate which quadrant had a higher monetary reward and colors at the high-reward location were not remembered better. In a follow-up experiment, we will test the hypothesis that locations must be more focal in order to associate that area with reward.

SOCIAL AND PHYSICAL AGGRESSION AS PREDICTORS OF DIGITAL AGGRESSION

Presenter: Tuan Nguyen
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3223
Additional Student Presenters: Sydney Wojczynski, Shrithika Venkat
Mentor: Alexandra Vazquez

Victims of cyberbullying are at a heightened risk for experiencing depression and suicidal ideation (Bottino et al., 2015), highlighting the critical importance of uncovering factors that predispose individuals to engage in cyberaggression. To date, only one study has compared the impact of physical versus social aggression in predicting cyberaggression (Burt & Alhabash, 2016). They found that social aggression predicted cyberaggression more than physical aggression, but unfortunately, were restricted to available cyberaggression questionnaires focusing on proactive sorts of behaviors. It remains unclear whether these findings would persist to reactive cyberaggression elicited during a virtual game. We examined a sample of 1,524 college students (72.9% female) to investigate whether and how physical and social aggression predicted self-reported cyberbullying and cyberaggression as elicited during a simulation of an aggressive online encounter. We estimated ordinary least squares regression models using SPSS. Analyses confirmed prior findings indicating that while social and physical aggression were both associated with self-reported cyberbullying ($R2 = .06$, $F (4, 1515) = 24.36$, $p<.001$; $R2 = .13$, $F(4, 1515) = 58.89$, $p<.001$, respectively), social aggression had a larger association ($\beta = .36$). Similarly, social and physical aggression were both associated with an in-vitro measure of cyberaggression ($R2 = .04$, $F (4, 979) = 10.49$, $p<.001$; $R2 = .05$, $F(4, 979) = 14.73$, $p<.001$, respectively), yet in this case, associations were stronger for physical aggression ($\beta = .24$)). Our results suggest that social aggression may be a stronger predictor of proactive cyberaggression while physical aggression is a stronger predictor of reactive cyberaggression.

IDENTIFYING ADOLESCENT SELF-HARMERS IN AN OUTPATIENT SETTING: DO PARENT REPORTS MATTER?

Presenter: Harsna Chahal
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3224
Additional Student Presenters: Jared Warzynski
Mentor: Melissa Benbow, Susan Frank

Well-documented, large discrepancies between parent and adolescent reports, of adolescent self-harm appear largely due to parental lack of awareness of adolescent self-harm behaviors. However, adolescents' unwillingness to report or differences in each reporter's interpretation of the adolescent's behavior and/or intent may contribute as well. This study: 1) assessed agreement between parent and adolescent reports of suicidal ideation and self-harm behavior; and 2) used reports from adolescents, parents, and/or both, to assess the utility of two incremental models predicting a) non-suicidal self-injury (NSSI) from negative affect and suicidal ideation and b) suicidal behavior from negative affect, suicidal ideation, and NSSI. The investigators used deidentified intake data collected over six years from 484 adolescent/parent pairs seen at an outpatient mental health clinic. Participants completed standardized questionnaires measuring adolescent mood problems, suicidal ideation, and self-harm behavior over the past three months: 39.7% of the adolescents reported suicidal ideation, 23.1% reported NSSI, and 12.6% reported suicidal behavior. Analyses assessing "accuracy" of parent report in predicting adolescent-reported suicidal ideation, NSSI, and suicidal behavior showed greater specificity (86.3%, 90.3%, and 99.3%, respectively) than sensitivity (65.1%, 58.9%, and 39.3%, respectively). Results of log regression analysis testing incremental models predicting NSSI and suicidal behavior were comparable when using only adolescent or only parent-report data (Cox and Snell R^2 ranged from 0.23 to 0.52). Moreover, parents' reports of

antecedent variables in the predictive models accounted for additional variance in adolescent NSSI and suicidal behavior even after controlling for adolescents' reports of the same variables.

DO REFERENCE PERIODS CHANGE INTERPRETATION OF EMOTION FREQUENCY QUESTIONS?

Presenter: Jenny Warkentien
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3225
Additional Student Presenters: Alli Harkenrider, Sam Barans, Emma Weber
Mentor: Richard Lucas, Brent Donnellan, Rebekka Weidmann, Andrew Rakhshani

In psychological research, participants are often asked to evaluate their experiences in the context of certain "reference periods" (e.g., the past day, past month, or past year.) Formerly, the use of different reference periods had demonstrated an effect on how participants responded to self-report questions. In Winkielman et al. (1998), based on whether participants were assigned to recall anger experiences from the past week or past year, they interpreted the meaning of the question differently. However, the study's effect has not been replicated, and generally, little attention is paid to how reference periods influence participants' interpretation of questions. The present pre-registered study will partially replicate and extend Winkielman et al. (1998) that evaluated how different reference periods affect responding. Consistent with the original study, participants' interpretation of questions will be analyzed by the strength, seriousness, and frequency of anger they infer questions are referencing. Additionally, this study evaluates how generalizable the effect is across positive (i.e., joy) and negative emotions (i.e., sadness), and further extends the study by adding a month reference period. A successful replication will provide implications for how researchers design retrospective questions and investigate the validity of current psychological tests measuring past emotional experiences. To replicate this effect, a planned sample size of 1,359 undergraduate students at Michigan State University will fill out online questionnaires using Likert scales from the original study. ANOVA and t-tests will be used to analyze the difference between reference period lengths and participants' interpretation of the retrospective questions.

INVESTIGATING EFFECTS OF LOAD ON WORKING MEMORY RECALL

Presenter: Allie Attari
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3226
Additional Student Presenters: Hannah Morrow
Mentor: Susan Ravizza

Working memory allows people to continuously update and integrate new information into their memory making it available for recall to make decisions, complete tasks, and work towards goals. Working memory has a limited capacity so it is important to remember only relevant information for task goals. This experiment focused on understanding the cognitive processes that underlie attention and working memory, specifically how certain information is prioritized in working memory. Previous research with remembering 4 colors found that attention increases

the formation of "high-resolution memories," and less guessing. We investigated whether attention would have similar effects on memory in a low load condition, below the capacity limit of 3-4 items. Participants were asked to recall one of the two colors that flashed on the screen. Before the colors appeared, they were given a cue pointing to the color they would most likely be asked to recall. The cue was accurate 66% of the time. We found that participants remembered the cued colors better than those that were uncued. The guess rate for the cued condition was 9% compared to 18% in the uncued condition. The precision of the color representation in memory was also higher in the cued condition. Comparing the low load and high load conditions demonstrated that attention lowered the guessing rate, but did not improve the precision of the memory representation. This suggests that attention primarily helps reduce distraction from other stimuli ensuring that the item enters memory but has no further benefits on precision when load increases.

CROWDSOURCING CLOSE RELATIONSHIP SCIENCE RESEARCH: TESTING 15 BURNING RESEARCH QUESTIONS

Presenter: Sneha Challa
Category: Psychology
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3227
Mentor: William Chopik

The study of close relationships science has been indispensable in quantifying the impact that social relationships have on health and well-being across the lifespan. The results from the field's studies also hold intuitive value to many people. As an exercise in research methods, we started by generating burning questions about close relationships we wanted to know the answer to. Questions ranged from approaches to dating, how people navigate break-ups, individual differences, to relationships between friends and even with our pets! We then designed studies, collected and analyzed data, and presented the results at this poster. The exercise served as a fun illustration of how to go about conceptualizing and operationalizing questions that also revealed substantive answers about how people navigate close relationships.

HOW TO CANCEL PLANS: A MIXED METHODS STUDY OF STRATEGY AND EXPERIENCE

Presenter: Sophia Caron
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3231
Additional Student Presenters: Jackie Thomas, Alaina Torres
Mentor: William Chopik

Cancelled plans are inevitable. However, maintaining a relationship is important and to cancel on them may evoke feelings of disappointment. To prevent this, we examined the best ways to go about canceling plans that will not negatively impact relationships. Our study examined what people consider appropriate and inappropriate reasons and methods to cancel plans. A variety of close-ended and open-ended questions regarding what participants believed was a

reasonable excuse, the worst excuse, and how they feel about ways that plans are cancelled were asked. Among 1,192 people (72.5% women; 71.8% White), a majority of the participants want an advanced notice and/or a quick call/text when plans are being cancelled. Health or family reasons were the most reasonable; excuses regarding a better offer, such as finding something better to do, were among the most unacceptable reasons to cancel plans. Over 80% of the sample felt annoyed when they found out an excuse to cancel was a lie. Honoring commitments are essential to maintaining personal relationships, which are associated with better health and well-being. However, disappointment is inevitable when it comes to canceling plans. The best way to go about that is to cancel in advance and have an honest and reasonable excuse in order to maintain those relationships that are a fundamental part in life and the need to belong.

WEIRD WILD WORLD: TEMPORAL CHANGES AND CHARACTERISTICS OF WHAT MAKES SOMEONE "WEIRD"

Presenter: Anna Parcells
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3232
Additional Student Presenters: Jamie Quaglia, Naila Saric, Antoinette Wingo
Mentor: Rebekka Weidmann, William Chopik

It is natural for people to strive to be thought of as unique. Being unique helps distinguish us as people, affirms our worth, and conveys information to others. In people's search for uniqueness, they often venture into the category of "weird". Capitalizing on recent research chronicling societal change in psychological traits, we examine the temporal and individual difference correlates of having a "weird personality." Over 300,000 people completed a need for uniqueness personality measure (Snyder & Fromkin, 1977) from 2000 until 2020. We track sample-level changes in weirdness/uniqueness over a 20-year period. A more focused sample of 600 participants revealed unique predictors and outcomes of having a weird personality. The current research speaks to a growing sentiment from the public that people are becoming weirder, self-centered, and strange by providing the first-ever descriptive data on whether that is true.

OPTIMISM IS PROSPECTIVELY ASSOCIATED WITH RESILIENCE DURING THE COVID-19 PANDEMIC

Presenter: Jasmine Amine
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3233
Additional Student Presenters: Corrin Misak, Em Perkins, Emily Tetreau
Mentor: Jeewon Oh, William Chopik

Emerging research has identified how protective factors-like optimism-are associated with resilience to stress during the COVID-19 pandemic. However, the majority of research is cross-sectional, which creates ambiguity around the causal direction because these very protective factors might have also changed due to the pandemic. In the current study, we used longitudinal

data from the Health and Retirement Study (N = 921; Mage = 64.54, SD = 10.71; 59.6% female; 57.5% White) to examine how optimism measured in 2016 predicted adjustment during the pandemic (in 2020). Higher baseline levels of optimism were subsequently associated with less worrying and stress resulting from changes in social contacts, less loneliness and not feeling overwhelmed, and greater COVID-related resilience and benefit- finding. The findings will be discussed in the context of mechanisms that facilitate the protective functions of optimism and other psychological characteristics.

MODELING CHANGES IN HEALTH AND WELL-BEING OVER A 10-YEAR PERIOD IN LATE LIFE

Presenter: Meghan Abrom
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3234
Additional Student Presenters: Jillian Lange, Alex Mison, Kayla Stevenson
Mentor: Mariah Purol, William Chopik

It is generally assumed that with better health comes greater happiness. However, for many years, psychologists have stressed bidirectional effects-in which both happiness and health influence each other in a reciprocal way. Unfortunately, methods to date have struggled to account for stable differences in health and happiness when seeing how they affect each other. In the current study, we used archival data from the National Health and Aging Trends Study, a nationally representative longitudinal study of Medicare beneficiaries aged 65 and older. We found significant changes in both health and happiness and present data on preliminary models designed to tease out causal processes between health and happiness. The results from this study will help clarify how health and happiness are related over time which has implications for future interventions that seek to raise one to improve the other.

REDUCING POLITICAL DIFFERENCES VIA A CLOSENESS-BUILDING ACTIVITY

Presenter: Anna Forest
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3235
Additional Student Presenters: Ria Jain, Ayushi Patel, Abby Roberts, Jessica Skaff
Mentor: William Chopik

Political differences between liberals and conservatives seem to be at an extreme high. As a result, psychologists have taken an interest in finding ways to reduce political tensions, which has many practical, legislative, and social benefits. In the current study, 90 unacquainted pairs took part in the Fast Friends exercise over the course of an hour-an activity thought to build liking and connection between strangers. Results revealed emotional and social benefits for people across the political spectrum, signaling a promising avenue for future policy work to bridge connections between disparate groups. We present the preliminary results from this project and detail future directions in the study of mitigating political animosity.

CHANGES IN RETROSPECTIVE CHILDHOOD MEMORIES IN OLDER ADULTHOOD

Presenter: Julia Maahs
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3236
Additional Student Presenters: Hannah Hua, Sneha Challa
Mentor: William Chopik

Everyone experiences childhood and some may hold nostalgia for their memories, but did you know that they hold secrets about us? Prior research has found that an individual's ability to develop their own demographic identities (gender, race, wealth, etc.) is based on their ability to reminisce on childhood memories (Glück & Bluck, 2007). However, there is a gap in research between demographics and their relations to autobiographical memories. Therefore, the current study (N=2,692) examines how people's demographics affect changes in their autobiographical memories about their parents. It was found that people of color had more positive memories about their fathers. Conversely, women, people who were highly educated, and were younger had a decrease in positive memories over time. With these results, we can deduce that certain environmental factors could affect someone's reaction to their memories based on their demographic identities. Furthermore, these results could then be beneficial for those in therapy to better understand those with varying demographic identities and their relation to childhood memories. Future research could be done to determine if there is a possible correlation between childhood memories and romantic relationships that could pre-determine one's attachment style later in life.

STORIES IMAGINED WHEN LISTENING TO MUSIC AFFECTS PERCEIVED DURATION

Presenter: Jewelian Fairchild
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3237
Additional Student Presenters: Sandy Lin, Meghana Gogineni, Zahra Ahmad
Mentor: J Devin McAuley

A recent study shows that individuals within cultures tend to imagine similar stories when listening to instrumental music (Margulis et al., 2022). Limited work has explored the effect these narratives have on the perceived duration of a musical excerpt. This study explores how narrative engagement influences an individual's perceived duration of an excerpt. One possibility is that people get lost in the music and the estimated duration shortens. Another possibility is that duration is connected to narrative happenings. More imagined events result in a longer perceived duration. We examined this relationship prospectively (experiment one) and retrospectively (experiment two). In the prospective experiment, participants listened to musical excerpts and estimated their duration. They then rated their narrative engagement and judged whether they imagined a story. In a second session, participants listened to the same excerpts and made continuous judgments of musical tension. In the retrospective experiment, participants were unaware that they would be estimating the music's duration. Participants

performed the same task of judging narrativity and estimating duration. In experiment one, duration estimates correlated positively with musical tension but not with narrative engagement. In the retrospective experiment, duration estimates were positively correlated with narrative engagement, but were not associated with musical tension. In the context of music, results from both experiments are consistent with the Arousal Clock Speed hypothesis (increases in arousal lengthen time estimates by speeding the internal clock) and the Ornstein Storage Size hypothesis (individuals tend to associate complex sequences of music with longer durations when judged retrospectively).

THE ROLE OF NEIGHBORHOOD DISADVANTAGE AND DEVIANT PEER AFFILIATION IN THE DEVELOPMENT OF ANTISOCIAL BEHAVIOR

Presenter: Leya Chambo
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3238
Additional Student Presenters: Nithya Gogineni
Mentor: Alex Burt

Studies of neighborhood context have consistently found that individuals from disadvantaged neighborhoods have poorer mental and behavioral health outcomes than their counterparts in wealthier neighborhoods. Peer influence has also been identified as an important predictor of mental and behavioral health, particularly during adolescence. For example, adolescents who live in disadvantaged neighborhoods and/or affiliate with deviant peers are at greater risk of engaging in physically aggressive and rule-breaking behaviors. Despite these findings, few studies have examined neighborhood and peer influences simultaneously. It is thus unclear whether, for example, affiliation with deviant peers predicts antisocial behavior even when accounting for the effects of neighborhood disadvantage. The purpose of our study was to address this gap in the literature by jointly examining neighborhood disadvantage and deviant peer affiliation as predictors of antisocial behavior in a population-based twin sample (N = 706). Participants were drawn from the Michigan State University Twin Registry (mean age = 14.6 years, 49% female). Neighborhood disadvantage was assessed using a composite measure of Census-tract disadvantage. Parents reported on the twins' affiliation with deviant peers, and the twins reported on their own antisocial behavior. Multilevel regression analyses were conducted to evaluate the role of both risk factors in relation to one another. Based on previous studies, both neighborhood disadvantage and deviant peer affiliation were hypothesized to predict antisocial behavior during adolescence.

SOCIAL MEDIA AS A SOAPBOX: ARE WE CONVINCED BY PERFORMATIVE ALLYSHIP ONLINE?

Presenter: Isabelle McKinney
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3241
Mentor: Ann Ryan

Allyship is important to advancing equity and inclusion in society, but sometimes acts of intended allyship can be viewed as less sincere or performative. There is little research on what constitutes performative allyship, its prevalence, or why it occurs. The purpose of this research study is to understand views of the performative nature of people's posts on social media. We surveyed undergraduate students as to their views of others' posts on social media regarding marginalization, discrimination, and inequities, and what they thought motivated the posting. This work will help contribute to the definition of performative allyship, as well as future work surrounding acts of performative allyship within the workplace context.

MEASURING COGNITIVE DISSONANCE FOLLOWING CLIMATE CHANGE- A COMPARATIVE MODEL IN DIFFERING WORLDS

Presenter: Savvy Barnes
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3242
Mentor: Susan Ravizza, Kristen Johnson

Climate change poses a severe threat to the environment and humanity. The threat of climate change, and subsequent challenges, are imbalanced between developed and developing nations as developing nations have less resources to make an effective response. Furthermore, developed nations have the resources and finances to afford buying and partaking in actions that more negatively affect the environment. Recent research focuses on effects in Westernized countries and lacks analysis on the psychological effects of these challenges. By analyzing Twitter data from the Midwestern United States and Kerala, India, this study compares tweeting habits and the avoidance of climate change topics prior to and following a similar extreme weather event (substantial rainfall not-otherwise-caused by natural disaster). This study hopes to address key differences between climate change viewpoints from developed and developing nations, and to provide a new measurement of cognitive dissonance through topic-avoidance. We hypothesize that developed nations will experience heightened symptoms of cognitive dissonance after witnessing an extreme weather event due to a higher sense of safety through education, resources, food security, etc. Additionally, we predict that the developed nation will tweet less about the event and climate change related topics to avoid conflicting emotions.

THE INVESTMENT MODEL IN ASEXUAL RELATIONSHIPS: THE MODERATING ROLE OF ATTACHMENT ORIENTATION

Presenter: Hayden Connor-Kuntz
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3243
Additional Student Presenters: Sanaye Lewis, Sania Sinha
Mentor: William Chopik

How do investment model characteristics and attachment orientations predict relationship commitment among asexual individuals? Our study looked at a sample of 485 self-identified asexual individuals currently in a romantic relationship. Individuals reported on their satisfaction, investment, alternatives, commitment, and their attachment orientations.

Satisfaction, investment, and fewer alternatives were associated with greater commitment. Attachment orientations only occasionally moderated the results: for people low in anxiety, satisfaction and investment were more strongly related to commitment compared to people high in anxiety. The current study provided an extension of the Investment Model to describe romantic relationships among asexual individuals.

EDUCATIONAL IMPACT OF COVID-19

Presenter: Emma LaBarre
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3244
Mentor: Catherine Durbin

As a result of the COVID-19 pandemic, remote learning has become a routine experience for millions of children and young adults. Given that remote or virtual learning is a new learning experience for most people, it is important that more research is carried out on the effects it has on different students' success. Such analyses are important for enacting education policies and knowing how to tailor online education, where necessary, to the needs of different kinds of learners. Research has already shown that a student's personality influences learning approaches and outcomes, and therefore information on personality's effects is relevant to decisions about virtual classes. The Big Five personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism) have been studied in regard to learning in classrooms, but as there has just recently been a massive increase in the number of students using virtual learning, more research is urgently needed. This research project was conducted by analyzing data regarding the Big Five personality traits and education. The data analyzed in this research came from surveys conducted multiple times over the course of the COVID-19 pandemic by psychologists at the University of Michigan. The questions from these surveys that relate to personality and online learning were selected and the corresponding data were analyzed.

SIMILARITY IN PERSONALITY FACETS IS ASSOCIATED WITH LIFE AND RELATIONSHIP SATISFACTION

Presenter: Ethan Wright
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3245
Additional Student Presenters: Sophia Ryan
Mentor: William Chopik

Similarity in personality traits is one of the predictors of interpersonal attraction. However, research has shown that personality similarity has a negligible influence on the life and relationship satisfaction of couples. A possible limitation of past research is the use of broad-level personality traits (i.e., the Big Five). The current study examined facet-level indicators of each of the Big Five personality traits to see if similarity on facet characteristics might better predict attraction. This study surveyed a sample of 1,366 romantic couples, including multiple races and same-sex couples. In a sample of 1,366 (M = 29.64 years together; Mage = 57.72,

SD = 15.84), individual and partner personality traits (both at the broad and facet level) were more associated with life and relationship satisfaction than similarity on these traits. Among the small similarity effects, similarity on positively valenced traits and dissimilarity on negatively valenced traits were associated with greater life/relationship satisfaction. The study enhances our understanding of the significance of facets of personality traits on the life and relationship satisfaction of couples.

IMPROVING TARGET DETECTION IN LOW PREVALENCE SEARCH TASKS WITH MULTIPLE TARGETS

Presenter: Amanda Hawkins
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3246
Additional Student Presenters: Derrek Montalvo, Merna Yaldo, Matthew Taylor
Mentor: Mark Becker

When targets are rare in visual search tasks they are often missed - the Low Prevalence Effect. This finding has implications for real-world search tasks including TSA baggage screening and radiology. We previously demonstrated that an intervention that distributed a set of target-present "probe" trials (with feedback) throughout the task improved low-prevalence target detection. However, that work used a single target, and the "probe" target was identical to it, an unrealistic situation for real-world tasks. We extend that work by asking participants to search for either of two targets (a T or O among displays of Ls and Qs) and vary the likelihood of the probe-target matching one target or the other. A control block (150 trials) measured target detection rates when both targets had a 10% prevalence rate. An experimental block (200 trials) consisted of "real" trials that were the same as the trials in the control block and had an additional 50 probe trials scattered throughout. In 80% of the probe trials the targets matched one target, with it matching the other target in 20% of trials. Target detection rates significantly increased in the probe block for both targets, and the magnitude of the benefit did not differ between frequently or rarely probed targets. Currently, we are collecting eye- movement data to determine the search mechanisms responsible for this probe benefit and are investigating how far the effect generalizes (e.g., will it generalize to a target that is never probed). Findings may help improve important real-world search accuracy.

EXAMINING THE SOCIAL-COMMUNICATION OUTCOMES FOR MEDICAID ENROLLED CHILDREN WITH AUTISM SPECTRUM DISORDER PARTAKING IN PARENT-MEDIATED INTERVENTION

Presenter: Jessie Greatorex
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3247
Mentor: Brooke Ingersoll

Parent-mediated intervention, in which a provider teaches a parent or caregiver how to use intervention strategies to improve their child's skills (e.g., how to increase communication skills), is an evidence-based practice that is recommended for young children diagnosed with

Autism Spectrum Disorder (ASD). Although parent-mediated intervention is considered best practice in treatment of children with ASD, it is rarely implemented in the community mental health system. This study aims to determine to what extent social communication outcomes are improved for children participating in Project ImPACT, an empirically-supported, manualized parent-mediated intervention for children with ASD. Participants include a) approximately 25 providers across seven ABA agencies that contract with the Michigan Medicaid Autism Benefit and b) approximately 25 caregivers of Medicaid-enrolled children on the autism spectrum. Providers are participating in a coinciding study examining best consultation methods to help them use Project ImPACT with caregivers in weekly telehealth intervention sessions. Social Communication outcomes will be assessed using caregiver responses on the Autism Impact Measure (AIM), a validated parent-report measure of child social communication skills completed online over five time periods throughout the course of the intervention. Growth curves using multi-level modeling will be calculated for each child enrolled in this trial. We anticipate that child social communication outcomes will improve over time and that there will be larger growth in the children whose providers deliver the intervention at higher fidelity. Overall, this study will help us identify the effectiveness of ASD parent-mediated interventions for families of lower-income backgrounds.

PURI 2022 - Coping, Resilience, and Sense of Belonging During the COVID-19 Pandemic

Presenter: Gabe Schafer
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3248
Mentor: Kaston Anderson-Carpenter

This research project will investigate the relationships between psychological sense of community, coping and resilience, and depression severity among adults during COVID-19. Data for the study were collected from July-August 2020 from 2,509 adults in the United States, Italy, Spain, Saudi Arabia, and India. The study's main variables of interest are sense of community (Brief Sense of Community Scale), coping and resilience (Brief Resilient Coping Scale), and depression severity (Patient Health Questionnaire-9). The study will be informed by a social determinants of health framework, which shifts the focus on health disparities from the individual toward the structural factors that influence those disparities. Guided by the framework, the student applicant will include key social determinants of health in the analysis and interpretation of data such as urbanicity, education, employment status, and racial/ethnic identity. The final research product will be a scientific manuscript that has been submitted to a journal for peer review, along with the accompanying email communication confirming the submission. This project will commence Fall 2021 and end Spring 2022, with the final product submitted on or before April 22, 2022.

PERSONALITY PREDICTORS OF STARTING A NEW RELATIONSHIP DURING THE COVID-19 PANDEMIC

Presenter: Daniel Litman
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3251
Additional Student Presenters: Megan Shuck, Alexandra Stapleton
Mentor: William Chopik

Dramatic social changes brought about by the COVID-19 pandemic shifted the dating scene and the likelihood of people starting new relationships. What factors make individuals more or less likely to start a new relationship during this period? From October 2020 to April 2021, 2,285 college students (Mage = 19.36, SD = 1.44; 69.2% women; 66.7% White) were given a survey measuring their personality traits and whether they started a new relationship. Anxiously attached and extraverted people were 10-26% more likely to start a new relationship. These findings are consistent with anxious people's desire for romantic closeness and extraverts' desire to be social and seek out interactions with people. Avoidantly attached and conscientious people were 15-17% less likely to start a new relationship. These findings are consistent with avoidant people's dislike of intimacy and conscientious people's risk-avoidance. How people pursued (or avoided) new romantic relationships closely mirrored their broader patterns of health and interpersonal behavior during the global pandemic.

ANALYZING THE MEASUREMENT OF AWE

Presenter: Megan Denehy
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3252
Additional Student Presenters: Alli Harkenrider, Alisar Alabdullah, Sam Barans
Mentor: Richard Lucas

Awe is an emotional response characterized by feelings of self-diminishment, connectedness with the surrounding world, unexplained physical sensations, and an altered perception of time and space (Yaden et al., 2018). Awe has been repeatedly defined as consisting of two main components: being prompted by a stimulus which is vast in nature and a need for accommodation (Keltner & Haidt, 2003). However, controversies over the measurement of awe make it difficult to clearly interpret existing studies. Many studies fail to distinguish between negative awe, characterized by feelings of fear and insignificance, and positive awe, characterized by feelings of wonder and joy (Gordon et al., 2017). Thus, it is unknown how much the valence of awe is important for understanding how the emotional experience relates to other psychological variables. The present study evaluates five commonly used measurements of awe to assess their validity and relations with theoretically-relevant variables (Krenzer et al.; Piff et al.2015; Shiota et al., 2006; Shiota et al., 2007; Yaden et al., 2018). Participants will begin with answering personality measures. Following this, participants will be instructed to recall and describe an experience of awe and the feelings it evoked then will respond to the five awe measurements as well as a comprehensive measurement of emotion. Resulting data will be subject to statistical analyses to evaluate reliability and validity. These

findings will contribute to the establishment of a consensus measurement of awe to allow for the integration of findings across future studies.

EXAMINING ADMINISTRATIVE AND LOGISTICAL BARRIERS IN IMPLEMENTATION OF TELEHEALTH ABA THERAPY

Presenter: Teresa Girard
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3253
Mentor: Anamiguel Pomales Ramos, Brooke Ingersoll

Following the COVID-19 pandemic, healthcare providers turned to telehealth to continue offering services. By examining barriers in administrative aspects of ABA services, we can identify gaps and support the implementation of telehealth services. Board-certified behavior analysts (N = 359) recruited through the Behavior Analyst Certification board email list completed a survey about their experiences with delivering ABA services over telehealth. Participants reported on acceptability (Acceptability of Intervention measure) and identified a list of administrative and logistical barriers (5-point Likert scale). Descriptive statistics were used to identify barriers and a hierarchical regression examined barriers as predictors for Telehealth acceptability. Clinicians frequently reported difficulties providing families materials (55.4%), transitioning clients to telehealth services (64.2%), telehealth include client access to technology (e.g., computer, smartphone) (45.7%), access to research or empirical evidence about the use of telehealth services for a particular practice or need (40.4%), session productivity (42.2%) and building rapport (41.8%). Telehealth acceptability was significantly predicted by clinician and client access to internet, access to materials, session productivity, and license portability (Table 1). These findings inform on administrative and logistical barriers clinicians experienced when using telehealth to implementing ABA with autistic clients and families. Facilitating access to online therapy materials, research on evidence-based telehealth practices, and technology can enhance the implementation of telehealth services. Additionally, findings highlighted factors that influence telehealth acceptability, which previous research has shown to influence service uptake (Wade, Eliott & Hiller, 2014). These factors can inform on clinic practices and policy changes to support the implementation of telehealth services.

CONTRIBUTION OF LIP READING TO SPEECH RECOGNITION IN COMPLEX LISTENING CONDITIONS

Presenter: Anusha Mamidipaka
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3254
Mentor: J Devin McAuley

Individuals frequently encounter speech in complex listening conditions, such as talking on the phone along a busy street with different competing background sounds. With the COVID-19 pandemic, complex listening environments have increasingly included 'glitchy' Zoom meetings

where participants sometimes have their audio inadvertently muted or unmuted and their video feed either on or off. This study examines individuals' use of visual speech information (i.e., lip reading) in speech recognition in 'Zoom-like' listening environments. In these experiments, individuals listened to one of four speakers produce five-word sentences of the form [Name, Verb, Number, Adjective, Noun] embedded in background noise and reported what they heard at different levels of noise. Experiment 1 compared speech recognition for an auditory-only condition, where speech was accompanied by a static image of the talker, to two conditions. In the first condition, the audio was paired with a video of the same talker producing the same target sentence. In the second condition, the audio was paired with the video of the same talker producing a different target sentence. Experiment 2 examined the role of visual speech information by maintaining an intact auditory rhythm and systematically disrupting the visual speech by temporally compressing and expanding the videos. Experiment 3 disrupted the auditory rhythm while maintaining a regular visual speech rhythm. Results reveal a large benefit of visual speech information to speech recognition, especially for more difficult listening conditions. In addition, the benefit of visual speech information is significantly reduced when the visual speech rhythm is disrupted.

ASSOCIATIONS BETWEEN PUBERTAL TIMING AND DEPRESSIVE SYMPTOMS IN GIRLS WHO IDENTIFY AS WHITE, BLACK/AFRICAN AMERICAN, HISPANIC/LATINX, AND MULTIRACIAL

Presenter: Emily Sokol
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3255
Mentor: Carolina Anaya, Kelly Klump

Early pubertal timing significantly predicts depressive symptoms in white adolescent girls; however, very few studies have examined these associations in participants who identify as other races/ethnicities. Some data suggest individuals from marginalized racial/ethnic groups experience puberty at an early age. Thus, if early pubertal timing predicts depressive symptoms in these groups, these individuals could be at an even higher risk for depression. This cross-sectional study examined associations between pubertal timing and depressive symptoms in pre-adolescent and adolescent girls who identified as white (n = 805), Black/African American (n = 78), Hispanic/Latinx (n = 38), or Multiracial (n = 70). Participants were ages 8-16 (M = 11.75, SD = 2.03). Pubertal timing was calculated by standardizing total scores on Pubertal Developmental Scale within age. Depressive symptoms were measured using youth report on the Children's Depression Inventory. As expected, pubertal timing was significantly associated with depressive symptoms in the white adolescent girls, such that early pubertal timing was associated with more depressive symptoms. Early pubertal timing was also significantly associated with depressive symptoms in Multiracial girls. Interestingly, 94% of these participants identified as white and some other racial identity. By contrast, no significant pubertal timing/depressive symptom associations were observed in girls identifying as Black/African American or Hispanic/Latinx. Early pubertal timing may only be significantly associated with depressive symptoms in girls who identify as white, including Multiracial girls. Future research is needed to replicate our results and identify specific factors that account for differences in pubertal timing/depression associations across different races/ethnicities.

PARENTAL COPING STRATEGIES VARIED BY THEIR PERCEIVED STRESS LEVEL DURING COVID-19 PANDEMIC

Presenter: John Sobah
Category: Psychology
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3256
Additional Student Presenters: Saif Juma
Mentor: Jiying Ling, Sisi Chen, Teresa Ng

High level of persistent stress and maladaptive coping strategies are related to poor health outcomes such as developing anxiety, depression, insomnia, and hypertension. The COVID-19 pandemic has dramatically elevated the stress level among parents with young children. To identify effective coping strategies used to cope with stress during the COVID-19 pandemic among low-income families, this study analyzed baseline data from 106 low-income Head Start parents (mean age=29.80, SD=5.62) who participated in two health promotion programs. Parents completed a demographic survey, the 10-item Perceived Stress Scale, and the Brief-COPE to measure their demographics, perceived stress, and coping strategies via Qualtrics. Pearson correlation and one-way ANOVA analyses were performed using SPSS Statistics 26. The study sample included 28.4% Black, 10.1% Hispanic, 46.8% single, and 45.9% unemployed. Nearly 60% received high school education or lower. Among the 106 parents, 29.2%, 55.6%, and 15% reported low, moderate, or high levels of stress, respectively. Overall, parents' perceived stress levels were positively related to their problem-focused (r=.30), emotional- focused (r=.53), and avoidant coping strategies (r=.69). Parents with perceived low or moderate stress levels frequently applied adaptive coping strategies for stress including active coping, planning, positive framing, and acceptance. In contrast, those with perceived high levels of stress were more likely to use maladaptive coping strategies such as self-blame and self-distraction. Results from this study indicate the importance of employing adaptive coping strategies to address high parental stress. Additionally, problem-focused coping should be recommended for low-income parents to handle stress during a global pandemic.

RESILIENT COPING, POSTTRAUMATIC STRESS, AND OPIOID USE DURING COVID-19 LOCKDOWN: A MODERATED MEDIATION STUDY.

Presenter: Stephen Beegle
Category: Psychology
Time Slot: 12:15 PM
Room Location: Meeting Room A
Number: 3257
Mentor: Kaston Anderson-Carpenter

This research project aims to investigate differential risk and protective factors of psychological distress on adults in five countries during the COVID-19 pandemic. Data for the study were collected from July-August 2020 from 2,482 adults in the United States, Italy, Spain, Saudi Arabia, and India. This study will specifically examine differential exposures of posttraumatic stress (Impact of Event Scale-6) and past 90-day prescription opioid misuse (Alcohol, Smoking, and Substance Involvement Screening Test) from an intersectional epistemology.

PSYCHOLOGY
Oral Presentations

SPORT STAKEHOLDER PERSPECTIVES ON THE FUTURE OF YOUTH SPORT: REFLECTIONS DURING THE COVID-19 PANDEMIC

Presenter: Richard Yan
Category: Psychology
Time Slot: 11:45 AM
Room Location: Meeting Room A
Number: 3261
Additional Student Presenters: Yusun Song
Mentor: Alysha Matthews, Meredith Wekesser

The COVID-19 pandemic and the onset of social distancing measures in 2020 prompted the pause of many youth sport programs across the country and abroad. This momentary cessation served as an optimal period of reflection for many youth sport stakeholders (i.e., administrators, coaches, and parents). The current study is a qualitative follow-up to a previous mixed methods study across stakeholder groups, focusing on the perception of parents. The purpose of this study is to gain an understanding of parental perspectives of the impact that youth sport organizations have on youth, including the benefits and drawbacks of the youth sport context and what changes parents would like to see upon the return of youth sport. This study implemented a qualitative approach by conducting semi-structured interviews with 20 youth sport parents who had a child/children involved in a sport program. Interviews were transcribed verbatim and inductively coded. Through an iterative process and use of critical friends, research team members inductively created meaning units which were discussed as a team before grouping into codes and themes. Preliminary analysis shows that parents feel youth sport organizations should prioritize youth enjoyment and creation of a holistic experience rather than solely focusing on elite performance and competition. Parents also felt that parental pressures and expectations placed on these programs may have contributed to the current hyper-competitive culture in youth sports. Results suggest that parents should prioritize youth enjoyment and experience by advocating for the interests of their children to all stakeholders of the youth sport system.

TIGER PARENTING AND ITS EFFECTS ON THE MENTAL HEALTH OF CHILDREN RAISED IN THAT PARENTING STYLE

Presenter: Caitlin Patton
Category: Psychology
Time Slot: 12:00 PM
Room Location: Meeting Room A
Number: 3262
Mentor: John Waller

Mental health and mental illnesses are some of the most talked about topics today. The stigmas around them are lessening and it is more important now than ever to figure out where the roots of anxiety, depression, etc. come from. That is why I decided to do my research on childhood mental health and how it is affected by how parents decide to raise their child. Specifically, I

chose to look at tiger parenting. While it was famously brought into the spotlight by Amy Chua, the general public does not have much familiarity with tiger parenting. It is a parenting style characterized by not having a warm or loving relationship with their children. Slight praise is given with achievements, but a high achieving child is expected. With practically no down time, children are constantly involved in extra-curriculars that they are expected to excel in. Most grow up to be successful adults, but at what cost? Rather than gathering my own data through surveys or interviews, I decided to do a literary review. To do so, I extensively looked through multiple databases to find relevant and recent research related to my topic. From there, I assessed what gaps there were in what was researched, and I drew conclusions from the data.

A GAMBLE OF LIFE AND DEATH: AMBIGUITY AVERSION, RISK PREFERENCES, AND PARENTAL INFLUENZA VACCINATION DECISIONS IN RURAL AMERICA

Presenter: Gregory Marchal
Category: Psychology
Time Slot: 12:15 PM
Room Location: Meeting Room A
Number: 3263
Mentor: Antonio Doblas-Madrid

Vaccine hesitancy has contributed to rural communities having lower vaccination rates than their urban counterparts, leading to outbreaks of vaccine preventable diseases like influenza that burden healthcare systems and cause hospitalizations and deaths. Previous research has generally linked vaccine hesitancy with risk and ambiguity aversion surrounding false beliefs about the safety and efficacy of vaccines, but there is little literature focusing on rural communities. In this paper, we conducted a lab-in-field experiment studying the role that risk and ambiguity aversion plays in vaccination decisions among parents with children under age five in rural Wyoming. We estimate constant relative risk aversion coefficients using each subject's preferred gamble from six gambles with real monetary payoffs. Parents also reported in a survey their perceived uncertainty of the risks in both catching a contagious disease and getting vaccinated. We find that the relationship between ambiguity aversion and vaccine hesitancy is much stronger than risk aversion. Parents who perceive greater uncertainty in the risks of vaccines relative to the risks of diseases tend to vaccinate their children for the flu at lower rates. This relationship exists after controlling for trust in the healthcare system, suggesting that policies addressing vaccine hesitancy could benefit from addressing the perceived ambiguity in the vaccination decision independent of healthcare trust.

UNDERSTANDING THE ROLE OF WELLBEING WHEN ASSESSING SUSTAINABILITY IN AGRICULTURAL SYSTEMS

Presenter: Sarah Hubbard
Category: Psychology
Time Slot: 12:30 PM
Room Location: Meeting Room A
Number: 3264
Mentor: Jennifer Hodbod

While awareness of environmental impacts from agriculture is increasing, it is essential that management recommendations undertake a systems thinking approach and also consider social implications. Agricultural systems are social-ecological systems, which means

sustainable systems must support social wellbeing as well as ecological wellbeing. There are already established sustainability indicators for the ecological and economic components, but the social component does not have the same quantifiable properties or an agreed set of indicators. Because of this, there is a lack of social wellbeing research in the field of agricultural sustainability. My project addresses this knowledge gap. As wellbeing is studied in a variety of fields, I have completed a systematic literature review of recent peer-reviewed publications concerning social wellbeing and wellbeing indicators. The literature has been pulled from multiple fields including international development, social psychology, and rural sociology to ensure the review is comprehensive. We found eight major wellbeing ideologies: Relational, Hedonic, Eudemonic, Material, Non-Material, Subjective, Objective, and Psychological. From these, we have designed a conceptual framework that synthesizes these wellbeing concepts. The integrated framing is theoretically innovative but also practical, providing a structure for measuring wellbeing. If we understand sustainability as supporting wellbeing over time, repeated data collection using this framing creates an improved understanding of social wellbeing indicators and allows sustainability professionals to target potential vulnerabilities more accurately, leading to the development of more sustainable and resilient systems. I conclude by describing one such application, where this framework is informing an ongoing resilience assessment in Michigan beef grazing systems.

SOCIAL SCIENCE: GENERAL
Poster Presentations

PANDEMIC DEVELOPMENT: THE POWER OF SHARED EXPERIENCES

Presenter: Alissa Hakim
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3301
Additional Student Presenters: Eryn Savage, Kim Guerra
Mentor: Tama Hamilton Wray, Sitara Thobani

This project aims to observe the importance of shared experiences in community building within the RCAH Sister Circle mentoring program. The Sister Circle aims to support undergraduate women of color at Michigan State University, specifically those in the Residential College of Arts and Humanities. The Sister Circle attempts to do this by tending to academic, personal, and professional needs through various kinds of programming. It is essential to create a sense of community within this organization in order to provide a safe space for Sister Circle participants. As academia transitions back to in-person, student organizations must rebuild potentially lost connections whilst forming new ones to build a community. This project expands on themes brought up in our previous research in which participants explained that they felt safe, supported, and valued within the RCAH Sister Circle. To conduct this research, participants of the RCAH Sister Circle will work together to create a mural, each creating an illustration that represents their sense of identity and putting it in a greater piece of art. This will be followed by a discussion of their experiences within the RCAH Sister Circle and the process of creating this art. This project could answer questions regarding the importance of shared experiences, their role in community building, and the effect it has on participation.

UNDERSTANDING THE IMPACT OF THE DREW SCIENCE SCHOLARS PROGRAM

Presenter: Hady Omar
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3302
Mentor: Vashti Sawtelle, Rachel Henderson

Nationally, there have been a number of programs that are designed to better support students from historically underrepresented racial and ethnic communities and economically disadvantaged students. Yet the underrepresentation continues. Education researchers have turned to ask questions about which programs work, why they work, and who they best work for. The Charles Drew Science Scholars is one such program. The Drew program produces results and my research is supporting the documentation of these results. With an increased GPA, graduation rate, academic success, the Drew program is doing something right. Drew scholars have a higher underrepresented minority (URM) population entering the program compared to the College of Natural Science in which the program is housed. Yet, URM Drew scholars have a graduation rate of ~80% compared to ~60% of URM students in the broader college. In this presentation, I will outline the core elements of the Drew Scholars program and describe the outcomes on student success, particularly for students from historically underrepresented communities. I will outline implications from this work for future work to support STEM students.

WHAT DOES MSU MEAN ABOUT DIVERSITY?

Presenter: Yolanda Gonzalez
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3303
Mentor: Eddie Boucher

Four wild diploid strawberry species hybridized (combined) to form the octoploid strawberry (Fragaria x ananassa) approximately one million years ago. We previously conducted a phylogenetic analysis that identified two previously unknown diploid progenitor species, F. viridis and F. nipponica, in addition to F. vesca and F. iinumae. Here we describe our course research project aimed to construct chromosome-scale genome assemblies of these two newly uncovered species.

MATTERS OF FACT: A PROMISING DIRECTION FOR COUNTER-PARTISAN MEDIA

Presenter: Ren Mueller
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3304
Mentor: Marty Jordan

Matters of Fact is a student organization at MSU that brings together politically diverse voices to conduct research and publish digestible articles for public consumption. It also features a peer review system to ensure factuality and logical rigor.

AGENCY, SUPPORT, AND EMPOWERMENT OF SORORITY WOMEN IN RESPONSE TO SEXUAL VIOLENCE

Presenter: Megan Lambrecht
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3305
Mentor: Niki Rudolph

While there has been in depth research addressing sexual violence education, the dynamics of fraternities, toxic masculinity, and suggestions for prevention in greek organizations, literary research surrounding the role of agency and empowerment within sororities are deficient. As an at-risk population for sexual violence within the greek life system, this research will address the education, prevention, and support services practiced by sororities affiliated with Michigan State University. Through student interviews about current practices and policies, I seek to provide a timely response to address the policies surrounding sexual violence within the greek life system and the agency of sorority women.

KNOWING BETTER DOESN'T MEAN DOING BETTER: A CONTENT ANALYSIS OF DEI STATEMENTS FROM BIG 10 SOCIOLOGY DEPARTMENTS

Presenter: Jenny Olivarez
Category: Social Science: General
Time Slot: 1:00 - 2:30 PM
Room Location: Arena
Number: 3306
Mentor: Stephanie Nawyn

Calls for an authentic implementation of "diversity, equity, and inclusion" (DEI) have spurred action from academic institutions across the nation in the past decade. As a result, we saw DEI statements arise from a breadth of organizations inside academic institutions, including individual departments and programs. While scholars have found that mission statements in higher education can have tangible benefits and lead to action, others have found that there can be a disconnect between the intent and the reality within their organizations. In this paper, the research team I am on will use a critical race theory lens to highlight the centrality of race and racism within institutions of higher education while emphasizing that departments of sociology are not exempt from perpetuating a racist reality. Sociology is of special interest given the discipline's focus on the conditions and processes that uphold social injustices and inequalities. After obtaining a full list of the fourteen Sociology departments in the Big Ten Academic Alliance, we collected thirteen DEI statements published on department websites in 2020. This spring, my team will conduct a content analysis through objectively and subjectively coding the thirteen DEI statements according to guidelines outlined in Wilson, Meyer, and McNeal (2012). At the conclusion of our analysis, my team and I anticipate presenting this research at the American Sociological Association annual meeting in August 2022.

VACCINE HESITANCY AND CLIMATE DENIALISM

Presenter: David Koster
Category: Social Science: General
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3312
Mentor: Aaron McCright, John Waller

Previous research demonstrates conservatives are more likely than liberals to be skeptical of climate science. Our study uses a cross-national survey to determine if Covid-19 has increased or decreased distrust of climate science among conservatives. This research question is crucially important in crafting policies to address climate change and decrease denial of climate science. It differs from other studies because it seeks to determine causality instead of just overlapping characteristics. Similarities between Covid and climate change denial hint that the pandemic has impacted the view of science by conservatives, but our research seeks to find a statistical relationship.

SOCIAL MEDIA & POLITICS

Presenter: Ryan Weinberg
Category: Social Science: General
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3313
Additional Student Presenters: Sydney Wojczynski
Mentor: John Waller, Heather McCauley

This research project is focused on social media norms and the spread of misinformation within political communities on the platform Instagram. Infographics, popular for their trendy aesthetics and colors, have become a popular source of false or skewed political (mis)information on Instagram. This is a dangerous development given their high accessibility to impressionable people. To study this contemporary social media phenomenon, we have developed a survey to investigate if there is a correlation between the level of acceptance of political information, on the one hand, and age group and partisan identity, on the other. We hypothesize that participants aged 25-34 will be less able to identify misinformation when it is presented in the "social media infographic" format, since this age group dominates Instagram demographics, making them more comfortable and familiar with this format of political information. We also hypothesize (a) that more partisan individuals will be more confident in their assessment of information as true or false and (b) that liberal participants will be especially confident with information in the Instagram "social media infographic" format because this platform is consistent with their desire to affirm their progressive credentials.

PARAEDUCATOR TRAINING IN CHALLENGING BEHAVIOR

Presenter: Madeline Leppek
Category: Social Science: General
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3314
Mentor: Sarah Douglas

Paraeducators are crucial in the development of children with challenging behavior, making it equally important to ensure that they are receiving adequate training to support this population. This study uses a mixed methods approach with a survey, followed by focus groups with the purpose of exploring paraeducators experiences and training related to challenging behavior. The participants that will be involved in both the survey and focus groups are paraeducators, special education teachers and administrators in grades K-12. The survey will be used to understand the demographics and extent of the experience of the participants. The study will then shift into focus groups that ask two questions: how do paraeducators support children with disabilities who engage in challenging behavior and how are paraeducators trained and supervised to address these behaviors.

SOCIAL NORMS AROUND E-CIGARETTE USE ON MSU'S CAMPUS

Presenter: Shweta Adsul
Category: Social Science: General
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3315
Mentor: John Waller, Cara Ludlow

My research project explores the psychological concept of social norms and health risk perceptions surrounding e-cigarette use in MSU graduate and undergraduate students. It is designed to learn about the use of e-cigarettes on MSU's campus: its scale, the norms that surround them, contexts in which people vape, and the level of knowledge about the potential risks entailed. The Centers for Disease Control (CDC) deems the use of e-cigarettes to be unsafe for children, teens, and young adults. The cartridges contain nicotine and other harmful substances that are not only addictive but also potentially harm adolescent brain development. According to the CDC, young people who smoke e-cigarettes are also more susceptible to smoking cigarettes in the future. According to the MSU's NCHA 2020 report, there has been a significant increase in the number of MSU students who smoke e-cigarettes. In light of this issue and looking at the increasing trends of e-cigarettes among MSU students, I decided to conduct my research on this topic. The two fundamental questions addressed by the study relate to the degree to which perceived descriptive social norms and weak knowledge of health risks are contributing factors to the inclination of many students to vape. In order to address these issues, questions about vaping were added to the university's NCHA ll 2021 survey conducted mainly on COVID-19 by the Health Promotion department, sent to undergraduate and graduate students at MSU.

POWR PROJECT CODING PROJECT

Presenter: Carolyn Lignell
Category: Social Science: General
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3316
Additional Student Presenters: Anna Rousseau
Mentor: Sarah Douglas, Tiantian Sun

Children with complex communication needs (CCN) are those who have developmental disabilities and have limited to no speech. A robust body of research shows that children with

CCN could benefit from the provision of augmentative and alternative communication (AAC) to meet their communication needs. The POWR online training system was designed to help paraeducators learn to use evidence-based interactive intervention strategies to support the communication skills of preschool children with CCN who use AAC systems. We evaluate the intervention effects of paraeducator and corollary change in child participants using an observational coding system. The coding system is a timed event coding system, meaning each code captures the occurrence and length of each target behavior. Examples of codes would be paraeducator modeling, wait times, and child verbal response. To ensure the integrity and reliability of the study result, we served as student researchers and trained to become reliable coders using the DataVyu coding systems to code interactions between paraeducator-child dyads. Student researchers had to complete certain tasks and training to become proficient in the POWR Project coding process. Student researchers were required to reach a 90% proficiency rate in areas of paraeducator communication, child communication, and wait times. Once they accomplished 90% agreement with mentor guidance in training tasks, student researchers could make coding contributions to the POWR Project. This presentation will provide an introduction to the POWR coding system and secondary coding procedures. Implications and future directions will be discussed.

SOCIAL SCIENCE: GENERAL
Oral Presentations

A RECIPE FOR A MORE EQUITABLE RESTAURANT INDUSTRY? THE ROLE OF FEMALE CHEFS IN SHAPING THE WORKPLACE

Presenter: Joanna Myatt
Category: Social Science: General
Time Slot: 8:30 AM
Room Location: Meeting Room C
Number: 3321
Mentor: Maite Tapia Y Van Maldeghem

Less than 7% of restaurants in the United States are led by female chefs. Women of color are particularly underrepresented making up only 3%. These numbers are surprising especially given that women make up about 50% of culinary school graduates (Schwedel 2017). While the home kitchen is often regarded as a female-gendered space, the professional kitchen is characterized by a strong male-dominated workplace. In other words, cooking, traditionally women's work, has become masculinized through professionalization (Cooper 1998). Furthermore, bullying, hot tempers, and incidences of sexual harassment are rampant within the restaurant industry. Throughout this research I ask, what is the effect of female chefs on the workplace practices. Specifically, do female chefs ensure a more equitable workplace? To what extent do female chefs' own intersecting identities, stories, and lived experiences influence the workplace policies, pay, and hiring practices? More broadly, what can we learn from female leadership especially in male-dominated occupations? To respond to these questions, I take on an inductive, qualitative examination of how female chefs shape their workplace. Iconducted in-depth interviews with mainly professional female chefs from all over the United States. In addition, I also interviewed male chefs - to allow for comparative data and as a control group. Throughout this process, I found that workplaces led by women tend to take on a more conscious approach, paying specific attention to equitable workplace culture and practices.

THE IMPACT OF NATIONAL DEI POLICY ON COMPANY DEI STRATEGY DEVELOPMENT AND MANAGERIAL HIERARCHY IN THE HOSPITALITY INDUSTRY

Presenter: Live Cannella
Category: Social Science: General
Time Slot: 9:00 AM
Room Location: Meeting Room C
Number: 3323
Additional Student Presenters: Miquela Ochoa
Mentor: Mi Ran Kim

The current social climate is consistently changing to accommodate more needs and underserved communities. Diversity has become more prevalent in businesses and government decision making. As stated in the Universal Declaration on Cultural Diversity, "cultural diversity is as necessary for humankind as biodiversity is for nature" (United Nations, 1995). The purpose of this study is to explore the significance of DEI policy in the United States on current trends and developments in the hospitality industry. The study objective includes investigating the correlation between government and hospitality and if equitable government policies appear in hospitality diversity strategies. This study examines how governmental influence is impactful on implementing DEI policies in the hospitality industry, why DEI is important to leaders in the hospitality industry, and what goals are hospitality businesses trying to achieve by adapting current policies. The results of this study will be evaluated based on the difference of manager levels with varying influence within their company.

THE ROLE OF TOXIC MASCULINITY, HOMOPHOBIA, AND TRANSPHOBIA IN TRANSGENDER HOMICIDES IN THE UNITED STATES

Presenter: Harnoor Kaur
Category: Social Science: General
Time Slot: 9:15 AM
Room Location: Meeting Room C
Number: 3324
Mentor: Christina DeJong

The Human Rights Campaign (HRC) reported that 53 trans people were murdered in the United States in 2021. Over the last few years, these numbers have only steadily grown, showing no signs of slowing down. While we do know, from the HRC again, that a large majority of trans people murdered are people of color, there are a number of factors beyond race that contribute to these growing numbers. Through this presentation, I examine the role that toxic masculinity, homophobia, and transphobia play in what can now be called an epidemic of transgender murders in the United States. Understanding the roles that these social institutions and concepts play in these murders can help formulate better policy strategies to prevent crimes against transgender people.

LEARNING TO REBUILDING ONE ANOTHER DURING PANDEMIC: IDENTIFYING PROTECTIVE FACTORS AND EMPOWERING LOCAL LATINX YOUTH AND LEADERS

Presenter: Esli Mendoza
Category: Social Science: General
Time Slot: 9:30 AM
Room Location: Meeting Room C
Number: 3325
Additional Student Presenters: Fatima Nunez-Sanchez
Mentor: Estrella Torrez

Through a weekly after school program designed to support current high school students, Undergraduate college students at MSU and leaders within the Lansing community come together to share experiences, mentorship, and inspiration. Through these sessions where we explore through our shared stories as first-gen students, students of Latinx identity, living/attending a PWI, along with being multilingual, we identify what we as individuals from a shared community can share to uplift each other. In this critical time where people are feeling emotionally, socially, and academically exhausted we look toward engaging members of our Latinx community with one another in efforts to rebuild our community.

PEDAGOGICAL PIGS: HOW FARROWING AND FOOD ETHIC CATALYZE TRANSFORMATIONAL LEARNING

Presenter: Ellie Vondette
Category: Social Science: General
Time Slot: 10:15 AM
Room Location: Meeting Room C
Number: 3327
Mentor: Laurie Thorp, Dale Rozeboom

NSC 292 focused on "The Pig Project", an MSU Hub Studio Course grounded in experimentation with transformational learning. This project included 5 faculty members of various disciplines and 20 students from 5 different colleges. The curriculum began with students assisting in farrowing and care of two gestating sows and their eventual litters at the MSU Student Organic Farm. This included not only farrowing, but also vaccination, castration, weaning, and slaughter. Aspects of wicked problems in agriculture, post-domesticity and other real-world issues were embedded into weekly discussions, paired with tangible experience in the pork industry. Our learning outcomes included honing the ability to boundary cross, demonstrating knowledge of systems thinking, gaining animal husbandry skills, and articulating personal food ethic. We experimented with novel assessment techniques including an oral final exam and focused on student needs with a fluid syllabus rather than tyrannic deadlines and midterms. Currently, we are examining qualitative data from multiple sources throughout our semester, including D2L discussion posts, weekly video reflections focused on gravity, ownership, relationship and place, and our final oral exam. These data sets are being utilized for qualitative research and a code book is being created for further outcome and gain. Preliminary analysis of the data indicates that collateral outcomes include development of self-identity, ability to hold paradox, respect for multiple perspectives and communication skills.

ENGLAND'S JEWS BEFORE EXPULSION: DESPOILING A DIASPORA

Presenter: Max Martus
Category: Social Science: General
Time Slot: 10:30 AM
Room Location: Meeting Room C
Number: 3328
Mentor: Emily Tabuteau

In the too-often tragic and tumultuous history of the Jewish people, their time in England is frequently overlooked and unexplored. Most commonly, we know that the Jews arrived in England after the Norman Conquest and were expelled from the realm in 1290. But to leave their story at that would be a grave over-simplification. In pursuing the accounts of what life was like for these semitic settlers and their descendants, a looking glass is opened into a truly unique time in Jewish history. First, the Jews as a collective community belonged to the King himself. The royal sovereign was in theory their owner, protector, and defender. In return for their safety, the assets of the Jews were to be at his constant disposal. But as one may discover, the plundering of their resources by the Crown was continual, while their protected status could be uncertain. In viewing the court rolls of the institution known as the Exchequer of the Jews, a picture develops of a community perpetually under threat of arbitrary imprisonment, extortionate tallages and taxes, corrupt constables and sheriffs, and cruel accusations of coin-clipping. Most startling, though, was the firsthand participation of English kings and queens in these ventures. It was an era of contrasts for the Jewish people; from extreme antisemitic violence to strangely profitable privileges. But in the end, from the Conqueror to the Queen, Jews in medieval England were seen as a renewable resource of economic enrichment for the English Crown.

BEYOND THE PALE: UNDERSTANDING INTERGROUP CONTACT IN NORTHERN IRELAND

Presenter: Macken Keefe
Category: Social Science: General
Time Slot: 10:45 AM
Room Location: Meeting Room C
Number: 3329
Mentor: John Waller, Brendan Mullan

Northern Irish history is a story of two distinct, yet intertwined, groups of people: Catholic-majority Republicans, who have predominately supported a united, free Irish Republic, and Protestant-majority Unionists, who typically support membership in the United Kingdom. For hundreds of years, these groups have been socially, economically, and politically disenchanted, contributing to the formation of anxieties towards each other. Their sentiments came to a head during the Troubles, a 20th century conflict that killed over 3000 people and left thousands more traumatized. Although the 1998 Good Friday Agreement officially ended the Troubles, the relationship between Catholics and Protestants remains fractured. Northern Ireland is still highly segregated along Catholic-Protestant lines, particularly within its largest city, Belfast. This urban segregation is multi-dimensional, but residential and educational separation have remained particularly stable to date. "Intergroup contact" has become an increasing point of focus in peace and justice studies literature. Recent studies have demonstrated the potential for positive contact experiences between members of disenchanted people groups to ease anxiety in post-conflict regions, thereby facilitating reconciliation. This research project applies intergroup

contact theory to understand the causes, conduct, and consequences of group relations in Northern Ireland. It explores the development and present state of intergroup contact research, with an emphasis on contact between racial and ethnic groups. This project then discusses the evolution of the Catholic-Protestant relationship over time, and identifies opportunities for increased contact between these groups in both residential and educational arenas.

EFFECTS OF TYPES OF CHILD CARE ARRANGEMENT AND PARENTING PRACTICES ON CHILDREN'S SOCIAL-EMOTIONAL OUTCOMES.

Presenter: Lucinda Gleespen
Category: Social Science: General
Time Slot: 11:00 AM
Room Location: Meeting Room C
Number: 3330
Mentor: Kyunghee Choi

Asian American children are more likely to report challenging social-emotional development outcomes. They are less likely to present with externalizing behaviors, their internalizing behaviors may go overlooked. The current study examined the predictors for Asian-American children's social-emotional developmental outcomes based on early experiences: early childcare arrangement and parenting practices. Parents can choose various types of early childcare for their children such as parental or non-parental care including formal or informal care which is influential on children's mental health. Second, compared to White American parents, Asian American parents are reported to have different parenting practices. The ways in which parents engage with their children on a daily basis are influential for their development. This study used the longitudinal study of the Early Childhood Longitudinal Study-K: 2011 (n=1,543). Children's socio-emotional scores were self-control, interpersonal skills, externalizing and internalizing problem behaviors, approach to learning, closeness, and conflicts reported by the teacher. Parental expectation, parents teaching and investment in children, and types of childcare arrangements such as Head Start, School-based public and private funded pre-K, informal care, and parental care. Children cared for by informal care have a lower approach to learning and lower child-teacher closeness scores. Children enrolled private-funded care had fewer external problems and lower child-teacher conflict scores. Those who attended school-based care had fewer child-teacher conflict scores. Children of parents who read books and who tell a story, and who play a game with their children frequently had higher child-teacher closeness scores, lower child-teacher conflict, and positive approaches to learning scores.

THE FLOATING CITY: THE HIDDEN HISTORICAL GEOGRAPHY AND FUTURE OF MAKOKO IN NIGERIA

Presenter: Olisa Mbelu
Category: Social Science: General
Time Slot: 11:15 AM
Room Location: Meeting Room C
Number: 3331
Mentor: Guo Chen

There is a rapid increase of slums across Nigeria without any urban development plan in sight. In a country with 196 million people, about 96 million of those live in poverty, which means

nearly 50% of the population are impoverished. The growth of slums and slum housing has sparked my interest to research the Makoko slum in Lagos, Nigeria. Much of the city of Lagos, Africa's most populous city, is a few meters above sea and vulnerable to sea-level rise and floods. This research dives deep into the history, geography, current critical issues Makoko faces, and possible solutions to redress the problems. In the 1960s, Makoko was geographically in an empty Lagos with fewer than 50,000 people in the community. The informal fishing settlement across the 3rd mainland bridge located on the coast of Lagos is now home to over 100000 people and continues to grow dramatically. Statistics show that there is very little information about the structures, density, and streets of Makoko. This lack of geographic documentation makes it challenging to track land ownership, develop infrastructure, optimize services, plan for emergencies, or support development. The government cannot properly allocate resources because Makoko is not on the map. Based on a literature review and visual materials, this presentation will provide a vivid account of the poor living conditions that the poverty-ridden residents of Makoko have to face and their recent struggles against evictions and suggest ways that can help improve the quality of life.

SOCIAL WORK
Poster Presentations

QUALITATIVE ANALYSIS OF THE MENTAL HEALTH LITERACY NEEDS OF RURAL AND MIGRANT YOUTH

Presenter: Tess Bond
Category: Social Work
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3402
Additional Student Presenters: Mireya Chavez-Martinez
Mentor: Kathryn Irish, Erin Kramer

Over the past 10 years, mental health disorders among rural youth (12-17-year-olds) living in the U.S have become more prevalent. Rural youth experience higher suicide rates, higher rates of mental health disorders, and lower rates of mental health literacy in comparison to their metropolitan counterparts. Migrant camps give their families free housing in return for their farmwork. Many migrant youths eventually join their parents, contributing to higher mental health issues due to the pressure of wanting to help their parents and wanting to be better in their education. This is a qualitative study that aims to better understand the needs of rural youth living in the U.S. concerning mental health literacy, with the long-term goal of developing mental health literacy programming tailored to mental health needs of youth living in rural communities. Approximately 20-25 semi-structured interviews will be conducted with students, parents, and public-school faculty living in a rural community in Western Michigan. Over half of the interviews will be with community youth, including youth living in migrant camps. Interviews will be coded via thematic analysis and entered into NVIVO. Themes among students in rural areas, migrant camps, and community adults (staff, faculty, parents) will be identified and used to inform mental health literacy programming for rural and migrant youth. Data analysis began February 2022. Early emerging themes are resilience in rural communities, social media normalizing mental health, and schools acting as the front line for mental health, substance use services, and other basic needs.

MENTAL HEALTH IN SCHOOLS: SHIFTING FROM A DEFICIT TO A STRENGTH- BASED PERSPECTIVE

Presenter: Carson Biederman
Category: Social Work
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3403
Mentor: Joanne Smith-Darden, Jenny Tanis

Social work is rooted in strength-based practices. Throughout my research at the SPARK Lab under Dr. Jo Smith-Darden, however, I have observed that K-12 education often addresses mental health from a deficit perspective. This perspective, as well as already existing negative stigma, may contribute to the reactive way the education system approaches mental health crises as opposed to finding proactive ways to promote student wellbeing. This project will examine how to shift the conversation of mental health in K-12 schools from a deficit perspective to a strength-based perspective. I will look at existing research that relates to this topic; specifically, identifying the outcomes of schools that have approached mental health in a positive way, if schools clearly define the difference between mental health and mental illness, and what current policy says about student mental health care. According to Mental Health America's 2021 report, 51% of 11-17-year-olds reported having thoughts of suicide or self-harm more than half or nearly every day of the previous two weeks. Further, among youth aged 12-17, 13.87% experienced at least one major depressive episode in 2018 and 9.7% of same-aged students live with severe major depression. My overall goal of this project is to uncover the benefits of looking at mental health from a strength-based perspective and encourage helping professionals, especially social workers, to reimagine our role in student mental health.

ADVERSE CHILDHOOD EXPERIENCES AND SUBSTANCE USE FREQUENCY AMONG COLLEGE STUDENTS

Presenter: Madi Boyle
Category: Social Work
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3404
Mentor: Jennifer Allen, Hyunkag Cho

Research has found that people who have experienced adverse childhood experiences (ACEs) are at risk for negative mental and physical health outcomes in adulthood, such as high rates of substance use. In this study, we looked at the relationship between ACEs and substance use frequency among a sample of college students. A cross-sectional survey was administered to college students enrolled in seven universities in the U.S. and Canada in 2016. Adverse childhood experiences were defined to include peer violence, exposure to community violence, childhood abuse and neglect, and exposure to domestic violence. Substance use was measured by frequency of use in the past 12 months. The linear regression model was significant, $R^2 = .049$, $F(15, 4395) = 14.955$, $p < .001$. LGBT people used drugs significantly more often than non-LGBT people ($\beta = .145$, $p = .012$). Those who reported more symptoms of depression used drugs significantly more often than those with fewer symptoms of depression ($\beta = .009$, $p < .001$). Those who ever experienced exposure to community violence ($\beta = .114$, $p = .007$), childhood abuse and neglect ($\beta = .098$, $p = .025$), or exposure to domestic violence (β

= .087, p = .042) reported more frequent drug use. This study sheds light on the underlying causes of substance use, calling attention to addressing those rather than just the substance use itself.

HOME-DELIVERED-MEALS FOR OLDER ADULTS IN MICHIGAN: RESOURCES AND CHALLENGES

Presenter: Marie Huber
Category: Social Work
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3405
Mentor: Paul Freddolino

Home Delivered Meal (HDM) Programs, also known as Meals on Wheels programs, deliver meals to homebound adults 60+ years old, and adults with disabilities, who cannot cook or shop for meals themselves. Nationally, approximately 5,000 providers serve more than 900,000 meals per day. In Michigan, responsibility for delivering meals rests with a network of 16 Area Agencies on Aging (AAAs) covering the whole state. These AAAs oversee 53 local programs delivering the meals using both volunteers and paid staff. The adults that these programs serve can become increasingly lonely. They are often resistant to embracing Information and Communications Technology (ICTs) because of feelings of mistrust. By providing training and access to modern ICTs we hope to help these adults become better connected. To help counter these adults' feelings of skepticism and mistrust of technology, our team is piloting a project with one Meals on Wheels program in a rural Michigan county to utilize the connection that their volunteer drivers already have with these isolated adults. I have been gathering information about HDM programs in Michigan including numbers of meals served, as well as the resources available to support technology instruction for meal recipients. The goal is to identify other HDM programs where the current pilot project can be replicated in larger and more diverse communities. Thus far 24 surveys have been returned (45.2% response), and follow-up phone calls are being conducted. The final report will provide details about HDM programs in Michigan and identify potential partners for replications.

MAKING ENDS MEET: DIFFERENCES IN NEIGHBORHOOD CHILD AND ELDER CARE RESOURCES IN DETROIT'S ETHNIC-RACIAL COMMUNITIES IN THE POST-COVID ERA

Presenter: Emily Cohen
Category: Social Work
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3406
Additional Student Presenters: Ava Fall, Noelle Rager
Mentor: Anna Santiago, Courtney Jones

The COVID-19 pandemic has resulted in unprecedented stressors for families. In Michigan, the pandemic has exacerbated an already overstressed care economy, limiting access to eldercare and childcare, which helps to explain why Michigan's overall workforce has decreased by 136,000 women since early 2020. The COVID-19 pandemic has posed a significant risk to families due to changes in financial stability, isolation, confinement, and increased caregiving

stress. In Detroit, precarious family and employment conditions have pushed families to utilize community resources differently. This study is focused on addressing how uneven neighborhood-based capacities available to residents shape the opportunity structures and family care resources that residents can find and utilize. The study examines how pandemic conditions have affected access to networks that provide family and economic support and how such access varies by race, ethnicity, and national origin. We use data on child and elder care resources from federal, state, and local sources, demographic and employment data from the U.S. census, and news media accounts and organizational reports to profile and map neighborhood socioeconomic conditions and resources in seven Detroit neighborhoods: Southwest Detroit/Springwells, Warrendale/ Warren Avenue, Brightmoor, North Campau/Banglatown, Livernois, the North End, and East Village. Using social and spatial analyses, the presentation will focus on the unequal distribution of child and elder care resources and the identified need for such resources in our target neighborhoods.

VISUAL & PERFORMING ARTS
Poster Presentations

THE SOCIETAL VIEW OF HETEROSEXUAL MEN AND THEATRE IN THE UNITED STATES; A RETROSPECTIVE FROM THE TWENTIETH CENTURY ONWARD

Presenter: Maegan Jankowski
Category: Visual & Performing Arts
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3601
Mentor: Laura MacDonald

My research dives into why it is that heterosexual men should not like theatre by society's standards. Through examining the past history of men and theatre in the twentieth century onward, I look into why there was a cultural shift from men liking theatre to theatre being emasculating to enjoy. Through popular culture references of 'men liking theatre' being a silly quip in many movies and tv shows, my research dives into why there is such a stigma around men liking theatre, when so many predominantly male-viewing audience shows that feature obvious and obscure theatre references.

COSTUME CONSTRUCTION AND IMPACT ON IMMERSIVE PERFORMANCE

Presenter: Kylie Jamrog
Category: Visual & Performing Arts
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3602
Mentor: Alison Dobbins

The costuming of performers defines the quality and audience relationship to the performers in an immersive theatre performance. Core concepts and ideas are subtly woven into the clothing and silhouette, creating a non-verbal way of experiencing the themes of the performance. This

is exemplified by the costumes in BranchOut, an immersive performance happening in the MSU horticulture gardens in early May. This performance focuses on sustainability, matriculture, and the communication methods of trees. To create immersion for the audience members, dancers' costumes will match the colors of the garden, utilize natural fibers, and have flexible fabric. Each performer will have their own color scheme, carefully chosen through the use of moodboards to coordinate with the naturally occurring colors in the garden. Paper made from natural fibers will double as costumes and props: strips of paper provided to the dancers will be transparent to showcase the colors of their costumes. Flexible knit fabric and water shoes will allow for uninhibited movement, enhancing interaction with the audience. Will the audience understand the key themes of the performance through the costumes? In order to analyze these impacts, I plan to both observe audience member's reactions to the performance and ask them their thoughts on how the costumes added to the immersion.

DEAR JACK, DEAR LOUISE: THE INTERMINGLING OF ARTISTRY AND TECHNOLOGY

Presenter: Jordan House
Category: Visual & Performing Arts
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3604
Mentor: Kirk Domer

For Dear Jack, Dead Louise, a play by Ken Ludwig, Jordan House served as the assistant scene designer to Professor of Scene Design Kirk Domer at Michigan State University's Department of Theatre. The show was part of the A.D. Players 2021-2022 Season at the George Theatre and told how Louise Rabiner and Jack Ludwig (the playwright's parents) met and fell in love by letter during World War II. Narratives written for the stage always reflect the human condition and spark an emotional response in audiences. This production embraced assemblage design, gathering images from letters written back and forth between Jack and Louise. Gaining valuable experience by collaborating with a professional team of designers and directors, this assistant design opportunity provided a real-world experience while in residence at a professional theatre company in Houston, Texas. The research revolved primarily around learning and implementing painting techniques to create a variety of faux textures, including tile, multiple wood grains, and metal. Using Rosco Off-Broadway Scenic paints, color theory was employed to match, highlight, shadow, and touch up printed designs on the flown scenery. Professional-quality paint samples and drafting were completed before the residency, becoming valuable additions to a student design portfolio. A Houston Press reviewer stated, "the A.D. Players' production is lovingly detailed… Louise has a makeup table with marquee lights, a dressing screen plastered with posters of '40s shows, and a handsome cathedral radio; Jack's space has a footlocker and desk with a large airplane wing as backdrop."

AUDIENCE MANAGEMENT

Presenter: Mallory Nowiski
Category: Visual & Performing Arts
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3605
Mentor: Alison Dobbins

As a performer steps onto their stage, the entire goal is to make the audience feel something. Whether this is sadness, joy, anger, fear, or something in between the dancer's body is choreographed to tell a story that the audience will never forget. The overarching question is to what extent does the audience feel these emotions and what specifically made them feel this way?

PRISON POETRY

Presenter: Michaela Martin
Category: Visual & Performing Arts
Time Slot: 3:00 - 4:30 PM
Room Location: Arena
Number: 3606
Mentor: Guillermo Delgado

The dehumanization of incarcerated peoples has always been a standard in the United States, both structurally and in societal norms. It is so ingrained in society that the very vernacular used to describe incarcerated individuals is demeaning and devaluing. This research emphasizes the importance of hearing incarcerated voices and their stories, along with the stories of their community members, who are affected by incarceration as well. Through the use of typography choices, graphic design, poetry workshops, zine making, love, care, and compassion this collection of pieces has been curated to show how heart-rending incarceration is, how often it affects our communities, how isolating the dehumanization can be, and how it is the responsibility of community members to rehumanize incarcerated and previously incarcerated individuals starting with the basics.

VISUAL & PERFORMING ARTS
Oral Presentations

FASHION-FORWARD FUNGI: AN EXPLORATION OF GROWTH IN SCIENCE AND TEXTILES

Presenter: Maddy Eischer
Category: Visual & Performing Arts
Time Slot: 9:30 AM
Room Location: Room 26
Number: 3611
Mentor: Theresa Winge

From clothing to transportation to agriculture, textiles are found in every facet of life. The textile and fashion industries are truly interdisciplinary fields incorporating the humanities, social sciences, natural sciences, mathematics, and engineering. The specific crossover between the artistic and scientific has gained increased attention from fashion designers, textile companies, and material engineers as society focuses on sustainability with continued expectations for technological advancement. Our research centers around the integration of chemistry, biology, and engineering into textiles used for the purpose of manufacturing dress (clothing, accessories, etc.). We begin with a review of current scientific journals and design research focusing on both the aesthetic and innovative details. This research discusses unconventional materials in dress (e.g. fashionable biomaterials made from mushrooms), the importance of

biomimicry inspired from the natural world (e.g. bulletproof spider silk), the use of material performance science to enhance existing materials (e.g. antimicrobial and smart textiles), and beneficial applications of these advancements. Textiles are underestimated for their role in fashion (and related products), but they are increasingly being used to advance health and safety, as well as promote sustainability. As consumers, designers, and scientists, it is crucial to understand the current textile advancements to assess their impact not only in the fashion and textile industries, but also in medicine, engineering, and the future of many human products.

COMMUNITY BASED ART EDUCATION: TWO CURRICULUM PROPOSALS AT THE SECONDARY LEVEL

Presenter: Natalie Park
Category: Visual & Performing Arts
Time Slot: 9:45 AM
Room Location: Room 26
Number: 3612
Additional Student Presenters: Emma Stoolmaker
Mentor: Dan Li

Most Pre-service Educators' curriculum development centers themes and activities that can suit any student population. While this is vital to a foundational portfolio of lesson plans for their careers, there has been a recent shift in pedagogy to respond to the lives and experiences of students and their communities. Pre-service teachers should foster skills developing curricula that consider and integrate the communities in which they teach. Community Based Art Education (CBAE) is an approach that "promote[s] contextual learning about local art and culture". Following our research about CBAE, we developed two potential lesson plans responding to specific communities and issues in mid-Michigan. In one lesson, students explore the mutual relationship humans have with the environment, by visiting and learning about the Shiawassee River and the Heritage Park dam in Corunna. Students will create lino-prints to bring awareness to an aspect of the relationship between their community and the Shiawassee River, display their work in a public setting, and discuss their work with members of the community at a public reception. The other focuses on the Lansing Art Gallery's ArtPath initiative. Students will learn about local and state-wide artists involved with the previous installation, take a field trip to ArtPath, and develop group proposals for works to be installed at an ArtPath site. Students will construct collaborative works that represent their shared understandings of community, later participating in a class-wide presentation that includes conversations related to the development and execution of their installations.

THE PERFORMING AUDIENCE

Presenter: Eliezer Amponsah
Category: Visual & Performing Arts
Time Slot: 10:00 AM
Room Location: Room 26
Number: 3613
Mentor: Alison Dobbins

In many instances, across many disciplines, participation is essential to the progression and evolution of teams, and subsequently, works being created. In this presentation, I will describe how I intend to measure audience engagement and participation using an upcoming performance orchestrated by my UGS 200H course on Immersive Theatre and Performance.

The general hypothesis behind my demonstration is that the presence of an already engaged individual has a significant influence on reluctant individuals to participate. The purpose of the research, and data to be collected, will provide an additional applicable strategy to modern industries or co-operative projects to foster an increase in individual engagement-should these outlined practices be employed. Because the live performance has yet to occur, these ideas remain unproven until the data is collected. However, in my demonstration, I intend to interact with the audience as a small social experiment to depict the foundational principles behind this hypothesis. In addition, as to not present a baseless conjecture, this thesis was formed from observations made in the UGS 200H class where activities conducted in the classroom received a more positive response when a few students exhibited interest in the activity. This is also backed research principles on Immersive Theatre and Virtual Reality Immersive Theatre.

MUSICAL COMPOSITION AND INTERACTIVE PERFORMANCE

Presenter: Elias Young
Category: Visual & Performing Arts
Time Slot: 10:15 AM
Room Location: Room 26
Number: 3614
Additional Student Presenters: Kofi Debrah
Mentor: Alison Dobbins

Interactive theater as a genre hinges on the equality of the performer and the audience to determine the experience of the performance. With the performances of Branch Out, an interactive performance taking place in MSU's Horticulture gardens in May of 2022, we want to identify components of music that enhance the experience of the audience. Our research seeks to delve into both music compositions that take the audience out of the immersive experience and combinations that actively keep the senses of the audience engaged. Previous research work on music performance in immersive theater has been centered on how much it keeps the audience engaged. However, that is not always the case. Our research seeks to categorize sound combinations with environments where these sounds maximize audience engagement. Our research will collect data on the branch out project, with a keen interest in music combinations that work in an open environment. The two researchers will be gathering data from different musical perspectives, as one will be engaging with the audience through percussive instruments and the other with a wind instrument. Both viewpoints will be included in the synthesis of the data, in order to determine another factor which may draw in or distract the audience members.

BY HER HAND: AN INVESTIGATION OF GENDER AND CLASS THROUGH THE DECORATIVE (OR FINE?) ARTS IN STUDIO PRACTICE

Emma Stoolmaker
Category: Visual & Performing Arts
Time Slot: 10:30 AM
Room Location: Room 26
Number: 3615
Mentor: D'Ann Desimone

"How does something as innocent and harmless as knitting become subversive? How can lace serve radical ends?" (McFadden, 2007). The Museum of Art and Design exhibited Radical Lace and Subversive Knitting to showcase the ways in which fiber artists situate their work within the broader scope of contemporary art. Historically, textiles and other forms of decorative art have been relegated classification outside of what is considered to be "fine art": that which utilizes a focused degree of "craft" and often indicates a particular function aside from being viewed. This type of work has strong associations with groups of working-class women on a global scale, often serving as a vehicle to narrate the gendered and class struggles for generations. Considering the words of McFadden, how can the decorative arts instigate subversion and maintain relevance in the contemporary art scene while still upholding the rich and complex histories of its former participants? Working closely with faculty member and practicing artist, d'Ann de Simone, I assisted in the creation and dissemination of bodies of work that promote the reclamation of decorative arts within a contemporary context. They question the ideologies, traditions, and visual signifiers passed down through generations of artists and what might be gleaned from those (namely non-male, working-class) makers who are still often distinguished from "fine artists." Through this studio assistantship, I too made a body of work that responds to the aforementioned questions, promotes a dialogue with the work of de Simone.

VISUAL & PERFORMING ARTS
Exhibits

THE COMMUNITY WELLBEING SERIES: MAINTAINING COMMUNITY THROUGH EMPOWERMENT, AND CULTURAL REPRESENTATION

Presenter: Aaliyah Buell
Category: Visual & Performing Arts
Time Slot: 11:30 AM
Room Location: Room 26
Number: 3621
Mentor: Kevin Brooks

The Community Wellbeing Series is a collaboration of RCAH community partners. This series offers strategies to acknowledge, support, and celebrate the reclamation of Black girls and women in history and culture, while providing approaches to improve the overall health and wellbeing of members of RCAH communities. This presentation will examine the role of representation in cultural empowerment that takes place through series events, while also reflecting on the methods of community engagement that have been used to produce such. Additionally, I elaborate on the ways in which the Community Wellbeing Series has not only withstood the influence of oppressive institutions, but also has generated a space that is powerful enough to work towards dismantling them.

INTEGRATED ARTS

Presenter: Jenna Schefka
Category: Visual & Performing Arts
Time Slot: 12:00 PM
Room Location: Room 26
Number: 3622
Mentor: Dan Li

A presentation of arts integrated projects in the classroom.

RESEARCHING AFRICAN AMERICAN DESIGNERS

Presenter: Skyla Mangum
Category: Visual & Performing Arts
Time Slot: 12:30 PM
Room Location: Room 26
Number: 3623
Mentor: Elka Stevens

To acknowledge and understand the artistry, influence, and impact of African American designers on the fashion industry, Dr. Elka Stevens, 2021-2022 Critical Race Studies Artist-in-Residence, teaches about black creatives and has been collecting information about them to develop a searchable, digital reference repository which elucidates African American designers and their contributions. This project is significant because too many African American fashion designers have been invisible within the fashion industry although many have been instrumental in shaping the manner in which Americans and other citizens around the globe have presented themselves for in excess of two centuries. Location, class, race, and gender conceal individuals of color working in and those aspiring to enter the billion-dollar world-wide industry. Moreover, the presence of many global trends with origins in the black America and a broader African Diaspora have been attributed to artists and creatives who are not of African descent or members of the culture. This database is characterized as a contribution to the study of black visual culture and digital humanities. This resource is not only for fashion industry professionals, but also for patrons, artists, other designers, educators, merchandisers, and most importantly, for the next generation of African American fashion designers. As student researcher supported by the College of Arts & Letters and an African American Fashion Design student, I have been working alongside Dr. Stevens to organize current information about and to identify new African American designers who are engaged in the fashion industry. This exhibition highlights select findings.

SEWING AND SUTURING: BRIDGING THE GAP BETWEEN FASHION AND MEDICINE

Presenter: Maddy Eischer
Category: Visual & Performing Arts
Time Slot: 1:00 PM
Room Location: Room 26
Number: 3624
Mentor: Rebecca Schuiling

The lab coat has been a sartorial symbol of influence and honor since the 1800's, yet few changes have been made to its appearance and construction. In a similarly prescriptive fashion, people are pushed to define their own singular pathway to success from a very young age. A

lifetime of "What do you want to be when you grow up?" causes many to focus on only one path to follow through school into a career until retirement. However, most people are multi- faceted and struggle with choosing only one of their many passions, skills, and dreams to pursue. As a student completing a Bachelor of Fine Arts in Apparel & Textile Design and a Bachelor of Science in Genomics & Molecular Genetics, this fashion exhibition seeks to demonstrate my personal experience in combining my dichotomous interests, culminating in a collection of re-imagined lab coats. Through the use of design, textiles, and handcrafting, this project acts as a physical combination of both my love for design and creation and my passion for research and medicine. Additionally, this exhibition uses the unconventional to explore and question the mores of professionalism. In utilizing a variety of materials from faux fur to clear vinyl, this collection acts as a commentary on what professionalism really entails and who gets to define it. This project seeks to demonstrate how success can arise from finding the connection between interdisciplinary fields and hopes to provide an example for children, adolescents, and adults who long to do the same.

VISUAL & PERFORMING ARTS
Performances

A MULTI-TEXTUAL INTERPRETATION OF PHILIP GLASS'S PIANO ETUDE NO.9

Presenter: Anqi Huang
Category: Visual & Performing Arts
Time Slot: 2:30 PM
Room Location: Room 26
Number: 3632
Mentor: James Sullivan

Minimalist music is often viewed as "lacking subjectivity" for interpretation due to its simplistic and repetitive musical language. In this lecture recital, I use Philip Glass's Piano Etude No.9 as a case study to challenge this view. Borrowing from the work of Orit Hilewicz, I introduce a listener-observer interpretation based on the intertextual relationships between Glass's piece and Marcel Duchamp's famous painting Nude Descending A Staircase. Although Duchamp's work is not itself minimalist, I argue that there is a strong connection between the two in terms of their repetitive design, geometric construction, and directionality. As a performer, to apply such a listener-observer interpretation can support a more inspiring and convincing performance. In sum, I suggest a creative lens either as a listener and a performer to comprehend and appreciate Glass's Piano Etude No.9 from a visual perspective.

SYMPHONIC ITEMS

Presenter: Christopher Robinson
Category: Visual & Performing Arts
Time Slot: 3:00 PM
Room Location: Room 26
Number: 3633
Mentor: Lorelei Jones

This performance consists of the performer gathering random materials and items. There are no limitations to the number of items, nor what the items are. Ones that can be chosen must be

ones that can make an audible sound when hit, folded, ripped, crushed, thrown, opened, closed, or anything else. The items must be collected and arranged in whatever way the performer chooses and will create a symphony of sound or noises. Whether or not the sounds have organization or repetition is up to the performer. There are no rules to the order of the performance. The performer can spend time organizing the items in a way that makes sense to them, testing the sounds of each item before making a symphony, or familiarizingthemselves with the feel of the objects. Once this is done, the symphony will be created. When the symphony is over, the performer will stop touching all objects and end the performance with a bow.

DO YOU WANT TO POP YOUR BALLOON? VOL. 2

Presenter: Grace Kurtz
Category: Visual & Performing Arts
Time Slot: 3:30 PM
Room Location: Room 26
Number: 3634
Mentor: Lorelei Jones

For this performance, I will use rainbow party balloons as an analogy for anger. I will sit facing the audience and repetitively blow-up balloons until they pop in my face. Anger is a valid emotion, but it can become self-destructive when not dealt with in a healthy way, especially when it's used to fuel decisions. The consequences of anger can "blow-up in your face", causing the angry person to instantly be viewed as childish, less trustworthy, and bring pain and shock to those in the anger's fallout zone. When I complete the piece, some of my anger will be dissipated, but the audience's anger levels will have increased. The loud pops and shock waves that briefly follow the sound will linger in the ears of the audience throughout the night, which might affect how they interact with people around them. They will hopfully consider the affect of their own anger on themselves and others because of this lingering ringing.

ARTS & HUMANITIES
Virtual Poster Presentations

CAN CHINA'S BELT AND ROAD PROJECT LAST IN CENTRAL ASIA? SUSTAINABILITY AND IMPLICATION OF CHINA'S INFRASTRUCTURE INITIATIVE

Presenter: Isabelle Borr
Category: Arts & Humanities
Room Location: Online Only
Number: 4101
Mentor: Norman Graham

China's Belt and Road initiative (BRI) project through the mainstream media portrays a massive modern twist on the silk road trading routes. Instead of horses, spices, and cloth, it is energy imports, manufacturing exports, and debt. The project criticisms include operating on a lack of transparency with overpriced materials, imported labor, and predatory lending behaviors that are driving participating countries into crippling debt. The amassment of debt in the billions of dollars is creating increasing opposition and questions on the world economic stage. China may not avoid repercussions financially, especially with a slowing economy. Do the benefits of the Belt

and Road projects are failing to meet goals cost or time effectively? Do the citizens of the host countries are growing frustrated, but do we need to truly be worried? The trade data from Central Asia seem to show falling/stagnated FDI contributions. Is China really going to be as dominant in the region as the world expects? Evaluating the rate of trade development and growth since the creation of the Belt and Road, this research is intended to examine the true sustainability of a global project within the confines of Central Asia, as well as the large question of whether BRI can serve to reduce Russians economic interference in the region.

THE EFFECTS OF COVID-19 ON THE TRAVEL INDUSTRY: AN ETHNOGRAPHIC STUDY OF A LOCAL OKEMOS TRAVEL AGENCY

Presenter: Megan Anthony
Category: Arts & Humanities
Room Location: Online Only
Number: 4102
Mentor: Steven Fraiberg

Many industries have been affected by COVID-19; one of the biggest being the travel industry. My research is focused on the understanding of the ramifications COVID-19 has brought to a local Okemos travel agency. With this research, my goal is to identify changes in the industry since the start of the COVID-19 pandemic in March 2020 and provide a better understanding of how effected businesses have adapted to our changing world. In order to do that, I engaged in a three-month ethnographic project at a local travel agency. Data was collected through a range of methods: participant observation, semi-structured interviews, and the collection of artifacts. Triangulating the data, I looked for different themes and patterns. The purpose of the presentation is to present my findings.

DO CORPORATIONS THAT OPERATE IN THE PALESTINIAN-ISREALI CONFLICT UNDERPERFORM?

Presenter: George Khamis
Category: Arts & Humanities
Room Location: Online Only
Number: 4103
Mentor: Antoinette Tessmer, Kirt Butler

Recognizing and upholding a standard for corporations that requires ethical practices and socially responsible operations is important for young investors who are more SRI oriented. We share the same sentiments and hope that our research provides an insight into the progressive view of balancing financial returns with social outcomes. Using stock market data, our project investigates corporations that operate and produce unethically in the disputed territories of Israel and Palestine. We hypothesized that due to the activism in the early months of 2020 against companies profiting from these territories that corporations would underperform. To support our line of reasoning we investigated and found boycotts that condemned these corporations' practices in widely supported petitions. Based on our investigation and reports from the UN Human Rights Office, we chose thirteen companies that best tailored to our goal of crafting a diverse and impactful portfolio. Our project utilizes a stock simulation platform to observe whether the 13 companies' stock underperforms as an effect of the ignited activisms. In our presentation we hope to illustrate the many nuances to our hypothesis and address the problems we came across. Our research hopes to find a correlation between operating

unethically and stock market performance. Ultimately, we wish to introduce to others the importance of operating ethically and motivate all individuals to be more socially responsible in their investments.

EQUITABLE AND INCLUSIVE FOCUSED TEAMS OUTPERFORM NONDIVERSE COMPETITORS IN REAL ESTATE INVESTMENT TRUSTS

Presenter: Matt England
Category: Arts & Humanities
Room Location: Online Only
Number: 4104
Mentor: Antoinette Tessmer, Kirt Butler

Globally, there has been a growing focus on the importance of Diversity Equity and Inclusion (DE&I) efforts by US companies. However, the asset management sector has notably been one of the least diverse industries. For example, The Knight Foundation found that "over 75% of asset management executives are white males and only 1.3% are held by black men while non-white women hold fewer than 1% of senior executive level jobs". Given this issue, we decided to investigate whether DE&I focused Real Estate Investment Trusts (REITs) will outperform non inclusive competitors on the stock market. Our research derived from the performance of 20

DE&I award winning and focused REITs, that were carefully picked based on their efforts to change the historically exclusive real estate investing market. The research is based on over four hundred data points pertaining to the REIT's market values of a carefully selected portfolio and a benchmark portfolio. Our analysis compared the performance of the DE&I focused portfolio to the Vanguard REIT Index. We collected data over the span of six months and in three different quarters, in order to ensure cyclical factors did not influence the outcome. Our findings support the prediction that REITs that place an emphasis on an inclusive and diverse team of individuals outperform REITs that fail to recognize the importance of a culture centered around DE&I. We expect to see an additional .5% average portfolio return when comparing our portfolio return to the Vanguard REIT index.

RACIAL EQUITY IN A FINANCIAL SERVICES COMPANY LEADS TO HIGH STOCK PERFORMANCE

Presenter: Aiden Tomsich
Category: Arts & Humanities
Room Location: Online Only
Number: 4105
Mentor: Antoinette Tessmer, Kirt Butler

Being an "only," a Black person who is the only Black person in the room, is an immense problem across all professions, but most prevalently in the financial services industry. According to a study done by McKinsey, 75% of Black employees in above entry level positions in financial services companies are "onlys." Our project sought to determine if the financial services companies that employ more than one Black person in their management team will outperform on the stock market. We expected these companies to outperform the S&P 500 because we believed that having a diverse set of races in leadership led to more creativity, innovation, and efficient business solutions. To conduct our research, we selected 15 publicly traded financial services companies that have more than one Black person on their

management team. We then invested $1 million proportionally in each company on a website called StockTrak. After compiling the results, we compared the returns and risks of those companies to the S&P 500, the closest measure of risks and returns for the overall stock market, of whom a majority do not have more than one Black person on their management team. In this presentation, statistical analysis of the risk and return performed in Microsoft Excel will be displayed to show how the 15 companies compare to the S&P 500. This comparison will aid in determining how valuable, in terms of return and risk of a stock, it is to have more than one Black person on a management team.

EVALUATION OF VOCAL AND LIFESTYLE OF ADULT'S: IMPACT OF VIDEO-CHAT ACTIVITIES

Presenter: Nishtha Kakar
Category: Arts & Humanities
Time Slot: 8:30 - 9:30 AM
Room Location: Online Only
Number: 4106
Mentor: Jeffrey Searl

The COVID-19 pandemic presented several challenges including replacing in-person instruction for academic and extracurricular activities. One widely adopted solution was the use of platforms with video chat capability. Social interactions, medical appointments, and even voice lessons happened over Zoom and other such applications. Reports have emerged that some people experience voice problems believed to be related to communicating in these video-chat modes. The goal of this study was to understand how the use of online video chat activities impacted the voice and vocal health behaviors of participants. This study had two aims to address the goal. The first was to develop an app for logging of daily voice activity. The app is completed, and its development is described in the poster. The second aim was to gather pilot data from users of the app about their voice and life-style behaviors, particularly as they relate to video chat activities. Data from 50 individuals who enrolled in the study are presented with descriptive statistics about them (demographics), their typical voice use, and perceived influence of video-chat on their voice. Data at study intake as well as data accumulated over multiple days of daily voice logging will be presented.

GREAT LAKES RATTLER ONCE HAD A BOUNTY

Presenter: Hannah Brock
Category: Arts & Humanities
Room Location: Online Only
Number: 4107
Mentor: David Poulson

In my presentation I will explain the reporting process behind learning about Michigan's only rattlesnake. The Eastern Massasauga once had a bounty, which is part of the reason its species has declined. My feature navigated how experts make the case to save a species that causes a fear response for some. This includes a need for more education about snakes and more support for species that aren't charismatic. Species decline is also related to the environment, including natural succession and fragmentation.

GENERATIONAL INVESTING

Presenter: Arnav Naik
Category: Arts & Humanities
Room Location: Online Only
Number: 4108
Mentor: Bonnie Knutson

I am researching and determining the importance of different generations and their investing trends. This will be done through a lens of generational markers and asset allocation. I will be researching, reading and writing as part of my research. I will also be analyzing new and unique investing philosophies in respects to each generation. Each generation has a set of unique characteristics which can be extracted and learned from. In the conclusion of my research, I want to have a formalized piece of writing which will allow me to gain a broader overview of this specific financial sector.

LONG-TERM COMMUNICATION EFFECTS AFTER TOTAL LARYNGECTOMY

Presenter: Edie Emery
Category: Arts & Humanities
Room Location: Online Only
Number: 4111
Additional Student Presenters: Koryn Pennebaker, Mariah Zammit, Kaylee Commet
Mentor: Jeffrey Searl, Kathryn Genoa

The intent of the study was to understand how communication is affected several years after total laryngectomy. Participants were adults who had a total laryngectomy a minimum of 5 years before being interviewed. To date, 5 participants have engaged in a recorded individual interview by phone or videoconferencing, and they completed additional surveys about their communication, fatigue level, perceived effort when communicating, and self-efficacy for managing chronic disease. Three of the five recorded interviews have been transcribed. For two of the transcripts, content analysis is in the process of being completed to derive themes and subthemes. Discussion of results will focus on the long-term effects of total laryngectomy and the evolving effect on the quality of life and communication abilities several years after ending cancer treatment.

THE ONLOOKERS

Presenter: Ridwan Sheikh-Omar
Category: Arts & Humanities
Room Location: Online Only
Number: 4112
Additional Student Presenters: Rachel Brown
Mentor: Alison Dobbins, Megan Halpern

The goal of this project was to explore whether an audience is more likely to get involved if they observe and then are given the opportunity to mimic a performer. As research is conducted about audience engagement and assessment, there appears the curiosity of what the audience members are expecting? What are their thoughts as they listen and watch a performance? And perhaps most importantly, how can I, as a researcher, capture their responses. This will be presented through poster platform. The title of the project is "The Onlookers". This involves the audience members changing their world by engaging in the social activity happening on the

stage. This may bring a therapeutic experience to the audience. If, and when the audience gets involved their movement will no longer be just sitting or standing. There will be movements like dancing, walking, etc. Additionally, this showcase will show the audience that they are more than just a product. An audience group interacts with performers, engages with the stage, and delivers as more than just a product. Although you wouldn't be able to view any results from the audience engagement until the day of the performance, you can still have expectations for them. The audience engagement assessments allow a more nuanced view of the audience demographics and needs. After testing the hypothesis, a visual of what kind of interaction between audience and performers creates a special tension is expected out of the outcome.

FINDING GAPS IN ONE'S KNOWLEDGE OF WORLD RELIGIONS AND HOW IT CORRELATES TO DISCRIMINATION AND INTOLERANCE TOWARDS OTHERS

Presenter: Sarah Hensel
Category: Arts & Humanities
Room Location: Online Only
Number: 4113
Mentor: Eddie Boucher

With an increasingly diverse nation, the need for cross cultural communication skills and acceptance is crucial. Religious and cultural discrimination has been an ongoing problem with an increase in Islamophobia, antisemitism, direct and indirect discrimination. A majority of cultural and religious knowledge is being obtained from the media including the news, social media, television, and films. These sources of information can provide inaccurate statements and biased opinions. The purpose of my research is to look at gaps in one's knowledge of world religions and how it can create discrimination towards others. This research was conducted using mixed methods including interviews, observations, and media analysis. The original hypothesis within my research is that if a student has a lack of religious and cultural education, they are more likely to either hold discriminatory views or accidentally offend others outside of their own religion and culture. Throughout the research process multiple findings have emerged some supporting and some conflicting my original hypothesis. Multiple public-school students, k-12 have had very little experience studying religious and cultural studies while many private and international k-12 students have more experience. Students have also expressed that when it comes to college courses many are uninterested in taking these classes due to the cost factors, if it applies to their major, and the pressure of grading. Another finding also indicated that many students are not intentionally discriminatory or hateful, but they rather have a lack of knowledge which can lead to false accusations.

WHAT IS FREEDOM? A LOOK INTO MSU STUDENTS' BELIEFS AND BEHAVIORS

Presenter: Emily Schultz
Category: Arts & Humanities
Room Location: Online Only
Number: 4114
Mentor: Eddie Boucher

Since the creation of the United States, Americans have always valued 'freedom', but we have never accepted a uniform definition. In the past few years, increasingly divisive ideas of

freedom have magnified sociopolitical tension among citizens. Issues-such as abortion laws, censorship, coronavirus restrictions, criminal justice reform, and immigration policy-have not only spurred heated political debates but also have incited protests, riots, anarchy, and violence due to citizens' concerns about the implications of these issues on their freedoms. My research explores the impact of this escalating sociopolitical conflict over freedom on the beliefs and behaviors of young adults. In this study, I used mixed methods-observations, surveys, interviews, and media analysis-to understand how, why, and to what extent Michigan State University students' beliefs about freedom differ and whether these beliefs are related to their unlawful behaviors. I hypothesized that students' beliefs would relate to the frequency of their delinquent behaviors. This hypothesis was partially supported. Some unlawful behaviors, such as underage alcohol consumption, correlated with specific beliefs about freedom. My results also support the existence of both affective and ideological polarization. Despite holding largely overlapping beliefs about freedom, 'left-leaning' and 'right-leaning' students fervently dismissed and seemingly despised students that they perceived as 'the other side'. Ideological polarization only emerged after students were asked to detail the extent to which we should be free. Almost all students agreed that we are not completely free; however, 'left-leaning' students were more likely to support limitations to freedom than 'right-leaning' students.

SINS OF COMMISSION AND OMISSION: DO IMAGES IN HIGH SCHOOL HISTORY TEXTBOOKS REFLECT THE HISTORICAL DIVERSITY OF THE AMERICAN PEOPLE?

Presenter: Justin Crouch
Category: Arts & Humanities
Room Location: Online Only
Number: 4115
Additional Student Presenters: Nel Robinson, Katie Denzin
Mentor: John Waller, Melissa Fore

We seek to provide a numerical measure of the inclusiveness of the most popular current high school history textbooks by analyzing the ratio of images of different racial, ethnic, and gender categories. Having coded the racial/ethnic and gender identities contained in every image in these textbooks, we calculate how closely the ratio of visual representations matches up to estimates of the actual demographic makeup of the American population over the timespans covered by each chapter. Our study finds that some racial and ethnic groups are significantly underrepresented in textbook pictures.

TEACHERS' UNIONS AND POLITICAL CONTRIBUTIONS

Presenter: Lucas Nunn
Category: Arts & Humanities
Room Location: Online Only
Number: 4116
Mentor: Matthew Grossmann

Recent increased attention has brought increased scrutiny on teachers' unions and the influence they hold in our educational institutions. However, due to differing membership in teachers' unions by state, different states have had different levels and types of influence from teachers' unions. Speaking generally, this difference in influence, mainly measured in the level of support given to either the Democratic or Republican parties, resulted from the differences

between different states' policies regarding school choice programs and labor retrenchment. I will be focusing on how school choice and labor retrenchment policies implemented over time have led to differing political party support by teachers' unions.

HOW HAVING A BACKGROUND FROM IRAQ IMPACTS LIFE IN AMERICA FOR THE CHALDEAN-ASSYRIAN COMMUNITY

Presenter: Kristin Kaczmar
Category: Arts & Humanities
Room Location: Online Only
Number: 4117
Mentor: Steven Fraiberg

The Chaldean-Assyrian community has a rich history that dates back more than 5,500 years with its largely Eastern Rite Catholic population residing until the 20th century in Iraq. Those who belong to this community are majority Christian with many, due to persecution and civil strife, migrating to Western countries with an estimated 500,000 residing in the United States. In the following ethnographic study, I try to look more closely at this population and the ways that they have adapted, adjusted, and negotiated these transitions. More specifically I focus this study on my own family who is a part of this community. In doing this work, I am collecting their stories using a number of data collection methods: semi-structured and elicited interviews (e.g., having them tell story stories from family albums), retrospective accounts, participant-observation, and the collection of artifacts. In trying to make sense of their stories, I am triangulating the data and developing key analytic themes and findings. The purpose of this study is to present my findings and look at the broader implications for the local Chaldean-Assyrian Community.

OPPORTUNITIES AND CONSTRAINTS IN ENVIRONMENTAL MOVEMENTS

Presenter: Sabrina Hall
Category: Arts & Humanities
Room Location: Online Only
Number: 4118
Mentor: John Waller

In this paper I researched how to maximize success with climate change regulation by referring to previous bipartisan pursuits for environmental legislation and analyzed their success or failure. The study centers around what factors must come together in order for an environmental concern to win the backing of a wide range of constituencies across the political spectrum. This paper anticipates what might be possible by searching the existing social scientific and scientific literature in order to learn what kinds of factors are associated with successful outcomes and the reverse in terms of environmental policy and legislation.

ON THE EDGE OF EMPIRES: HISTORICAL PERCEPTIONS OF THE NAGORNO- KARABAKH QUESTION

Presenter: Chris Eyke
Category: Arts & Humanities
Room Location: Online Only
Number: 4121
Mentor: Martha Olcott

History as an intellectual endeavor seeks to produce narratives about the past to provide meaning for the present. Distinct from a subjective field of inquiry, the intellectual study of the past is used to create a pattern of meanings and implications to address contemporary issues. These narratives are particularly powerful because they assemble a series of facts to advance a system of belief. Certain historical works, therefore, serve to represent and reinforce the prevailing ideological perceptions of the time and cannot be viewed as whole truths. Historical works can be used to examine the past and present uses, and misuses of history in support of Armenian and Azeri claims to the contested territory of Nagorno-Karabakh. The selective use of facts-and the deliberate omission of others-have helped both groups to offer valid but incomplete narratives that exist separately from broader understandings of the region. While competing claims and the ways in which facts are organized around them are complex, they can be simplified into two categories: absolute and comparative. Absolute claims are those supported by historical interpretations that see one group as the original and undisputed owner of the territory. There is an emphasis on a continuity of possession and inhabitance that does not acknowledge competing claims. Comparative claims, the more prevalent of the two, recognize the other's existence in the territory but seek to diminish their perceived presence. The purpose of this paper is to review past and present narratives, observe notable paradigms shifts in a larger context, and offer new interpretations on the issue.

SENTIMENT ANALYSIS OF CIRCUIT COURT PRE-NOMINATION SPEECHES

Presenter: Lindsey Sullivan
Category: Arts & Humanities
Room Location: Online Only
Number: 4122
Additional Student Presenters: Jack Carlson, Rebecca Kildee
Mentor: Jonathan King, Ryan Black

While public attention is fixated on the Supreme Court, the Courts of Appeals hears and decides the majority of appellate cases within the United States. And, with a continually decreasing docket at the Supreme Court, Courts of Appeals judges are increasingly influential in U.S. law and politics. But, in order to impact law and policy, judges must first be nominated and confirmed to the bench. We know that qualifications, ideology, and luck all play important roles in being nominated. However, as nominees are increasingly active in public life prior to nomination, how does behavior prior to nomination differentiate amongst nominees? Or, put another way, are there systematic differences in how potential nominees represent themselves prior to nomination? Using pre-nomination speeches given by circuit court nominees, our team provides insight into the pre-nomination behavior of judicial nominees. After gathering pre-nomination speeches given by judicial nominees, the documents were cleaned to a machine-readable format. Once cleaned, we run sentiment analysis on a random sample of judicial

nominees nominated by various presidents. This provides the first sentiment analysis of circuit court nominee speeches as well as evidence of systematic differences in nominee sentiment by nominating president.

COMPARING THE IMPORTANCE OF INCLUSIVE LEADERSHIP ON HOTEL EMPLOYEE'S JOB SATISFACTION, GRATITUDE, AND COMMITMENT TO CUSTOMER SERVICE ACROSS EMPLOYEE GENERATION GROUPS

Presenter: Live Cannella
Category: Arts & Humanities
Room Location: Online Only
Number: 4123
Additional Student Presenters: Miquela Ochoa
Mentor: Mi Ran Kim

Leadership plays a critical role in enhancing employees' innovative work behavior. In particular, inclusive leaders work with people, never to people, and therefore at every step of activities show their availability to employees, which encourage them to develop, promote, and implement new and useful ideas (Javed, 2017; Ryan, 2006; Sanders et al., 2010). The purpose of the study is to explore the impact of inclusiveness on employee satisfaction, employee gratitude, commitment to customer service, and to examine similarities and differences in the relationships among the concepts across different generational groups.

LANGUAGE AND INTERACTIONS AMONG TWINS

Presenter: Juliana Chabot
Category: Arts & Humanities
Room Location: Online Only
Number: 4124
Mentor: Steven Fraiberg

For this ethnographic project I will study the language and interactions among different sets of fraternal and identical twins. I am a fraternal twin myself and wanted to study how other twins have grown up and how it compares to my own story. Twins tend to have a closer relationship compared to other relationships between siblings. This bond can oftentimes be unexplainable but yet is something so special to observe. A relationship between a set of twins is often referred to as a "family within a family" with a very close connection. The purpose of this project was to explore this question through a series of interviews by collecting data and stories about various sets of twins, drawing upon my own stories, and further data found from online resources and documentaries. I will observe this data and develop key analytic themes and findings.

NEVER SINCE BEFORE...: THE ACCEPTABILITY OF THE SIMPLE PAST WITH CERTAIN ADVERBIALS, THE SEQUEL

Presenter: Kaelyn Hopton
Category: Arts & Humanities
Room Location: Online Only
Number: 4125
Additional Student Presenters: Evie Cook
Mentor: Alan Munn

Present perfect statements may occur in conjunction with adverbials such as 'already', an example being 'Nancy has visited the mall already'. Some speakers of American English also allow these same adverbials with the simple past tense, such as in 'Nancy visited the mall already'. This fact is consistent with the idea that the past and the present perfect tenses compete with each other pragmatically (Schaden 2009). Our research looks at this phenomenon with respect to three specific adverbials, namely 'before,' 'never,' and 'since.' Participants were given an acceptability judgment test asking them to rate sentences based on how natural they sounded. We carefully designed our experiment to elicit a present perfect reading in participants, even when judging a sentence written in the simple past, with the goal of investigating possible overlap in meaning. This experiment is a continuation of research conducted by our lab last year. In this iteration, each participant was presented with both present perfect and simple past sentences, as opposed to rating only present perfect or simple past sentences. This will allow us to more directly test the pragmatic competition hypothesis.

DEVELOPMENT OF A CODING SCHEME TO ASSESS EMOTION CONVERSATIONS BETWEEN MOTHERS AND ADOLESCENT TYPICALLY DEVELOPING SIBLINGS OF INDIVIDUALS WITH AUTISM SPECTRUM DISORDER

Presenter: Jennie Boulus
Category: Arts & Humanities
Room Location: Online Only
Number: 4126
Mentor: Amy Nuttall

Having a sibling with Autism Spectrum Disorder (ASD) has both positive and negative effects for typically developing siblings (TDS; Hodapp et al., 2005; Meadan et al., 2010), who provide significant amounts of caregiving throughout childhood. The present work aims to develop methods to examine mother-youth conversations between adolescent typically developing siblings' (TDS) of children with Autism Spectrum Disorder (ASD) and their mothers. Observational coding of parent child interactions is a gold-standard method for family research (Kerig & Lindahl, 2001). The Autobiographical Emotional Events Dialogue (AEED) is a global coding scheme used to analyze the narrative crafted between mother-child dyads. Evaluating the voices of both partners contributes to the assessment of the story's development based on involvement and mutual engagement with scores ranging from 1 to 9 (Koren-Karie et al., 2000). AEED was systematically translated to assess the Parent-Child Disclosure Task (Campione-Barr & Smetana, 2004) between mothers and TDS. Behavioral anchors that are salient to this developmental period were identified while maintaining the robust features of this framework. This modification addresses gaps in the coding manual to contribute to the understanding of the role of elaborative conversations between mothers and

adolescent TDS. Results from implementing this coding method will contribute to understanding mother-child relational conversations in the ASD family context and TDS experiences.

THE INCLUSION EXPERIENCES OF EDUCATIONAL TEAMS SUPPORTING STUDENTS WHO USE AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Presenter: Karli Carpenter
Category: Arts & Humanities
Room Location: Online Only
Number: 4127
Mentor: Sarah Douglas

Existing federal education laws emphasize the importance of including students with disabilities. However, for students with limited communication skills, such as those with autism spectrum disorders, developmental delays, and intellectual disabilities, inclusion can be complex (Finke, McNaughton, & Drager, 2009). These students often utilize augmentative and alternative communication (AAC) systems to communicate - systems such as communication apps, picture symbols, and sign language (Light & Drager, 2007). This study will investigate the experiences, challenges, and successes of educational team members supporting students who use AAC in inclusive educational settings.

DESIGNING DECLINE: THE RECLAMATION OF AN INDUSTRIAL SITE AND THE DESIGN IMPACTS ON ENVIRONMENTAL, SOCIAL AND ECONOMIC RESILIENCE

Presenter: Brooke Shevela
Category: Arts & Humanities
Room Location: Online Only
Number: 4131
Mentor: Jun Hyun Kim

The abandoned industrial crisis in Michigan calls for the redevelopment of abandoned industrial site areas into functioning public spaces. These neglected spaces develop negative impacts on the surrounding communities regarding aesthetic, safety, economic, and environmental issues. The purpose of this study is to examine the redevelopment of underused sites, especially those featuring an industrial site element, and the effects on the nearby community. The Michigan Central Station in Detroit, Michigan, USA was selected as a case study. Landscape performance research was applied to analyze the environmental, social and economic benefits of reclaiming abandoned industrial sites and their inner elements. This study brings positive contributions to the future redevelopment of neglected urban public space through the creation of more sustainable and safer sites. In addition, the major findings support to bring benefits on public physical health by promoting outdoor activities. Property values of the site and adjacent area are impacted positively with enhanced aesthetic site features and walkability features. The findings of this study will help designers and urban planners to see the value in reusing existing industrial sites instead of undergoing the harmful demolishing process and eventually lead to a more sustainable community design.

A QUALITATIVE META-SYNTHESIS OF FRIENDSHIP EXPERIENCES FOR STUDENTS WITH DEVELOPMENTAL DISABILITIES

Presenter: Karli Carpenter
Category: Arts & Humanities
Room Location: Online Only
Number: 4132
Mentor: Sarah Douglas

One in every 6 children in the U.S, age 3 through 17, are diagnosed with a developmental disability. Along with other developmental challenges, children with developmental disabilities show marked difficulty establishing and maintaining friendships, have fewer opportunities to engage with same aged peers, and develop fewer friendships. However, strong friendships can reduce anxiety, depression, and suicidal ideation and can can improve quality of life, support emotional well-being, and provide mental health benefits. Although extensive literature has examined the friendships of typically developing children, the nature of friendships between children with disabilities and their peers has been minimally explored (Webster & Carter, 2007). To date, there is no summary of qualitative research exploring the friendship experiences with children with developmental disabilities. Therefore, we conducted a qualitative meta-synthesis to provide a comprehensive understanding of friendship experiences of individuals with developmental disabilities. Findings will be presented with implications for policy and practice.

ASSESSING RELATIONS BETWEEN THE HOME SELF-REGULATION ENVIRONMENT AND CHILDREN'S SELF-REGULATION SKILLS

Presenter: Meme Awamleh
Category: Arts & Humanities
Room Location: Online Only
Number: 4133
Additional Student Presenters: Dania Alawamleh
Mentor: Nicholas Waters

Children's self-regulation skills-including memory, inhibition, and cognitive flexibility-are important predictors of their academic success. Accordingly, there is interest in uncovering the factors that support children's self-regulation development, with researchers identifying aspects of parenting as key contributors. However, most research conducted to date has focused on relations between broad aspects of parenting, like sensitivity or cognitive stimulation, and children's self-regulation development. Yet, it is also important to investigate whether parents' self-regulation-specific practices are related to children's self-regulation. Therefore, in the present investigation, we evaluated whether the home self-regulation environment is predictive of children's self-regulation skills. Parents/caregivers of 295 children (123 boys, 172 girls; Mage= 4.38 years, SD= .76) filled out a family questionnaire and children completed a battery of self-regulation assessments. To evaluate whether the home self-regulation environment was predictive of children's self-regulation skills, we estimated a series of partial correlations, controlling for children's age at testing and gender. Based on previous research, we hypothesized that the home self-regulation environment may predict children's self-regulation skills in some but not all domains. Somewhat unexpectedly, we found that the home self-

regulation environment was unrelated to children's memory (r= -.001, p= .993), inhibition (r= -.061, p= .441), cognitive flexibility (r= -.116, p= .139), and global self-regulation skills (r= .017, p= .831). Taken at face value, these results could be interpreted as evidence that the home self-regulation environment may be unrelated to children's self-regulation. However, given that our measure of the home self-regulation environment has yet to be validated, more research is needed.

DIFFERENT STYLES OF GYMNASTICS PRACTICE: LOOKING AT THE EFFECTS ON PERFORMANCE & WELL-BEING

Presenter: Orla Young
Category: Arts & Humanities
Room Location: Online Only
Number: 4134
Mentor: Steven Fraiberg

There are multiple organizations within the sport of gymnastics, including the NAIGC (National Association of Intercollegiate Gymnastics Club) and the USAG (USA Gymnastics). NAIGC is a non-profit organization that gives college-aged individuals and adults the opportunity to continue their gymnastics training with clubs at multiple universities across the country, whereas USAG is the national governing body of gymnastics within the United States, and is known for training and picking gymnasts to compete in competitions like the World Championships and the Olympics. Within these different organizations, opposing practice styles have been observed. NAIGC practices were found to be more relaxed in comparison to the regimented practice style used by USAG clubs. The stricter nature of the USAG practices is considered to create better athletes in regard to technique, strength, and skill, but are also known to increase the likelihood of the athletes 'burning out', or losing their love for the sport, and for having a negative effect on mental and physical health. Opposingly, the calmer NAIGC practice style is considered to have a less draining effect on athletes, allowing them to continue their love for the sport and lessen the amount of stressors they have associated with the sport. Despite these positives, the non-militant style of practice is also known to produce athletes who are not as technically skilled. This study aims to investigate what the effects of different practice styles are on performance and on well-being? An ethnographic study was performed, with field observations being collected at Michigan State University's NAIGC club practices, interviews being conducted with gymnasts who have experience in either environment, and my personal experiences in both of these settings. I used the information found through these methods to look for themes and patterns in the data and to come to a conclusion regarding the effects of these practice styles on gymnast performance and well-being.

IMMIGRATION ETHNOGRAPHY: A STUDY OF TRANSNATIONAL WORKERS/FAMILIES INTO A SMALL MIDWESTERN TOWN

Presenter: Salma Elsaadany
Category: Arts & Humanities
Room Location: Online Only
Number: 4135
Mentor: Steven Fraiberg

Migration is an increasing phenomenon of the 21st century that involves the remixing of identities, worldviews, and everyday practices. The globalization and mixing of different cultures as people transition between communities is a theme that can be studied through questions surrounding the experiences of migrants and exploring the adaptation/adjustment process they undergo. In focusing on how this process unfolds for people, one would usually think first of large cities like New York or Los Angeles as hubs for transnational people, but what about a small, midwestern town? Midland, Michigan, houses a rich community of people who have immigrated from their home countries, largely due to the presence of a multimillion dollar chemical company (Dow Chemical) that brings in employees and their families from across the world. In this sociologically focused case study of the town, ethnographic research methods (including semi-structured interviews, participant-observational study) are used to explore the key question involving how immigrants adapt and adjust when moving between vastly home and host cultures. In this study, the experience of Arab immigrants is highlighted through interviews with immigrants from various Middle-Eastern countries. The purpose of this project is to find themes in different experiences, looking more closely and presenting these issues to those who may not understand things the challenges and changes immigrants can go through, including the ways this process shapes their identities, practices, and worldviews.

PHYSICAL AND MENTAL IMPACTS OF CLIMATE CHANGE: A CASE STUDY OF ENVIRONMENTAL, IMMOBILITY AND RISK FACTORS WITHIN BHOLA SLUM

Presenter: Tessi Lila
Category: Arts & Humanities
Room Location: Online Only
Number: 4136
Mentor: Guo Chen

Climate change is a devastating global phenomenon, disproportionally affects many within global slums, and creates a perpetual cycle of mobility and immobility. When referring to mobility and immobility in this study, mobility means when an individual migrates elsewhere to escape environmental dangers. In contrast, immobility means the inability, whether that be physically or mentally, to leave an area. Research covering mobility/immobility involving migration focuses on mental illness. This research study first examines the physical impacts of climate change but then further explores the mental consequences with connections between immobility and human risk assessment. The study focuses specifically on Bangladesh and the slums within, as it is one of the few countries whose geographic location puts it at an extreme disadvantage. After analyzing the geographical conditions of Bangladesh as a whole, the study focuses on the Bhola Slum as a microcosm to illustrate how global slums around the world are increasingly suffering due to climate change and the psychosocial effects on those within slums. Specifically, the study investigates how slums are often both a historical refuge from previous climate disasters and a makeshift solution by local states and continue to be vulnerable to the same issues. To examine this topic, I conducted a literature review of the impacts of climate change seen around the globe, in Bangladesh, and the Bhola slum. To further understand the issues within Bhola, secondary data, including visual materials documenting the experiences within the Bhola slum, were compiled.

SPEECH TREATMENT OUTCOMES FOR PATIENTS WITH HEAD AND NECK CANCER: A SCOPING REVIEW

Presenter: Pritha Gangapur
Category: Arts & Humanities
Room Location: Online Only
Number: 4137
Additional Student Presenters: Kate O'Connell, Shae Cesarz
Mentor: Jeffrey Searl

The goal of this project is to complete a scoping review of the extant literature regarding outcomes of speech interventions for adults with head and neck cancer in order to identify knowledge gaps that can motivate targeted research in the future. This presentation describes the rationale and the need for the scoping review and describes the process for completing the review. To date, the steps completed include specifying the research question target in the scoping review, generating search terms and strategies, specifying criteria for excluding and retaining articles in the review, completing the literature search, and organizing search results across findings from three different data bases. The steps remaining will be described including plans for reviewing titles and abstracts to identify studies requiring a full reading of the study, criteria applied in evaluating the retained articles, and summarizing findings across the retained articles. Ultimately, the results of the scoping review will provide useful guidance for understanding the strength of the literature regarding speech treatment outcomes for people with head and neck cancer and identify knowledge gaps that need to be addressed to guide clinical work.

SUBURBAN DECLINE: THE FUTURE OF AMERICAN METROPOLIS

Presenter: Alissa Hakim
Category: Arts & Humanities
Room Location: Online Only
Number: 4138
Mentor: Vincent Delgado

The spread of urban blight from central cities to their suburban counterparts is an ever-growing contemporary issue. Urban blight is rooted in historical segregation practices and policies that have developed into contemporary issues in urban planning, relating to the intersections of race and economic status that shape sociocultural contexts. One specific area that is affected by urban planning failures is public secondary education, thus this project aims to answer the question: How do racial, ethnic, and socioeconomic backgrounds interact with geographic distance from the urban center regarding student success in public secondary schools? To answer this, my methodology takes a comparative approach that utilizes both quantitative and qualitative frameworks. This project considers publicly accessible school data for both lines of reasoning, the first using racial, ethnic, and socioeconomic demographics as well as graduation and college readiness indicators. The second utilizes parent/guardian survey reports made available via Chicago Public Schools. In doing so, this project takes the collective responses of the parental community as well as the performance of the students in tandem to compare different data sets from schools in and around Chicago, thereby observing potential patterns of declining student success. Limited work has been done on the adverse effects of suburban decline on public secondary education, but contemporary trends of school funding and city

planning could find that inner-city and inner-ring suburbs are very similar in terms of education quality and disparities.

POLICE CORRUPTION IN JAMAICA: LITTLE TO ZERO ACCOUNTABILITY

Presenter: Kadrianna Cohen
Category: Arts & Humanities
Room Location: Online Only
Number: 4141
Mentor: Sanja Kutnjak Ivkovic

Jamaica, located in the Caribbean, is a postcolonial country with a population under three million that suffers from police corruption. The police force in Jamaica, the Jamaica Constabulary Force, has undergone reform in recent years to better the relations between the police and the public. However, the Jamaica Constabulary Force frequently violates human rights and is notorious for extrajudicial killings. The force has also been accused of protecting Jamaica's wealthy and elite while neglecting the poor, who are mainly descendants of involuntary African immigrants. This research aimed to explore and describe the different types of crimes committed by members of the Jamaica Constabulary Force and how often they are held accountable. Accountable, for this research, refers to whether the officers are fined, given administrative leave, and/or receive a jail/prison sentence. This research is qualitative in nature and utilizes specific keywords to search the web archives of five daily newspapers (Jamaica Observer, Royal Gazette, Jamaica Times, Jamaica Gleaner, and Jamaica Star) during a 10-year period (2010-2020) to identify the crimes committed by officers from the lowest rank (constable) to the highest (commissioner). In addition, this research concluded with a discussion about the persistent poverty/ income of officers and the role it plays in creating an environment that breeds police misconduct.

DEMYSTIFYING THE LEAKY PIPELINE: UNCOVERING THE WHY BEHIND GENDER AND RACIAL DISPARITIES IN CAREER ADVANCEMENT IN CRIMINOLOGY AND CRIMINAL JUSTICE

Presenter: Margaret Amshay
Category: Arts & Humanities
Room Location: Online Only
Number: 4142
Mentor: Sanja Kutnjak Ivkovic

Despite faculty of color, particularly female faculty, being proportionately better represented at the junior faculty level in criminal justice and criminology, the overwhelming majority of full professors-over three-quarters-in this field are white men. This disparity suggests that female faculty/faculty of color, unlike their white male counterparts, may be "leaking out of the pipeline" before obtaining promotion to higher professorial ranks. Extant literature consistently finds disparities in gender and racial composition of criminology and criminal justice faculty in research productivity and scholarly influence. Yet, there is a dearth of research systematically examining the source of this disparity. This study seeks to add to the extant literature by exploring potential sources and correlates of these disparities. Using a survey of criminology and criminal justice faculty and members of the two leading professional associations in the field (i.e., the American Society of Criminology; the Academy of Criminal Justice Sciences).

This survey asked about professional and personal factors that could impact faculty promotion and retention, including the distribution of effort, potential obstacles, and the availability support systems. The goal being to determine the potential source of the leak in the pipeline. These results will help fill the gap in current literature by allowing for a more comprehensive understanding of the potential factors contributing to the leaky pipeline for female faculty and faculty of color. Our research will also lay the foundation for future scholarship that can further investigate avenues of improving the equity and inclusivity of higher education in criminology and criminal justice.

(MIS)TAKEN HISTORY: A VISUAL ANALYSIS ON THE PRESENCE OF RACIAL CARICATURES IN U.S. HISTORY TEXTBOOKS

Presenter: Roxy Sprowl
Category: Arts & Humanities
Room Location: Online Only
Number: 4143
Additional Student Presenters: Ayden Ferris, Jade Elder
Mentor: John Waller, Melissa Fore

Do American high school history textbooks contain racial, ethnic, gender, and class stereotypes? This is an important question because these texts are a critical source of information for American students about their nation's past. As such, it is vital that they provide students with fair and accurate representations of different groups and demographics. We know from an earlier study that a number of the most widely used history textbooks include images which portray stereotypical visual representations of certain groups. In most cases, they do so in order to illustrate the prejudices of earlier periods of US history, but some of the time the image selectors fail to make explicit that an image is stereotypical. The aim of this presentation is to convey the results of an analysis of several leading high school history textbooks designed to address two questions related to the use of pictures containing stereotypes. First, given that it is almost certainly damaging to present stereotypes without acknowledging that they are dehumanizing, how many racial/ethnic/gender/class caricatures are included in different texts without captions explaining the chauvinism of the image? And, second, how often do textbooks include caricatures but nonetheless recognize that an image conveys a prejudicial representation? Ultimately, our goal is to understand whether or not including caricatures in textbooks is inherently counterproductive. This initial study, however, focuses on ascertaining how adequately different textbooks inform students when an image is problematic.

DETROIT ACCESSIBILITY PROJECT

Presenter: Charlotte Bachelor
Category: Arts & Humanities
Room Location: Online Only
Number: 4144
Additional Student Presenters: Emily Lin
Mentor: Kate Birdsall

A collaborative effort sponsored by The Cube (publishing - process - praxis), the Detroit Accessibility Project (DAP) aims to create inclusive and accessible accessibility guides for Downtown Detroit tourist hotspots so all visitors can enjoy the rich cultural and vibrancy the motor city has to offer. Our presentation will detail our research process, outcomes thus far, and our plans for implementing this system in the Detroit area.

CREATING A WELCOMING ENVIRONMENT: WHAT WORKS FOR YOUTH IN A COMMUNITY-BASED YPAR INITIATIVE?

Presenter: Audriyana Jaber
Category: Arts & Humanities
Room Location: Online Only
Number: 4145
Mentor: Joanne Marciano

The Youth Voices Project is a Youth Participatory Action Research project that partners youth participating in a community-based college readiness program with college students and university researchers as youth explore issues of equity in the subsidized housing community where they live. This presentation will examine whether and how youth participants experience the culturally relevant and sustaining practice of a welcoming and affirming environment during weekly two-hour-long after-school sessions. Implications for community-based researchers and teachers will be discussed.

How the Humanitarian Crisis in Syria Affected Children Refugees' Oral Health

Presenter: Samhita Bolisetty
Category: Arts & Humanities
Room Location: Online Only
Number: 4146
Mentor: Camelia Suleiman

The humanitarian crisis in Syria has resulted in one of the largest refugee exoduses to date. As a result, access and quality healthcare has been severely affected for lots of Syrians refugees, especially children and one of the leading health problems is oral disease. Much little attention is given to this major health issue and there is a lot to explore about how much oral care is offered to these refugees. Poor oral health can lead to infection, tooth loss and even other health problems throughout the rest of the body. Especially for these refugees, oral health is one of the most overlooked health issues and this negligence, especially in children, can affect them throughout their whole life. According to BMC oral health, the amount of children refugees that have dental caries increased from 17.2% to 87% over the past 15 years in Iran which means that the humanitarian crisis in Syria affected refugees a great amount. Some concepts to explore for this phenomenon are intersectionality and under western eyes. Intersectionality examines how different factors intertwine to see how oral care is affected for refugees while under western eyes explores how other countries view the situation. Other factors that could have contributed to Syrian refugees not maintaining dental hygiene is cultural practices or trauma as well. There have been many studies done but to create effective change, more research needs to be conducted to help understand the lifelong effects of not being able to obtain proper oral care.

RESEARCH STUDY ON SOCIAL MEDIA PRACTICES AMONGST YOUNG COLLEGE STUDENTS

Presenter: Matea Zoga
Category: Arts & Humanities
Room Location: Online Only
Number: 4148
Mentor: Steven Fraiberg

The field that I am studying is social media platforms and the various practices and habits that surround these social spaces. There are many social media platforms that have developed with today's society, and the key component to all of these platforms is the people who use them, specifically young adults, and more specifically, young college students. Social media has taken a big part of their lives, and it has become something that is a part of our everyday routine. I am studying how various people represent themselves on their different platforms, and what the differences are between genders. I am asking how representation differs between different social media platforms for young males and females, and how practices across social media platforms are engraved into the minds of young people as social media becomes more prevalent in our society. The purpose of this project is to explore my research question through a series of interviews and observations of various social media platforms, including Instagram, Snapchat, Twitter, and Tik Tok. Using interviews, surveys, and different text readings, I am conducting my research to find information about my various questions surrounding social media practices. Furthermore, I use this information to analyze the digital culture and its surrounding rituals, rules, and language that is changing the world today, and continuing to be changed as technology and other aspects of social media evolve to the modern world.

A CRITICAL STUDY OF INDIA'S INEFFECTIVE SLUM POLICIES AND POSSIBLE IMPROVEMENTS TO THEM

Presenter: Isabelle Waurzyniak
Category: Arts & Humanities
Room Location: Online Only
Number: 4149
Additional Student Presenters: Rainy Jain
Mentor: Guo Chen

Sixty-five million people in India live in slums, which exceeds the population of Britain. Due to rapid urbanization, the number of slum dwellers is increasing in the big cities in India. This growth means the land value increases, leaving only one alternative: Slum. While every government policy has its pros and cons, slum policies in India vary from highly successful to failing badly. The reasons behind the failures were not significantly different yet quite interconnected. For improving the lives of slum dwellers in the Global South, it's crucial to study the reasons behind the existing policies' failure and reform them as needed. In this research project, we critically review the policies the Indian government has implemented to improve slums over the past 70 years and assess their subsequent successes and failures. We examine two sets of questions. First, we review the government policies at India's state and federal levels soon after independence and some initiatives taken recently regarding COVID-19. We ask why these policies continue to fail and why they are still in place despite their failures. Secondly, we discuss the government policies related to the health issues of slum dwellers in India, such as lacking access to healthcare and how slums have been affected by the pandemic. Throughout, we examine reasons that led to the failure of slum policies, ask why the slum situation continues to deteriorate, and look for ways to improve the future of Indian slums.

THE GRIM REALITY OF FOOD INSECURITY IN ASIAN SLUMS

Presenter: Olivia Bartunek
Category: Arts & Humanities
Room Location: Online Only
Number: 4150

Mentor: Guo Chen

Despite the ever-advancing world and multifarious relationship we have with food around the globe, food insecurity remains a prominent issue in various urban and rural environments. Covid-19 impacts have increased the severity and influence of food insecurity worldwide. The main objective of this project is to investigate the unforgiving and durable effects of food insecurity with a focus on the slums of Asia. A review of research publications and journalistic reports suggests that most Asian slum communities are food insecure. This project also seeks insight into the severity, manifestation, and consequences of food insecurity within specific slums. As this recent food insecurity crisis has exacerbated repercussions on individuals' health, wellness, and safety, I will explore the mediating roles of various individual factors on the impact of food insecurity. I analyze over twenty articles, including literature reviews, cross-sectional research, and case studies on the relationship between food insecurity and malnutrition, poor mental health, stunting, and underweight individuals - notably among children. Studies have identified education levels, gender roles, house income, size, and monthly expenditures as individual-level variables that affect the impacts of food insecurity and its outcomes. This project includes a photo documentary visualizing the intersectionality regarding food insecurity on various scales for a diversity of groups and communities. As part of a more extensive outlook, this project will help inform policy interventions to support slum communities and the global health system. The policy solutions, in turn, help mitigate the effects of this crisis on vulnerable populations.

THE HIDDEN HISTORY OF ZIKA AND ITS IMPACTS ON GLOBAL SLUM REGIONS SINCE 2007

Presenter: Sarah Ganesan
Category: Arts & Humanities
Room Location: Online Only
Number: 4151

Mentor: Guo Chen

Known to be "a disease of the urban poor," the Zika virus made its presence known to the world during its outbreak, but while the rest of the world saw a decline in the virus's prevalence, slum populations still dealt with it as a lingering problem. The Zika virus thrives off having a significant risk of transmission through human and animal contact. Because slum cities and areas are densely populated while also having issues concerning unsanitary conditions, the number of people who contracted the virus in the slums flourished. To further explore how the Zika virus took over the slums and how it prospered, this research study focused on the slums in India and favelas in Brazil, such as Bapunagar in Ahmedabad and Pau de Lima in Salvador. This study examined statistics, specific conditions, and outcomes of the Zika virus and its effects on the slums. Although the Zika virus rapidly spreading was the major complication when attempting to control it, external factors contributed to the increase in infected numbers in the slum, a major one being the lack of government intervention. The harm to the already vulnerable population living in slum conditions was drastic due to the government's negligence to the well-being of the poor in the country. This study also presents global visual materials to supplement the analysis of the Zika virus's effects on slums.

A REVIEW OF THE EDUCATION OF SYRIAN REFUGEE CHILDREN IN AMERICA

Presenter: Weeam Guetari
Category: Arts & Humanities
Room Location: Online Only
Number: 4152
Mentor: Camelia Suleiman

The plight of Middle Eastern refugees has been a permanent topic in mainstream media since the crisis began in 2011. However, once these displaced peoples are resettled in new areas, the narrative is often cut-off, although their struggles unfortunately do not end there. In particular, little is known about how refugees adapt to a new schooling system, and if there are any proper resources for them. In this project, the experiences of forced immigrants are considered as a way of dispelling any incorrect assumptions. Sources used include previously published studies and interviews with members and allies of the refugee community.

DECONSTRUCTING THE MODEL MINORITY MYTH: AN ANALYSIS OF HOW US IMMIGRATION POLICIES CREATE FALSE NOTIONS OF SOUTH ASIAN AMERICAN SUCCESS

Presenter: Justin Fernando
Category: Arts & Humanities
Room Location: Online Only
Number: 4153
Mentor: Anna Pegler-Gordon

Currently, South Asians are viewed as one of the most successful ethnic groups in the United States, as they have one of the highest household incomes. Because of this, they are deemed as "model minorities" - people who overcame immense racial odds in order to find success in this country. The idea of the model minority myth, and the perceptions of Asian Americans as successful, has long been a prominent view in this country. However, it is also incredibly problematic to classify Asian Americans as such, as it can lead to the neglect of the problems that this community faces. In addition, much of the success of this group has largely been attributed to cultural, or racial differences, in that Asians are simply more hardworking, and smarter than other minorities. Such description, as many scholars would suggest, is plainly false. In fact, much of the reason why we see South Asians, and Asian Americans in general, achieving economic success is due to the conditions of their immigration. In this research, I seek to identify how US immigration policies have contributed to the selectivity of South Asian immigrants, and how these policies have created false notions of South Asian American success, ignoring the problems that this group faces on a daily basis.

REWRITING THE WESTERN STORY OF ISLAM

Presenter: Zoe Rasico
Category: Arts & Humanities
Room Location: Online Only
Number: 4155
Mentor: Camelia Suleiman

Over the past couple of months, I've researched the dangers of a single story as it pertains to Islam. Single story narratives are stories told from a limited point of view which may result in

detrimental biases. In my research I was able to investigate how Western media's violent portrayal of Islam cultivated irrational fear towards Muslims in America. In exploring the contents of American media on Islam, there are numerous portrayals of violence and the struggles of the Middle east. The result of this violent standpoint in the media leaves many Americans to assume that Muslims are to be violent. The reality that Muslims are people, people with values, morals, families they love, is completely lost because it isn't represented. Muslims are people we can and must talk to in order to learn from them. I had the amazing opportunity to speak with a forcibly displaced Syrian who practices Islam who offered to share with me their experiences and practices of their beautiful culture. Ultimately, I wanted to research Islam's origins and culture because we waste so much time hating others out of ignorance, but if we took the time to learn and understand one another, we could irradicate ignorant taboo, and strive for a better future.

WOMEN'S EDUCATION THROUGH THE LENS OF "I AM MALALA"

Presenter: Teagan Johnson
Category: Arts & Humanities
Room Location: Online Only
Number: 4156

Mentor: Camelia Suleiman

I am Malala is dissected in order to dispel stereotypes held in the Western world about Islam in regards to women and education. The countries in focus are Pakistan and Afghanistan. Malala's point of view and the information she provides in her autobiography helps to reveal the truth about how girls view their education and the struggles they face in order to obtain it. The main obstacle analyzed is the influence of the Taliban. This is because they do not believe women and girls should have access to an education past a certain age, despite it being a fundamental Islamic right. These subjects are examined through the concepts of Intersectionality and the Danger of a Single Story.

COPTIC LANGUAGE REVIVALISM

Presenter: Verena Daniel
Category: Arts & Humanities
Room Location: Online Only
Number: 4157
Mentor: Camelia Suleiman

Fighting to be the dominant language in its native land since its inception, the Coptic language is an example of the linguistic and cultural losses that come with colonialism. This research examined the history of the language, its significance, the forces behind its extinction, and the ongoing preservation and revivalism efforts. The final written stage of Egyptian, it was rivaled by Greek in the Hellenistic Period in Egypt, and then by Greek and Latin under the Romans, and then further suppressed by Arabic. Today it can mostly be considered a religious language, used in worship in the Coptic Orthodox Church of Alexandria, illustrating the intersections of historical, religious, and national linguistic identities. While it's not used colloquially anymore, there are efforts in the global Coptic community to preserve and revive the language as a crucial part of the Coptic and Egyptian culture and identity.

MULTILINGUAL REPOSITORY FOR ABSTRACTS IN APPLIED LINGUISTICS (MURAL)

Presenter: Sarah Jozefaciuk
Category: Arts & Humanities
Room Location: Online Only
Number: 4160
Mentor: Meagan Driver

I will be presenting on our Multilingual Repository created by Meagan Driver. This repository is used to make research in applied linguistics more readily accessible to scholars and speakers of non-English languages. We will house translations of abstracts of peer-reviewed articles published within the field of applied linguistics in the last ten years.

MODERN NATIONALISM AND THE MOVEMENT OF PEOPLE IN THE OTTOMAN EMPIRE

Presenter: Kyle Nguyen
Category: Arts & Humanities
Room Location: Online Only
Number: 4162
Mentor: Camelia Suleiman

Towards the end of its life, the Ottoman Empire faced a myriad of issues that challenged it's very existence. Some were economic while others were political. This research focused on the political issues that plagued the Ottoman Empire towards the end of its life particularly nationalism and its role in the lack of cohesion within the empire. This research looked at nationalism's role in being a vehicle of greater movement among populations, whether they are the ethnic minorities of the empire or the ruling populations. For the sake of this presentation the Greek ethnic minority within the empire is used as a case study on the effects of these ideologies.

OTTOMAN EMPIRE MILLET SYSTEM

Presenter: Hannah Morse
Category: Arts & Humanities
Room Location: Online Only
Number: 4163
Mentor: Camelia Suleiman

The Ottoman Empire had a unique form of government that was meant to combine the different peoples living in the Empire with minimal conflict. Each religion had their own court system that ruled their people with their own laws that were under the law of the Ottoman Empire as a whole. The example of the Millet System shows a tolerance of other religions under Islamic rule. There were many readings that we covered in class that I used to research the system as well as how it relates to The Dangers of a Single Story.

YEMEN: A PROXY WAR

Presenter: Sophy Smithson
Category: Arts & Humanities
Room Location: Online Only
Number: 4164
Mentor: Camelia Suleiman

Since September 16, 2014, Yemen has been in a state of civil war. This war, which has lacked coverage in the media, has resulted in what the rest of the world deems a "failed state". Examining the roots and causes of the war in Yemen shows that there is a stronger, outside force perpetuating the conflict: a proxy war. The United States and Saudi Arabia have taken a role in the war, supporting certain factions in efforts to undermine Iran. We looked at Yemen as it appears in the media, accounts from victims of the war, and the roots of outside involvement in this conflict.

MAPPING THE GEOSPATIAL AND TEMPORAL NETWORKS OF ETHNIC KOREAN AUTHORS IN CHINA

Presenter: Sydney Warner
Category: Arts & Humanities
Room Location: Online Only
Number: 4165
Mentor: Catherine Ryu

This project aims to visualize the geolocation-based information extracted from an anthology of novellas to create immersive maps of the connections between 13 ethnic Korean authors residing in China from the early 20th century to 1989, when the anthology was published in Japanese. This is my initial pilot study for digital humanities; more specifically, it is an extension of a larger project led by my faculty mentor, Dr. Catherine Ryu, at Michigan State University (MSU) and her multilingual team who are in the process of translating the anthology into English. Conceived as an open resource built on the StoryMaps platform that accompanies the anthology once in print, this project will illuminate temporal, cultural, linguistic, and administrative spaces that the ethnic Korean authors occupied, particularly in northwestern China. Moreover, this project will visually represent how the authors are interconnected, observing any notable patterns in social interactions among themselves, as well as with their Chinese counterparts and other ethnic members; and how their positionality influenced these authors' literary vision and output pertaining to the 13 novellas. The focus of my presentation project will be a series of maps notated with multilingual representations (Chinese, Korean, Japanese, and English) of the networks accompanied with relevant cultural and historical notes to contextualize both the authors' lived historical world and the fictional world captured within the novellas. The presentation will also include the process and organization of the data collection, and the broader implications of this project in studying literature and culture using interactive technology tools.

SUFISM A STORY OF RELIGIOUS EXPERIENCE AND BELIEF

Presenter: Morgan Davis
Category: Arts & Humanities
Room Location: Online Only
Number: 4166
Mentor: Camelia Suleiman

Sufism is the mystical form of Islam, and this faith focuses on the spiritual connection of Allah and man. The novel "Forty Rules of Love" was used as a source to determine the faith and the endurance of the people of the Middle East regarding their passion and belief in the Quran. Sufism is a spiritual path combined with the Islamic religion in order to unlock another aspect of belief and further one's relationship with Allah. Sufism's influence in the past and today's world is recognized due to the practice being seen as a solution to what many call "Radical Islam."

EM-BODYING LIBERATION: EXPLORING AFRO-BRAZILIAN WOMEN AND BLACK WOMEN FROM THE UNITED STATES BODIES AS SITES OF LIBERATION

Presenter: India Everson
Category: Arts & Humanities
Room Location: Online Only
Number: 4167
Mentor: Sitara Thobani

Combining Black scholar's work on Black "human" geography, Bodymemory, quilombos, and ideas surrounding Audre Lorde's "Uses of the Erotic", I explored Afro-Brasilian women and Black women from the United States' bodies as not only cultural archives but moving geographic sites that embody liberation. I used the phrase "moving geographic sites that embody liberation" to describe how Black women themselves are cultural terrains that are familiar with the world around them because of Bodymemory or the ancestral knowledge their bodies hold about past events. Bodymemory allows Afro-Brazilian women and Black women from the United States to have unique relationships to the land beneath their feet, the world (metaphysically and physically), and wisdom from their ancestors that can lead to physical liberation. During this study, I also examined similarities as well as differences between Afro-Brasilian women and Black women from the United States. What makes their connection to land 'unique'? Why is solidarity among Afro-Brasilian women and Black women from the United States crucial for liberation among other reasons?

A STUDY OF QANON PROPAGANDA ON TWITTER AS INFORMATION WARFARE

Presenter: Faith Foster
Category: Arts & Humanities
Room Location: Online Only
Number: 4169
Mentor: Laura Dilley

The degree to which online spaces have become tools for foreign actors to wield influence and wage information warfare has been poorly understood. In order to gain further insight into the ways foreign actors co-opt and exploit internet technologies for political purposes, we studied

Twitter activity related to QAnon - a political belief system mainly demonizing the U.S. Democrats - in the time leading up to the 2020 election. Based on previous media manipulation and propaganda research, we hypothesized that QAnon-related Twitter activity would yield evidence of a mixing of Twitter traffic across overtly pro-QAnon accounts with that of accounts indicating consistencies with identities suspected to be susceptible to QAnon narratives, such as far-right conservatives and interest in New Age or Occult topics. Additionally, we predicted a well-defined hierarchy of influential QAnon and QAnon adjacent networked accounts. Network analyses were used to study interaction traffic across thousands of QAnon and QAnon-adjacent Twitter accounts. Through these analyses, evidence supporting both hypotheses was obtained. The results are interpreted with respect to frameworks surrounding organized persuasive communication campaigns involving deception and coercion as well as recent examples of internet and tech-enabled targeted persuasive messaging. While there is no explicit evidence regarding the national affiliations of most individuals behind the Twitter accounts, patterns in the data yield evidence consistent with the hypothesis that Russia may have played an influential role in organizing or promoting accounts in the QAnon Twitter network in the months leading up to the 2020 U.S. presidential election.

ABORTION DEBATES LIVE: A LOOK INTO THE REPRESENTATION OF PRO-LIFE AND PRO-CHOICE OPINIONS ON SOCIAL MEDIA LIVE STREAMS

Presenter: Bella Seigo
Category: Arts & Humanities
Room Location: Online Only
Number: 4170
Mentor: Steven Fraiberg

Recent laws around abortion have caused controversy throughout the nation. Many are left to wonder if the state they live in will best represent their own opinions on the matter, let alone the opinions held by the majority of the region. Naturally, this has sparked heated debates on both ends of the spectrum. It is between those who believe it is a mother's right to decide to terminate a pregnancy (pro-choice) and those who believe it is not a mother's right (pro-life). I grew curious as to what the arguments presented on both sides were, and how those two communities would go about representing their positions while in debate. To understand a more modern approach to debate, turned to social media. Not only does it have a vast reach with the ability to showcase large communities, but it also allows for participants to share unfiltered truths about their beliefs. More specifically, TikTok was the main platform I used for research. With over 2 billion downloads worldwide, it is one of the farthest-reaching and fastest-growing social media platforms available. I also wanted to focus on a younger demographic (younger than 40 years old) because those voices tend to speak the loudest when it comes to influencing the type of change in laws seen today. The goal of this ethnographic study is to present findings of examples and patterns seen in abortion debates online between pro-choice and pro-life participants. This is being done between December 2021 and March 2022, where data collection is occuring on a bi-weekly basis through particpant-observation and semi-structued interviews. In order to analyze the data, I am engaging in a process of open and focused coding to identify various themes and patterns. The puprpose of this presention is to present these findings with the aim of gaining a closer understanding of the complexities surrounding the arguments around this contentious issue.

GOING THE DISTANCE: PUBLIC MICROTRANSIT AND JOB ACCESS IN LOW- INCOME COMMUNITIES

Presenter: Joey Allen
Category: Arts & Humanities
Room Location: Online Only
Number: 4171
Mentor: John Waller

Users of public transport often have substantial walks to and from convenient transit stops at the start and end of their journeys, which reduces the appeal of this mode as opposed to the use of personal vehicles. In seeking to address this 'first- and last-mile' problem, transportation agencies have increasingly turned toward "microtransit" - or on-demand ridesharing services - as a potential solution. Microtransit increases the flexibility of transit service by providing non-fixed pickup and drop-off locations, catering directly to more locations within a given area. The low-income communities which are most dependent on low-cost, dependable transit may find this approach helpful in achieving higher levels of upward social mobility and workplace integration. However, in evaluating the promise of microtransit, we need to consider the constraints of its ability to increase employment opportunities for underserved populations. The purpose of this research project is to carry out a test of the efficacy of microtransit in making more jobs available to minority and/or low-income Americans. It does so by investigating whether job access has been enhanced within low-income communities which have access to light-rail transit stations combined with a public microtransit service. One station and adjacent microtransit service area from Dallas, TX and Los Angeles, CA will be selected and, using US Census and American Community Survey data, each area's socioeconomic status and internal employment opportunities measured. The study will then determine the accessibility of those employment opportunities within half-mile radii of light-rail transit stations versus expanded zones made accessible by microtransit service.

CODE-SWITCHING WITHIN THE LGBTQ+ COMMUNITY

Presenter: Brandon Roberts
Category: Arts & Humanities
Room Location: Online Only
Number: 4172
Mentor: Steven Fraiberg

For years the LGBTQ+ community has struggled to fit into society and one of the ways in which they have adapted to fit into a heteronormative cisgendered society is through language. For people in minority groups they often have their own insider language that they communicate with members of their own in groups and switch out of when interacting with people who are not a part of their group. To discover more about code-switching in this specific community, I engaged in an ethnographic project and collected data in multiple ways, such as conducting semi-structured interviews with my peers who are a part of the LGBTQ+ community and engaging in participant-observations. To triangulate all of the data collected, I identified patterns and themes in their language, communication, and interactions. The purpose of this presentation is to present my findings on code-switching in the LGBTQ+ community to members of Michigan State University. The information that is found from this study has the possibility to make it easier for those not a part of the community to understand members of the LGBTQ+ community as well as make it easier to communicate.

DANCING THROUGH EMOTION

Presenter: Maya Elliott
Category: Arts & Humanities
Room Location: Online Only
Number: 4173
Mentor: Alison Dobbins

For my presentation, I plan to study a dance performance for Spring 2022. The key question in this research explore: How can we get the audience more involved in the dance? When dancers perform, they perform with a purpose. They listen to the music that they are dancing to and create emotion through a story. When performers are dancing on stage, there may be times where you cannot truly understand their emotions until you feel them yourself. For example, the audience can enjoy a dance but because they have not performed the dance, they may not know the true meaning behind it. An audience that shifts from passive to active involvement in the dance will create a deeper emotional impact. To ensure that audience feel an emotional impact, it would be nice to get an opinion from some audience members about their emotions while watching the dance.

THE IMPACT OF AUGMENTED REALITY ON THE UNDERSTANDING AND COMPREHENSION OF CONCEPTS IN A PERFORMANCE

Presenter: Insiyah Shakir
Category: Arts & Humanities
Room Location: Online Only
Number: 4174
Mentor: Alison Dobbins

For my project I am studying how augmented reality can be used in order to help an audience better understand the concepts of a performance. I am planning on analyzing different augmented reality performances in order to see if these performances can help increase an audience's participation and enjoyment for these performances. When creating an augmented reality many different aspects need to be carefully considered in order to make a successful and thorough experience for the audience. For example, the creators of these performances need to make sure that all senses are accounted for (smell, taste, sound, sight, and even touch) so thatthe audience is actually successfully immersed in the augmented reality. These performances also need to include some point of interest that will hold the audience's attention in order to keep them interested and engaged. These performances should include interactive elements that are realistic and match what would be expected in the real world. If these rules are applied correctly the audience may be able to learn about different experiences that the audience may not be able to actually experience in real life. My goal is to study effective augmented realities in order to see if they can help an audience understand different concepts that are being presented in the performance. Specifically, I am studying how augmented reality can be used in order to give people a better understanding of how forestry and ecology works.

STUDIO ASSISTANT MACHINE (S.A.M.)

Presenter: Jessie Gott
Category: Arts & Humanities
Room Location: Online Only
Number: 4181
Mentor: Abhishek Narula

The Studio Assistant Machine, or S.A.M., is a painting machine that assists you in your process by painting alongside you. As humans, nothing we do is ever truly random, and this is something I've struggled with in my own work, as I often find myself overthinking and making calculated decisions in attempts to be random and spontaneous. I have constructed a machine that I could paint alongside with to create a work of calculated chaos, with myself being more calculated (even when trying to be random) and S.A.M. making more chaotic and spontaneous brushstrokes. The machine is comprised of a motorized arm that sweeps back and forth across a canvas, attached to an easel to create the optimal studio experience for the artist. The Studio Assistant Machine moves quickly and pauses between movements as if to contemplate where it will go next, while I paint with it, attempting to keep up with its quick pace. The piece is performative in that over time, as we paint together, we see lines appear and disappear, speaking to the process of painting as it is all about mark making and reworking what has already been put onto the surface. In this piece, I show the combination of efforts of myself and the machine to create an end product that I never could have made on my own.

BENI (BEWILDERED BY EVERYTHING AND NEEDING INTERVENTION)

Presenter: Theo Durrett
Category: Arts & Humanities
Room Location: Online Only
Number: 4182
Mentor: Abhishek Narula

BENI is a foot long robot who is capable of creating drawings from straight and wavy lines as he is pulled across a long roll of paper (30ft +) . However, he also represents my (the presenter's) ADHD. In order to complete his simple job, he needs assistance from the presenter to stay on track and keep moving. The arm on his back meant to draw the wavy lines only moves when you yell encouragingly at him. The cord by which he is pulled needs to be readjusted periodically to keep him moving at a steady pace. Whenever he strays too close to the edge of the paper he needs to be reoriented. BENI's wheels were made using woodworking techniques and his body was cut out of chipboard. His sound sensitivity and propulsion systems were coded using two arduino uno boards.

MEAT MARKET

Presenter: Taryn Renshaw
Category: Arts & Humanities
Room Location: Online Only
Number: 4183
Mentor: Lorelei Jones

An array of meat has been laid out on a tarp as market sounds play from a speaker. An audience member will come and sit in front of the tarp and don gloves. The market master (Taryn) asks what meat the audience member wants, the market master gives the opposite

meat of what they ask for. The audience member has exactly 30 seconds to slap, rip, and abuse pieces of meat from the selection. If they stop under or go over 30 seconds, they will be sprayed with a water bottle as the market master shouts, "I SAID 30 SECONDS!" The market master then directs the audience member to hold on to the meat and come back 5 minutes before the end of the set. For 1 minute and 30 seconds, the group of audience members trade and barter with their meat. At exactly 1 minute and 30 seconds, the market master lets out a blood-curdling scream. After the scream, the market master collects the meat and gloves, and states, in a very chipper voice, "All clean! It's like nothing ever happened."This work explores the concepts of human trafficking and the cycle of abuse. This work simulates the abuse, physical, sexual, or psychological, that many people will inevitably go through in some form during their lives. The artist effectively turns themself and the audience members into the perpetrators of abusive behavior.

MUSIC: AN EARLY JAZZ MUSICIAN'S JOURNEY INTO FILM SCORING

Presenter: Hugh Downs
Category: Arts & Humanities
Room Location: Online Only
Number: 4184
Mentor: Randell Napoleon

Early jazz musician Hugh Downs, set out to discover the process of a jazz musician becoming a film composer. Last summer, during the month of July, he traveled to Bulgaria to gain practical experience in film composing at the Europe Film Academy. As a participant-observer, he developed abilities in writing for film, recorded with musicians live, connected with composers in the film music industry, and worked with a team of highly experienced faculty. Presented here are excerpts of the live recording sessions of his compositions recorded at the Bulgarian National Radio Studio.

SEARCHING

Presenter: Reese’SaMone Tatum
Category: Arts & Humanities
Room Location: Online Only
Number: 4185
Mentor: Tama Hamilton Wray

Historically when colonizers overrule and take over land, aboriginal culture, religion, and history is wiped from the native citizens of that land. This raises the question of when history is taught, who is in power to tell the story, and from what perspective? Through the exploration of the historical relationship between African Americans & Indigenous Americans, we can view and analyze its intersectionality. Furthermore, this research investigates how both ethnic groups have been named and classified in law as well as official and everyday spaces. These classifications have impacted people's culture and freedom. Through the primary sources and historical documents woven into the art piece, we can analyze history that has been neglected at the non-university level. As well as viewing an interpretation of the information gathered from earlier findings. Knowing your history gives you knowledge of your identity. What is the use of identification when you do not know who you are nor where you come from?

HISTORY AND TESTIMONY IN THE DIGITAL AGE: STUDYING HOLOCAUST SURVIVORS PANEL 1

Presenters: Kira Arvanitis, Julian Akkashian, Amino Dahir, Isabelle Fanning
Category: Arts & Humanities
Room Location: Online Only
Number: 4191 - 4194
Mentor: Amy Simon, Deborah Margolis, Steven Weiland

Survivors of the Holocaust have provided vivid accounts of their experience. Over 52,000 video and audio testimonies at the USC Shoah Foundation's Visual History Archive document the impact of the Holocaust on Jews and other victims of the Nazis. They help us to understand what can be learned about the Holocaust from the perspective of those who survived to tell their stories? We can capitalize on digital resources to complement traditional textual ones in doing research in a domain of inquiry with profound historical and personal meanings. This panel (one of two) reflects study of Doris Bergen's authoritative War and Genocide and presents examples from the testimony of Holocaust experience on these themes: a) Foreign Aid in fighting the War and its Effect on Victims; b) Forced sterilization and the Holocaust c) To what extent did the Nazi revolution become routinized in the lives of ordinary Germans?; and d) Power Dynamics: The Kapo and Badge System.

HISTORY AND TESTIMONY IN THE DIGITAL AGE: STUDYING HOLOCAUST SURVIVORS PANEL 2

Presenters: Mathew Yonan, Allison Klonowski, Abby Mondro, Katie Von Steinman
Category: Arts & Humanities
Room Location: Online Only
Number: 4195 - 4198
Mentor: Steven Weiland, Deborah Margolis, Amy Simon

Survivors of the Holocaust have provided vivid accounts of their experience. Over 52,000 videos and audio testimonies at the USC Shoah Foundation's Visual History Archive document the impact of the Holocaust on Jews and other victims of the Nazis. They help us to understand what can be learned about the Holocaust from the perspective of those who survived to tell their stories. We can capitalize on digital resources to complement traditional textual ones in doing research in a domain of inquiry with profound historical and personal meanings. This panel (one of two) reflected the study of Doris Bergen's authoritative War and Genocide and presented examples from the testimony of the Holocaust experience on these themes: a) Poles and the Holocaust: Survival or Betrayal?; b) The Experiences of Polish Camp Prisoners; c) The Psychological Effects That Hiding Had on Holocaust Survivors; and d) Resistance, Fear, and the Gas Chambers

SCIENCE & ENGINEERING
Virtual Poster Presentations

TONO-VERA ALIGNMENT ACCURACY

Presenter: Ava Cabble
Category: Science & Engineering
Room Location: Online Only
Number: 4201
Mentor: Andras Komaromy

Objective: To assess the efficacy of the automatic alignment feature of the Tono-VeraTM (Reichert, Depew NY) rebound tonometer and compare its measurements to the manual feature without the alignment system enabled. Animals Studied: 22 glaucomatous Beagles with ADAMTS10-open-angle glaucoma (OAG), 2 carrier Beagles of ADAMTS10-OAG, 1 normal Beagle, and 1 Beagle with achromatopsia. Procedures: In each dog, intraocular pressure (IOP) readings were collected using three different techniques with the Tono-Vera™: an average of 3 measurements with the alignment system, 1 measurement with the alignment system, and 3 measurements obtained manually without the alignment system. The order of collection measures was randomized when collecting IOPs from each dog. IOPs were collected from a total of 49 eyes by two different tonometer users. Some animals were collected from more than once, but never more than once on the same day. Results: TBD Conclusion: TBD

NOVEL DETERMINANTS OF PLURIPOTENT STEM CELL DIFFERENTIATION TO PRIMORDIAL GERM CELLS, AND THEIR SIGNIFICANCE

Presenter: Brandon Hajnos
Category: Science & Engineering
Room Location: Online Only
Number: 4202
Mentor: Yuan Wang, Yilin Xie

Pluripotent stem cells (PSCs) and more specifically, using mouse PSCs to generate primordial germ cells (PGCs) in large quantities to discover novel molecular determinants and their mechanisms regarding establishing the germline. To achieve this main goal, candidates (factors/regulators) must be recognized in their respected roles in regard to the specialization of PSCs to PGCs. The candidates were identified using CRISPR/CAS9 screening. The functional impacts of these candidates will be explored upon their expression being altered/disturbed.

PHYTOCHEMICAL DRUG DISCOVERY FOR COVID-19 USING HIGH-RESOLUTION COMPUTATIONAL DOCKING AND MACHINE LEARNING ASSISTED BINDER PREDICTION

Presenter: Theodore Belecciu
Category: Science & Engineering
Time Slot: 8:30 - 9:30 AM
Room Location: Online Only
Number: 4203
Mentor: Daniel Woldring, Zirui Wang

The COVID-19 pandemic has wreaked havoc on the world for two years now, and although vaccines are now available, there are many regions of the world that do not have adequate access to them. Moreover, variants may emerge that are resistant to existing vaccines, and therefore cheap and readily obtainable therapeutics are needed. Phytochemicals, or plant chemicals, can be possible therapeutic options, since many of them have documented antiviral properties. Such compounds are often both abundant and safe. If these substances bind to key SARS-CoV-2 proteins and disrupt their function, viral replication will be inhibited. Computational screening methods have advanced considerably in recent years, and they can expedite drug discovery efforts by showing which substances have high binding affinities to certain proteins. In this study, we screen a large phytochemical library against a comprehensive set of SARS- CoV-2 proteins using a high-throughput computational workflow. We accomplish this using both a standard Rosetta protein-ligand docking protocol and ligand based virtual screening (LBVS) with machine learning. Using the standard protein-ligand docking protocol on an initial phytochemical library, we identified 34 lead compounds. Using structural and chemical features of these 34 leads, our LBVS was available to identify 53 possible leads, of which 28 were validated through another round of protein-ligand docking. Lastly, our total 62 leads underwent a computational ADME screening, where 18 of these leads showed promising pharmacokinetic properties. Overall, this study demonstrates how a high-throughput computational workflow can be applied to screen large numbers of potential COVID-19 therapeutics.

INTERACTIONS OF LATE STAGE ENDOSPORULATION PROTEINS IN BACILLUS SUBTILIS

Presenter: Maura Barrett
Category: Science & Engineering
Room Location: Online Only
Number: 4204
Mentor: Lee Kroos

Bacillus subtillis, a Gram-positive soil bacterium, undergoes endosporulation during starvation conditions. During endosporulation, the intramembrane metalloprotease, SpoIVFB, activates the transcription factor σK. Two inhibitory proteins, SpoIVFA and BofA, regulate SpoIVFB activity, preventing cleavage of ProσK's pro-domain . Signaling from the forespore releases inhibition. When activated, σK RNA polymerase expresses the products that form the spore coat and lyse the mother cell. It is currently unknown how BofA and SpoIVFA interact with each other and with SpoIVFB. Previous work suggests that BofA and SpoIVFA may interact through their C-terminal regions. To study this, Escherichia coli was engineered to express a vector containing Cys-less Pro-σK and SpoIVFB with Mono-Cys variants of BofA and SpoIVFA. The cysteine residues were added to the C-terminal regions of BofA and SpoIVFA. If two residues are in

proximity to each other, a disulfide bond will form after exposure to the oxidant Cu2+(1,10-phenanthroline)3. Multiple variants were tested; however, no complex was observed. New information from a coevolutionary model suggests that there may be areas of interaction between the C-terminal end of MBP-BofA and SpoIVFB. Currently experimentation is directed towards constructing plasmids with Mono-Cys variants of each and crosslinking samples to elucidate areas of proximity. If areas of interaction are found, it would help in confirming the current model as well as the coevolutionary model. Our work aims to improve knowledge of intramembrane metalloproteases and their regulation.

ENGINEERING RADIOPAQUE MATERIALS FOR BIOMEDICAL IMAGING

Presenter: Laney Buchanan
Category: Science & Engineering
Room Location: Online Only
Number: 4205
Mentor: Kendell Pawelec

Radiologists use clinical imaging like Computed Tomography (CT), Magnetic Resonance Imaging (MRI), or Ultrasound to check the location and integrity of the biomedical devices. However, most devices, once implanted, are difficult to distinguish from native tissue. Adding contrast agents to these devices significantly improves radiologists' evaluation of the implant location, type, and damage. A 20-week degradation study was designed to characterize what is needed to translate biomedical devices incorporating CT visible contrast agent Tantalum Oxide (TaOx) nanoparticles. TaOx nanoparticles were incorporated into scaffolds mimicking biomedical devices, made from one of three FDA approved biocompatible polymers: Poly(ε-caprolactone)(PCL), 50:50 (poly(lactide-co-glycolide)(PLGA), or 85:15 (poly(lactide-co-glycolide) (PLGA). To assess the effect of TaOx on degradation, four different weight percentages of TaOx were used in each of the three polymer matrices: 0wt%, 5wt%, 20wt%, and 40wt%. Degradation media was either phosphate buffered saline (PBS) (pH 7.4), sodium citrate buffer (pH 6.5), or sodium citrate buffer (pH 5.5). PBS mimics a normal human tissue pH. Citrate buffer (pH 6.5) mimics acute inflammation and tissue acidosis and relates more closely to pH values found in vivo after implantation. Citrate buffer (pH 5.5) mimics lysosomal space and highlights the worst-case scenario devices will encounter after implantation. Each week, mechanical properties, mass loss, and radiopacity were recorded. Data was also collected and analyzed using MicroCT scans, supernatants were changed in eppendorf tubes to maintain sink conditions, and scaffold mechanical testing was performed.

GENERATION OF A MAMMALIAN CELL LINE THAT SECRETES BIOLUMINESCENT EXTRACELLULAR VESICLES

Presenter: Jeannie Lam
Category: Science & Engineering
Room Location: Online Only
Number: 4206
Mentor: Masako Harada

Extracellular vesicles (EVs) are naturally occurring membrane-bound vesicles that mediate intercellular communication through transporting proteins, lipids, and nucleic acids, thus, they

have the potential to be used as therapeutic delivery vehicles. Our project aims to replace the protein expressed on the surface of EVs with gaussia luciferase (gLuc), a bioluminescent protein found in marine copepods for imaging the EVs. We used PCR to amplify the gLuc insert and the backbone which were then imaged using gel electrophoresis. This gLuc insert along with the backbone were purified and then recombined through Seamless Ligation Cloning Extract (SLiCE), a novel cloning technique that utilizes bacterial cell extracts to create recombinant plasmids through homologous recombination in a single in vitro reaction. The plan is to use this construct to integrate the gLuc fragment into a mammalian cell genome using the CRISPR/cas9 system. As of now, we have created the intended recombinant plasmid and have purified the plasmid from cells as well as created a glycerol stock of the cells. Our goal is to produce cells that naturally secrete gLuc-labeled EVs using the CRISPR/Cas9 system.

DIAGNOSTIC APPLICATIONS OF APTAMER PROBES AGAINST PATHOGEN SPECIFIC MYCOBACTERIUM BOVIS BIOMARKERS

Presenter: Ethan Hall
Category: Science & Engineering
Room Location: Online Only
Number: 4207
Mentor: Srinand Sreevatsan

Mycobacterium bovis is an upper respiratory disease found primarily in cattle although it can infect many other animals, including humans. The current diagnostic test for this disease is based on immune response to an insertion of the protein tuberculin into the skin. However, because this test must be read 72 hours after administration, this test is often time consuming and in areas with limited veterinary access, may not be rapid enough and demands a double visit by a veterinarian which is also costly. To improve diagnostic time and accessibility we will test DNA aptamers against an identified M.bovis protein. Aptamers are short, single stranded nucleic acid molecules that bind specifically to target proteins like antibodies. Electrophoretic mobility shift assays (EMSA) will be used to test our aptamer binding affinity and DNase footprinting will be used to determine the functional region of the aptamer. The final hope for this project is to create a lateral flow testing device to expedite the time needed to diagnose animals and to lessen the burden of cost.

DOES LIGHT COMPOSITION IMPACT STRESS LEVELS OF SHELTER CATS?

Presenter: Mary Gardella
Category: Science & Engineering
Room Location: Online Only
Number: 4208
Mentor: Alexandra Yaw, Hanne Hoffmann, Jacquelyn Jacobs

While animal shelters are essential for keeping cats safe from unfit living conditions, they are a stressful environment. Stress increases cortisol and promotes undesired behaviors such as aggression and hiding. Reducing stress in shelter cats can make them more attractive for prospective adopters and reduce their duration of time in the shelter. Previous studies found that light composition impacts behavior, where blue light has an arousing effect, while dim and red light is calming. Based on this, we investigated how cats are affected by the shelter room light composition. I hypothesize that reducing light intensity and removing blue light wavelengths will reduce cat stress as compared to white lighting. Three lighting conditions were studied

(white, dim, and blue-depleted light) during the first 6 days the cats were in the shelter, with assessment of stress through cortisol measures and behavioral approach tests in adult, single-housed male and female cats. For all conditions, behavioral stress scores decreased over the enrollment period. A significant correlation was found between cortisol levels and behavior stress scores for cats on white light, but not on dim and blue-depleted light. Interestingly, preliminary data show that female cats had lower behavioral stress scores and lower cortisol levels on blue-depleted and dim light, as compared to white light. Male data is less clear, but trends in the same direction. This shows for the first time that room light manipulation can help shelters enact easy and inexpensive changes that make the adjustment period shorter and easier for incoming cats.

NEMATODE VECTORING ENDOBACTERIA BETWEEN FUNGAL ISOLATES

Presenter: Ashley Barstow
Category: Science & Engineering
Room Location: Online Only
Number: 4211
Mentor: Gregory Bonito

Fungal endobacteria of the genera Mycoavidus and others related to Mollicutes show evidence of horizontal transfer between fungal lineages. However, the mechanism of this transmission is unknown. Mycophagy is hypothesized to be a mechanism that may account for the horizontal transmission of endobacteria from one individual or species to another. To test this hypothesis experiments were conducted with mycophagous nematodes. This experiment included growing a fungal strain with confirmed endobacteria and using mycophagous nematodes to determine if they can facilitate the horizontal transfer of the endobacteria. There has been evidence that shows that nematodes can carry and defecate viable bacteria. Utilizing this knowledge, allowing nematodes to feed on one strain with endobacteria, and then introducing it to a strain without the presence of the endobacteria could show that fungi can uptake the endobacteria. This could allude to the origin of the relationship between the fungi and the endobacteria. Upon analysis, endobacteria DNA was detected within the fungi that had been introduced to the nematodes previously grazing on fungi with endobacteria.

TAILORING THE ELECTRONIC PROPERTIES OF POTASSIUM-INTERCALATED BIRNESSITES VIA TRANSITION METAL SUBSTITUTION FOR ARTIFICIAL PHOTOSYNTHESIS

Presenter: Rachel Schenck
Category: Science & Engineering
Room Location: Online Only
Number: 4212
Mentor: Jose Mendoza Cortes

The Earth receives more solar energy in 1 hour than humanity's entire annual energy budget. Despite this, more than 80% of our energy consumption comes from fossil fuels. Technologies that can efficiently convert sunlight into useful energy have the potential to revolutionize energy production. One such technology is photocatalytic water splitting, where you use sunlight to split water to create a chemical fuel; Artificial Photosynthesis. Birnessites are structures composed of edge-sharing transition metal oxide octahedrae intercalated with positively- charged ions that

can be used as catalysts in water splitting. Past research by Lucht and Mendoza [JPC-C 2015, 40, 22838] found that birnessite bulk will have very different electronic properties compared to the slab birnessites with the same composition due to an decrease in the band gap from ≈5 to ≈3 eV, suggesting this could be used for trapping sunlight. In this work, we study the effect of varying the transition metals in potassium-intercalated birnesites using first-principles Density Functional Theory (DFT). The calculations required first optimizing their structures, energy and properties of the birnessites with various transition metals(TM). We found that -in bulk form- most of the transition metal oxides yield semiconducting or insulating behavior. Based on these findings, we hypothesized that our slab structures will have a smaller band gap that can be useful for sunlight-capture. In future work, we will explore how tailoring these electronic properties by using different TM can lead to the design of more efficient catalysts for water splitting and sunlight-capture materials.

DETECTION OF FOODBORNE PATHOGENS USING A COMPUTER PROGRAM

Presenter: Varsha Rajagopalan
Category: Science & Engineering
Room Location: Online Only
Number: 4213
Mentor: Evangelyn Alocilja, Emma Dester

Data from the Centers for Disease Control and Prevention (CDC) show that there are an estimated 38.4 million cases of foodborne illnesses in the United States every year. Therefore, preventative measures need to be taken in order to reduce the number of cases of foodborne illnesses. A fundamental procedure of foodborne illness reduction is the detection of harmful bacteria in food before it passes to the consumer. One way to achieve this outcome is through a biosensor. In this study, a gold nanoparticle biosensor is used to rapidly and economically detect foodborne bacteria using a visual colorimetric result. This specific project is focused on the development of a computer program that would quantify the color values in order to determine the presence or absence of the pathogen. This computer program is accessible and a low-cost alternative to expensive spectrometry equipment which is normally used for sample analysis. By making this biosensing technology more accessible, it can have a more positive impact on society as it would help reduce cases of foodborne illnesses.

SHI DOKU BOARD SOLUTIONS: HOW MANY CLUES IS ENOUGH?

Presenter: Logan Fica
Category: Science & Engineering
Room Location: Online Only
Number: 4214
Additional Student Presenters: Grace MacLaren, Emma Losey
Mentor: Robert Bell, Richard Edwards

Sudoku puzzles are a puzzle played on a 3x3 grid of boxes. Each box contains the numbers 1-9 that cannot be repeated within a box, row, or column. There exist points while solving where a square can contain multiple numbers and the puzzle can still be finished successfully. This relationship seems to be based on the number of clues. The inclusion of a new clue can eliminate a possible value in a square, e.g. a puzzle may exist that can be solved with either 1 or 3 in the same position, but the inclusion of another clue could eliminate an option and further limit solution puzzles. Adding clues continues to reduce possible solutions until there is only

one. Python and algebraic methods were used to determine the number of clues necessary to reach this point for Shi Doku puzzles, which are a 2x2 grid that use the numbers 1-4. Additionally, we investigate how this relationship depends on the location and layout of the clues.

ANTIBIOTIC RESISTANCE IN SOILS FERTILIZED WITH DUCKWEED BIOMASS

Presenter: Ian Chesla
Category: Science & Engineering
Room Location: Online Only
Number: 4215
Mentor: Dawn Dechand

Land application of duckweed (Lemna minor) grown in constructed treatment wetlands recovers nutrients from wastewater but can introduce antibiotics found in waste streams to the soil. This study aims to assess if the addition of duckweed used to treat wastewater containing antibiotics to planted soils correlates with a higher antibiotic resistance of Escherichia coli in the soil. Duckweed was exposed for one week to synthetic wastewater containing environmentally relevant concentrations of the antibiotics tetracycline, oxytetracycline, and sulfamethazine at 48, 47, and 0.3 micrograms/liter respectively. The plant Arabidopsis was grown for four weeks in soil columns filled with sandy silt soil that had E. coli incorporated into the soil. Columns were fertilized based on four treatments. (1) a no-fertilizer control, (2) a conventional-fertilizer, (3) duckweed with sorbed antibiotics, and (4) duckweed with sorbed and metabolizedantibiotics. The duckweed treatments were created by exposed active and inactivated duckweed to synthetic wastewater antibiotics. At the end of the 4-week period, E. Coli will be cultured from the soil on Meuller-Hinton agar and analyzed for antibiotic resistance using the disk diffusion method. It is expected that soils exposed to the duckweed samples will display more antibiotic resistance. Through this study a potential negative impact of a beneficial nutrient recovery strategy can be better assessed.

MIGHT STANDARDIZED FIELD STAFF RATINGS HELP IMPROVE EPIDEMIOLOGY'S DEMENTIA RESEARCH?

Presenter: Will Schieber
Category: Science & Engineering
Room Location: Online Only
Number: 4216
Mentor: James (Jim) Anthony

After decades of clinical research on patients, epidemiologists studying occurrence of dementia syndromes and other cognitive troubles in large population samples turned to abbreviated assessment or screening tools such as the Mini-Mental State Examination, recently converted to audio computer-assisted self-interview (ACASI) modules. In this project, the aim is to produce 'proof of concept' evidence that large sample population studies of cognitive troubles in older populations might be improved by having field staff make standardized ratings of difficulties faced by each study participant during the course of the ACASI assessment session. For this work, the study population includes non-institutionalized community-dwelling elders of the United States (US), as sampled, recruited, and assessed for each year's National Surveys on Drug Use and Health (NSDUH), 2002-2019. Field staff evaluated participant difficulty

understanding the ACASI items. Age-specific analysis-weighted proportions, with calculus (Taylor series) for variance estimation, have disclosed fairly regular age-specific occurrence of these difficulties, which might or might not be manifestations of dementia-related processes. In addition to age-specific estimates, year by year, I hope to present Bayesian 95% credible intervals for each cohort of elders sampled, recruited, and assessed in the NSDUH fieldwork between 2002 and 2019.

UTILIZING HYDRUS 1-D TO GUIDE PHOSPHORUS APPLICATION ON FARMLAND

Presenter: Greg Rouland
Category: Science & Engineering
Room Location: Online Only
Number: 4217
Mentor: Steven Safferman

Phosphorus is a critical nutrient necessary for plant growth and currently up to four year's worth of it can be applied at once. There is major concern concerning the amount of this limited nutrient that is wasted due to leaching through the soil. The goal of this project is to utilize Hydrus 1-D, a computational fluid dynamics modeling program, to develop a soil model that can be used to determine what types of Michigan soil are the most at risk for leaching. This model takes into various parameters such as soil type, rainfall, adsorption and applied phosphorus and the scenarios chosen represent 80% of the corn growing soil in the state of Michigan. Further manipulation can be done in order to determine the effect of greater rainfall or reduced phosphorus application. This information can then be used to guide farmers on best management practices for phosphorus application.

A NOVEL LOW-COAST APPROACH TO REDUCE STRESS IN SHELTER CATS

Presenter: Grace Jaksen
Category: Science & Engineering
Room Location: Online Only
Number: 4218
Mentor: Alexandra Yaw, Hanne Hoffmann, Jacquelyn Jacobs

Animal shelters around the country are overflowing with abandoned and stray cats, many of them never get adopted. Cat temperament is a deciding factor for many families when looking to adopt, and most cats' behavior in stressful shelter kennels is not reflective of their behavior outside of the shelter environment. One environmental factor known to regulate stress and behavior is light composition, however it remains unknown how light composition impacts cat stress and behavior. We hypothesize that dim and blue-depleted light will decrease stress behavior and increase locomotor activity in shelter cats. To understand the impact of light on feline stress, we evaluated cats at the Ingham County Animal Shelter under standard (bright white light), dim (white light) and blue-depleted light. The cats' stress was scored with the accredited Cat Stress Score behavioral approach test and locomotor activity was recorded continuously via smart collars. Our preliminary data show that dim and blue-depleted light allow female, and to a lesser degree male cats, to more rapidly reduce stress in response to the shelter environment. The activity data is currently being analyzed. We expect to find an increase in activity during the duration of shelter enrollment for all the cats, where cats on dim and blue-depleted light overall will have higher activity than cats on standard light. The preliminary data

indicates that using blue-depleted and dim light reduces cat stress. This project might lead to a low cost, non-invasive method for improving cat welfare and successful feline adoptions in the shelter.

AN INDUCED PLURIPOTENT STEM CELL APPROACH TO STUDY HUMAN POST-INFARCTION REMODELLING AND HEART REGENERATION

Presenter: Merlinda Sewavi
Category: Science & Engineering
Room Location: Online Only
Number: 4219
Mentor: Aitor Aguirre, Colin Ohern

Cardiovascular disease (CVD) is the leading cause of death in the developed world, contributing to of all human deaths. Acute cardiovascular events, such as myocardial infarction (MI), can result in sudden death or lead to chronic heart conditions, such as congestive heart failure (CHF). CHF can arise from a process called post-infarction remodeling, which has been studied extensively in adult mice. Scarring of the heart often leads to structural abnormalities that cause decreased contractile force and diminished systemic circulation, which are hallmarks of CHF. The emergence of human induced pluripotent stem cells (hiPSCs) has provided an alternative to study human heart tissue. The Aguirre lab recently published a protocol describing differentiation of hiPSC aggregates into human heart organoids (hHOs) that recapitulate the cellular, structural, and functional characteristics of the human heart. However, the hHOs lack innate immune cells, making the hHOs an insufficient model to study post-infarction remodeling and heart regeneration. To include macrophage populations within the hHOs, hiPSC derived monocytes are added to the hHOs during their development. The addition will consider the events that occur in heart development of humans, mice, and hHOs to select an appropriate time. The degree of immune cell integration in the hHOs will be visualized and quantified through immunofluorescence confocal microscopy. Preliminary data suggests there are monocyte-derived macrophages within the interstitial spaces and peripheral surfaces of the hHOs. With more development, ideally, the hHOs will model macrophage populations found in vivo to study post-infarction remodeling and regeneration in human heart tissue.

MINDFUL INTERVENTIONS ON ANTHROPOMETRIC AND BEHAVIORAL OUTCOMES IN NATIVE AMERICANS

Presenter: Jordan Fransik
Category: Science & Engineering
Room Location: Online Only
Number: 4221
Mentor: Tsui-Sui Kao

Native Americans suffer from obesity-related comorbidities: cardiovascular disease, diabetes, and premature death. This review examines characteristics of existing community programs targeting lifestyle behaviors and anthropometric outcomes in the Native American population. Guided by Whittemore and Knafl methodology (2005) an integrative literature review was conducted to understand the characteristics of existing lifestyle promotion community programs designed for Native Americans. Of 1024 eligible articles, 11 met the inclusion and exclusion criteria which is the Native American population, having a community-based approach, and have an anthropometric or behavioral outcome. This review included four experimental (36%), six descriptive (55%) and one study protocol (9%). The programs were led by community

members and included health education, personal interviews/coaching, and skill-building toolkits to enhance participants' healthy lifestyles. A total of 1,884 participants were included with a mean age around 24.9 years (7/11 articles) and with majority females (72% among 5 articles specifying gender). About 45% of studies (5/11) showed significant change ($p<.05$). Among these five studies, 80% (4/5) showed significant changes in BMI, body fat percent (%BF), waist circumference (WC), and Self-efficacy scores in physical activity (PA) and healthy eating. One study showed significant associations between adult's and child's PA which are closely associated with television and computer use at home. It's clear that community-based programs show promise in terms of engaging and promoting Native Americans' healthy lifestyles particularly when they're significantly associated with anthropometric changes. Thus, more efforts are needed to understand how to mitigate obesity- related comorbidities. Furthermore, consideration of cultural humility is critical to program success.

THE STRESS AND RESPONSIBILITIES OF MICHIGAN CLINICAL NURSE SPECIALISTS DURING THE COVID-19 PANDEMIC?

Presenter: Chloe Gordon
Category: Science & Engineering
Room Location: Online Only
Number: 4222
Mentor: Jackeline Iseler

This study aims to describe the relationship between individual, geographical, and institutional factors correlated with informal and formal role changes of clinical nurse specialists (CNS) in Michigan during the coronavirus disease 2019 (COVID-19) pandemic. This cross sectional, descriptive study aims to analyze the relationship between various factors and the roles and stress levels of CNSs in Michigan during the pandemic. Average stress at work and home for married CNSs was slightly higher than single. CNSs who worked in maternal and child health had the highest stress levels at work and home. Self-identified, interdisciplinary, and bedside nurse-initiated, increased the CNSs' responsibilities for CNSs working in COVID units and adult patients in acute through critical care. Notably, younger CNSs did not initiate new responsibilities for themselves as often and older nurses were called upon for help less often by the bedside nurses. Despite increases in responsibilities, CNSs did not go through formal job description changes. Stress levels and responsibilities were most influenced by age, patient population, and marital status. The sample was not diverse enough to analyze the influence of gender, race, or ethnicity on stress or responsibilities.

UNDERSTANDING KNOWLEDGE OF SODIUM CONTENT IN COMMONLY USED FOOD ITEMS IN PATIENTS WITH CARDIOVASCULAR DISEASE

Presenter: Victoria Matovski
Category: Science & Engineering
Room Location: Online Only
Number: 4223
Mentor: Pallav Deka

Cardiovascular diseases account for the largest number of deaths globally every year. A restricted sodium diet is often part of the management of most common cardiovascular

diseases such as hypertension, heart failure, coronary artery disease, etc. For long-term adherence to the recommended levels of sodium, it is important to understand if patients with cardiovascular diseases are knowledgeable of the amount of sodium in food items. As such, the purpose of the study is to determine if patients with cardiovascular diseases can accurately determine the sodium content in commonly consumed food items. In this cross-sectional study, a total of 100 participants, during their regular visit to the cardiologist, will respond to a survey indicating the amount of sodium they think is present in one serving of 70 different food items. Participants will be recruited from Capital Cardiology PC located in Lansing, Michigan. An independent t-test will be done to analyze any significant difference in the actual sodium content in the food items and that indicated by the participants. The IRB application has been submitted. Data collected will start in February and will be completed in March. The significance level will be set at α=.05. Data will be analyzed using SPSS version 25.

THE EFFECTS OF PRAIRIE STRIPS ON PERMANGANATE OXIDIZABLE CARBON

Presenter: Ceco Maples
Category: Science & Engineering
Room Location: Online Only
Number: 4224
Mentor: Corinn Rutkoski, Sarah Evans

Agricultural systems have the potential to sequester soil carbon through regenerative land management practices. However, because soil carbon requires decades to centuries to form and stabilize, it is difficult to measure short-term effects of management practices on soil carbon accrual. Active carbon, a labile C pool that is accessible to soil microbiota, has been shown to respond quickly to changes in management and serve as an early indicator of long term C sequestration. In this project, we examine the influence of in-field prairie plantings (prairie strips) on soil active carbon. Soil samples were collected in 2019 and 2020 from Neal Smith National Wildlife Refuge (Prairie City, IA), where prairie strips were planted in 2007. Soils were analyzed for permanganate oxidizable carbon (POXC) as a measure of the active C pool. After 13 years of prairie strip establishment, there was no evidence of POXC accrual in or near prairie strips. Prairie strip soils contained the same amount of POXC as row crop soils at the same landscape position. Whereas crop POXC decreased from 2019 to 2020, prairie strip POXC was unchanged. Prairie strips appear to retain - but not increase - soil active C relative to crop soils after more than a decade of establishment.

HARACTERIZING HOW THE TRANSCRIPTION FACTOR TFOY POSITIVELY REGULATES MOTILITY IN VIBRIO CHOLERAE

Presenter: Brennan Grimes
Category: Science & Engineering
Room Location: Online Only
Number: 4225
Mentor: Christopher Waters

The bacterial pathogen Vibrio cholerae, the causative agent of the diarrheal disease cholera, transitions between aquatic and gastrointestinal environments during the infection process. The second messenger cyclic-di-GMP aids in this transition by regulating many phenotypes

including biofilm formation and motility. We have previously shown the cyclic-di-GMP regulated transcription factor TfoY regulates motility of V. cholerae to create three distinct motility states in response to changing cellular cyclic-di-GMP levels. At low cellular cyclic-di-GMP levels, when TfoY accumulation is highest, a highly motile phenotype designated the "dispersive state" is observed. TfoY is known to be regulated by cyclic-di-GMP dependent mechanisms at the transcriptional and post-transcriptional level. The mechanism by which TfoY induces dispersive motility remains uncharacterized. The formation of cyclic-di-GMP is catalyzed by diguanylate cyclase (DGC) enzymes and degraded by phosphodiesterase (PDE) enzymes, and biofilm formation and motility are dependent on several DGCs and PDEs. Thus, I hypothesize that TfoY induces dispersive motility by reducing cyclic-di-GMP concentrations through the repression of DGCs or the activation of PDEs. To test the effects of TfoY on intracellular cyclic-di-GMP levels, I conjugated a cyclic-di-GMP biosensor into various V. cholerae strains including the wild type and tfoY mutant, and the fluorescence levels will be monitored over twelve hours. The results of this experiment will indicate whether TfoY regulates cyclic di-GMP and allow the identification of specific DGCs and PDEs that are regulated. My findings will lead to a better understanding of TfoY's regulatory mechanism and its role in the ability of V. cholerae to cause disease.

LISTERIOSIS DRIVES PERTURBATIONS IN THE EICOSANOID PATHWAY

Presenter: Pam Jones
Category: Science & Engineering
Room Location: Online Only
Number: 4226
Mentor: Kayla Conner, Jonathan Hardy

Prenatal infections can pose great danger to both mother and fetus. These infections can trigger adverse pregnancy outcomes including miscarriage, stillbirth, and pre-term labor (PTL). One pathogen commonly associated with fetal-maternal infections is Listeria monocytogenes (Lm). Lm is a relatively common food contaminant and is dangerous to immunocompromised people, such as pregnant women. Lm can cross many physiological barriers, allowing it to colonize the placenta. Animal models of pregnancy- associated listeriosis have demonstrated its ability to induce PTL but the exact mechanisms underlying this outcome are unknown. To study this infection pathway, we used a mouse model of pregnancy-associated listeriosis in pregnant CD-1 mice. In this model, we have shown that Lm infection alters eicosanoid concentrations in the placenta. Specifically, concentrations of prostaglandins E2 (PGE2) and F2α (PGF2α)are increased in infected placentas compared to uninfected controls. Both are known to play key roles in the regulation of labor. The goal of this project was to investigate the potential routes for disturbance along the eicosanoid pathway which could lead to altered placental eicosanoid concentrations. Identification of eicosanoid pathway perturbations in Lm infection could aid in development of intervention strategies to mitigate or prevent Lm-induced PTL. Additionally, this work could inform on more general mechanisms of PTL induction associated with other placental pathogens.

RELATIONSHIPS OF LENGTH VS. WEIGHT TO ESTIMATE BIOMASS

Presenter: Amy Vodopyanov
Category: Science & Engineering
Room Location: Online Only
Number: 4227
Mentor: Nina Wale, Lindsey Thompson

Nutrient cycling is a process by which organic and/or inorganic matter is transferred back and forth from the environment to its living organisms. Daphnia are a planktonic crustacean, commonly referred to as water fleas. In their freshwater ecosystems, they are a vital contribution to the overall biomass. Daphnia feed on algae and are prey for some fish and insects. Their secretion feeds algae, which in turn converts carbon dioxide into oxygen, allowing for all other life in the ecosystem to respirate. In my research, I am deriving a relationship of length versus weight of two subgenera of Daphnia, magna and dentifera, to interpret biomass. Host clones, D. magna 6A and D. dentifera mid37, produced in the lab as a control, cohorts are collected every week to measure length and weight for each age group. These measurements, applied in a linear regression model, allow for the understanding of Daphnia's contribution to the overall biomass of their ecosystems.

COVID-19 RESPONSES IN SLUMS ACROSS THE GLOBE

Presenter: Abhinav Patelu
Category: Science & Engineering
Room Location: Online Only
Number: 4228
Mentor: Guo Chen

Throughout slums around the world, there are visible disparities in the quality of life among residents living in these overcrowded urban conditions in comparison to others. These disparities have been strengthened through the pandemic when overcrowded communities, including slums, have consistently faced higher case rates, death rates, and hospitalization rates of COVID-19 while simultaneously receiving minimal government attention during the pandemic. Therefore, it is necessary to understand and learn disease transmission prevention methods, maintain proper hospital and healthcare services, and educate underprivileged slum communities regarding infectious transmission. Research has been conducted on all these services but consistently fails to enact changes in all slum communities. To better improve this, information from various research projects investigated key findings regarding methods to better enforce pandemic prevention and treatment. This information is further organized to include visual representations and photo documentaries to expose slum conditions and depict proper pandemic etiquette. Overall, adequate pandemic prevention, treatment, and care are possible; organizing and understanding the information behind preventing and managing a pandemic is crucial. However, my research focused on understanding and learning disease prevention methods, maintaining proper hospital and healthcare services, and educating slum communities regarding transmission.

SALICYLIC ACID INFLUENCE ON ARABIDOPSIS THALIANA ROOT MICROBIOMES

Presenter: Asia Hawkins
Category: Science & Engineering
Room Location: Online Only
Number: 4231
Mentor: Sarah Lebeis

The plant root microbiome serves many functions including protection against pathogens and plant growth promotion. One of the primary mechanisms driving Arabidopsis thaliana root

microbiome assembly is phytohormone salicylic acid [SA] which is known to inhibit the growth of pathogens due to a cascade effect in the plant's rhizosphere receptors. Previously, several genotypes of A. thaliana varying in SA production and downstream signaling were used to determine how these differences affect the microbiome found in the endosphere of the plant. To accomplish this, the roots of these genotypes of A. thaliana were ground up and placed into a plant tissue culture media and used to a new generation of A. thaliana. This process was repeated four more times to create communities associated with these genotypes as well as SA. The bacteria found in the media were then isolated and made into freezer stocks. With these freezer stocks I grew them on several different media to identify plant associated traits, as well as conducted 16S rRNA gene sequencing to identify the specific genus of the bacteria. Subsequently I tested the isolates sensitivity to SA and conduct monoassociations between isolates and A. thaliana with varying levels of SA production and signaling.

PLANT ANTIMICROBIAL ACTIVITY AGAINST PROBIOTIC E.COLI

Presenter: Erica Schafer
Category: Science & Engineering
Room Location: Online Only
Number: 4232
Additional Student Presenters: Ihika Lagisetty
Mentor: Michael Bachmann

In our efforts to develop plant-based antimicrobial compounds active against gastrointestinal pathogens, like Salmonella and diarrheagenic E. coli, we will also look at the antimicrobial effects on the normal gut/flora microbiome. For this, we will label bacterial strains that are part of the normal microbiome with a light-emitting reporter (luciferase) and assess the antibacterial effects in vitro and in vivo in mouse models of GI infection.

INTERACTIONS BETWEEN INTRAMEMBRANE PROTEASE SPOIVFB AND ITS INHIBITORY PROTEINS

Presenter: Eric Smith
Category: Science & Engineering
Room Location: Online Only
Number: 4233
Mentor: Lee Kroos

Bacillus subtilis is a bacterium that can form spores. To ensure that sporulation only happens during environmental stress, such as starvation, certain proteins necessary for spore formation are synthesized only when the sigma factor, SigK, is active. Sigma factors direct RNA polymerase to bind at DNA promoters and initiate transcription. SigK is synthesized with a Pro-region that inactivates the protein. One goal of our research is to understand the regulation of Pro-SigK activation. SpoIVFB is the protease that cleaves the Pro-region from Pro-SigK, producing active SigK. Two proteins, SpoIVFA and BofA, inhibit SpoIVFB until the right time during sporulation. Our group is investigating the location of interactions between SpoIVFB and its inhibitory proteins. A previous study showed that part of BofA interacts with SpoIVFB near its active site (where Pro-SigK cleavage normally occurs). Using co-evolutionary analysis and computational modeling, we believe there are positions of proximity between the proteins that have not been tested. Mutagenesis was used to substitute a cysteine amino acid residue at these positions and substitute serine for any other cysteines in the proteins. The proteins were produced in Escherichia coli, where they form a complex. We then tested whether a disulfide

cross-link (i.e., a disulfide bond between two proteins) could be formed, which would imply that the cysteines were in proximity. Cross-linked proteins migrated slower during gel electrophoresis and were detected with antibodies by performing immunoblots. Our results will help to better understand a mechanism of intramembrane protease regulation.

EFFECTS OF MATERNAL LEAD EXPOSURE AND RESTRICTED HOME CAGE BEDDING ON CAREGIVING IN FEMALE RATS AND LATER OFFSPRING SOCIOEMOTIONAL BEHAVIORS

Presenter: Sim Singh
Category: Science & Engineering
Room Location: Online Only
Number: 4234
Mentor: Joseph Lonstein

Maternal sensory signals play a crucial role in the function and structure of a developing brain; specific signals can work to promote vulnerability or plasticity to cognitive as well as emotional disorders. In rodent models of early-life stress, fragmentation as well as maternal lead exposure provoke emotional and cognitive dysfunction in offspring. Our model of early-life disadvantage will help us understand the development/neurobiological underpinnings of aggression and other antisocial behaviors in humans. We investigated the effects of maternal lead exposure and restricted home cage bedding on caregiving in female rats as well as lateral offspring socioemotional behaviors. The use of a laboratory rat model allows us to study the effects of early-life disadvantage on later social, affective, and reward-like behaviors. Female rats were mated and given 0.1% lead acetate in their drinking water or regular drinking water or left undisturbed. On the day of parturition, litters were weighed and culled. Dams were given standard amounts of bedding or low emulate low resource availability and continued to receive leaded or regular water consistent with their pregnancy condition. Offspring behavior entailed the testing of one male and female from each litter for anxiety-like behavior via elevated plus maze. Another female from each litter was mated and tested for maternal aggression towards an unfamiliar male intruder to the home cage. We hypothesize that chronic exposure to lead during prenatal life, alone or together with low maternal home cage bedding, will reduce mothers' caregiving behaviors and affect socioemotional behaviors in the offspring.

THE POWER OF PINTO BEAN FLOUR

Presenter: Sydney Burtovoy
Category: Science & Engineering
Room Location: Online Only
Number: 4235
Mentor: Karen Cichy

Pinto beans produce nutrient dense flour; however, studies show flours of this origin fail to elicit many desirable sensory qualities in products baked with conventional wheat flours. Increased protein and varying starch ratios may explain this disparity. Given the protein, iron, vitamin, and mineral benefits pinto bean flours could provide, research in optimizing its quality parametershas the potential to help alleviate many nutrient deficiencies worldwide. Since previous Rapid Visco Analyzer (RVA) analysis discovered a significant relationship between starch ratio and genotype, further investigation of this macronutrient's effect on pasting was

desired. Thus, in this study Megazyme starch assays were utilized to determine the starch content of over one- hundred and fifty pinto bean flour samples of differing genotypes; 46 from North Dakota and 103 from Washington. Then, pasting and gelation were evaluated with the RVA. Overall, pinto bean flours required more time to reach the peak viscosity (13 minutes) compared to standard wheat flours (9 minutes). Their peak viscosity tended to be either similar to or lower than that of hard, high protein wheat flour. Additionally, the breakdown viscosity was far lower in the pinto bean varieties, ranging from around -13 to 150cP in the North Dakota and -10 to 117cP in the Washington genotypes. Wheat flour ranged between 775 to 1419cP with increased protein content showing lower breakdown viscosities. This indicates that pinto bean's high protein and lower starch content contributes to the pasting properties of its flour which influences sensory and quality attributes of the final food product.

A COMPARISON OF NEUROTYPICAL MEN AND WOMEN TO WOMEN WITH TURNER SYNDROME ON THE READING OF THE EYES OF THE MIND TASK

Presenter: Nazia Haque
Category: Science & Engineering
Room Location: Online Only
Number: 4236
Mentor: Rebecca Knickmeyer, Reid Blanchett

Turner syndrome (TS) is a neurodevelopmental disorder caused by the full or partial absence of the second X chromosome in phenotypic females. It is characterized by deficits in cognitive domains such as executive functioning, visuospatial reasoning, and social cognition. This reduction in social cognition encompasses understanding of self and others, and the ability to read facial communications. Currently, no mechanism exists to thoroughly investigate these cognitive domains without an in-person cognitive battery. To answer future questions about cognition in TS, the researchers designed on online browser-based battery that could be taken on a personal computer anywhere in the world. The objective of the current study was to test a component of this extensive battery, trying to ascertain whether there was a statistically significant difference between a cohort of 30 women with TS and 30 typically developing women with no reported health conditions or medication in the facial communication aspect of the social cognitive domain. We utilized the Reading the Mind in the Eyes task as our metric, which presents a set of eyes to the participant and asks them to match the emotional state to the eyes given four possible options. Our analysis revealed a statistically significant difference between groups ($p < 0.001$), with TS women scoring significantly lower than XX women. We therefore rejected the null hypothesis. The Reading the Mind in the Eyes task is one of many tests given on the web-based platform designed by the researchers as part of a full battery meant to probe differences between X0, XX, and XY individuals in domains often affected by TS. The current study adds support to the growing literature surrounding TS and its unique cognitive profile and is the first step in validating our full battery.

ULTRALUMINOUS X-RAY SOURCES IN EXTRAGALACTIC GLOBULAR CLUSTERS: SEARCHING FOR BLACK HOLES IN NGC 4472'S GLOBULAR CLUSTER SYSTEM

Presenter: Wasundara Athukoralalage
Category: Science & Engineering
Room Location: Online Only
Number: 4237
Mentor: Stephen Zepf

The question of whether or not black holes are hosted by globular clusters is one of the leading open questions in Astronomy. While globular clusters are "black hole factories" through normal stellar evolution, some theories predict that black holes will be ejected early in the history of the globular cluster. However, recent observational work and theoretical studies in the last 15 years have suggested that this may not be the case, and studies of ultraluminous X-ray sources in extragalactic globular clusters have provided evidence of some of the most exotic black hole candidates in globular clusters. We have evidence that one of these sources might be an intermediate black hole.

ANALYSIS OF ENVIRONMENTAL COMMUNICATION METHODS USED BY GREAT LAKES ECHO STAFF WRITERS

Presenter: Rachel Duckett
Category: Science & Engineering
Room Location: Online Only
Number: 4238
Additional Student Presenters: Wali Khan, Kayla Nelsen, Gabrielle Ahlborn
Mentor: David Poulson, Eric Freedman

Great Lakes Echo (GLE) is an environmental journalism initiative produced by the Knight Center for Environmental Journalism at Michigan State University. Original digital content covering news around the Great Lakes watershed is produced by students, faculty, professional journalists and Capital News Service. GLE students use various reporting and information-gathering methods to communicate about environmental issues. For example, for a story about "community fridges," one staff writer utilized social media to seek out expert sources around the nation. Through a process of deliberation, the information accumulated was condensed and standardized to appeal to a general readership to increase public understanding and interest in the topic. We have investigated and will be presenting an analysis of effective environmental communication and news-gathering methods using several recent GLE articles.

HOW DOES LOCAL ECOLOGICAL KNOWLEDGE IMPACT BIODIVERSITY CONSERVATION? AN INVESTIGATION WITH A META-ANALYSIS APPROACH

Presenter: Ovya Venkat
Category: Science & Engineering
Room Location: Online Only
Number: 4239
Mentor: Jianguo Liu

Maintaining and restoring global biodiversity is vital for ecological balance and environmental progress, but policies that aim to address the conservation of global biodiversity often overlook the contributions of Indigenous knowledge. While communities have been previously seen as a barrier to the decision-making progress, studies have shown that integrating traditional and local ecological knowledge gained from Indigenous communities into natural resource management can be a more effective way to reach conservation and sustainability goals. To investigate the mechanisms within Indigenous knowledge that affect environmental conservation and quantify the effects, this project utilizes a meta-analysis review of prominent contemporary literature on biodiversity conservation and natural resource management. This project aims to understand how Indigenous knowledge affects biodiversity outcomes on a global scale and analyze case studies in which integrating Indigenous knowledge into biodiversity and natural resource conservation was successful.

DIETARY PREDNISONE QUELLS SOME BUT NOT ALL SILICA-TRIGGERED MANIFESTATIONS OF AUTOIMMUNE DISEASE IN LUPUS-PRONE NZBWF1 MICE

Presenter: Anna Skedel
Category: Science & Engineering
Room Location: Online Only
Number: 4240
Additional Student Presenters: Jenan Shareef
Mentor: Jack Harkema, Lauren Heine, James Wagner, Ryan Lewandowski, James Pestka

Prednisone (PR), a corticosteroid, is used to treat autoimmune disease (AD) such as lupus. Its effectiveness to prevent/treat crystalline silica (cSiO2)-triggered AD in occupational settings like mining is not known. In our study, we tested the hypothesis that PR-amended diets prevent cSiO2-triggered AD in lupus-prone NZBWF1 mice. Six-week-old female NZBWF1 mice were fed purified AIN-93G control diet (CON) or PR-amended AIN-93G diets representing human equivalent doses (HED) of 5 mg/d (PL) and 14 mg/d (PH). Two weeks later, animals were intranasally instilled with either saline vehicle or 1 mg cSiO2 once per week for 4 consecutive weeks. Feeding regimens were maintained until necropsy at 14 weeks post-instillation. Mice in the cSiO2/CON group had marked pulmonary B- and T-lymphoid cell and plasma cell infiltration, perivascular ectopic lymphoid tissue formation, and inflammatory cells and autoantibodies in bronchioalveolar lavage fluid (BALF), in contrast to VEH/CON mice that had no lung pathology. cSiO2/CON mice also developed glomerulonephritis. cSiO2/PH mice had minimal pulmonary ectopic lymphoid tissue formation and B-cell and plasma cell infiltrations, and minimal to no glomerulonephritis. cSiO2/PL mice had only modest reductions in pulmonary and renal pathology. Consumption of either low or high PR diets did not significantly lower T-lymphoid cell infiltration, BALF inflammatory cells or autoantibodies triggered by cSiO2. These results indicate that PR at a high HED selectively quells toxicant-triggering of some but not all AD pathology in NZBWF1 mice. It does, however, ameliorate glomerulonephritis. In conclusion, alternative preventative treatments may be needed to fully prevent toxicant-triggered AD in the workplace.

METAGENOMIC COMPARISON OF THE SKIN MICROBIOME OF TOXIC AND NON-TOXIC POPULATIONS OF THE ROUGH-SKINNED NEWT

Presenter: Lucy Sullivan
Category: Science & Engineering
Room Location: Online Only
Number: 4241
Mentor: Elizabeth Heath-Heckman, Heather Eisthen

Tetrodotoxin (TTX) is a neurotoxin found in many animals, including certain species of fish, flatworm, and salamander. It works by blocking voltage-gated sodium ion channels, preventing neurons from passing signals. Taricha granulosa is a species of salamander whose mechanism of TTX production is still uncharacterized. In other TTX-possessing organisms, TTX is generated by symbiotic bacteria that live on or in the animal. We believe that these newts similarly get their TTX from bacteria residing in the granular glands of their skin. Previous research demonstrated that members of their skin microbiome are capable of TTX production. We continue this research by comparing genetic data from the skin microbiome of toxic and non- toxic populations, using the SqueezeMeta pipeline for assembly and analysis. Our findings reveal a diverse microbial community with complex metabolic processes we can parse for clues about the biosynthetic pathway of TTX.

LAKE STURGEON RESTORATION EFFORTS- MENOMINEE RIVER

Presenter: Lexi Atler
Category: Science & Engineering
Room Location: Online Only
Number: 4242
Mentor: Kim Scribner, Jeannette Kanefsky

Lack of spawning habitat for Great Lake Tributary spawning fish, including lake sturgeon, is a major impediment to effective management. Fish transport over hydroelectric dams on the Menominee River has begun to monitor the adult passage of lake sturgeon in their movement from their spawning sites upstream. However, managers have not been able to determine whether adults transported have reproduced or why the relative contribution of these adults have been relative to resident adults. The sampling methods were used to collect and genotype adult and larval sturgeon during a 2-year period upstream of the Menominee Dam. Total length (in mm) was measured, and a fin clip was taken. The genetic analysis samples were chosen randomly from the larval samples and all the adult samples were used for pedigree analysis. PCR was conducted to genotype adults and larvae at 18 microsatellite (diploid and polyploid) loci. GeneMarker and pedigree reconstruction software were used to assign larval to full and half sibling groups. Size and age of successful sturgeon that reproduce will be quantified. Estimates of the proportional contribution of passed adults to total annual movement will be made.

TWO-PHASE ANAEROBIC CO-DIGESTION OF FOOD WASTE AND ELECTROCOAGULATION SLUDGE WITH A NOVEL STARTUP PROCEDURE USING ACTIVATED CARBON

Presenter: Blake Smerigan
Category: Science & Engineering
Room Location: Online Only
Number: 4243
Mentor: Wei Liao, Sibel Uludag-Demirer

Anaerobic digestion is a conventional biological process to turn carbon in wastes into methane (CH4) rich biogas. Despite its common use for handling organic wastes, food waste poses a technical challenge for anaerobic digestion, often resulting in lower methane content and increased hydrogen sulfide production due to its acidity and sulfur containing compounds. This study brings in a new approach for the two-phase anaerobic digestion of food waste by using iron-rich sludge produced from electrocoagulation (EC) of black water as the co-substrate in the second biogas production phase. The hydrolysis and fermentation of food waste in the first phase with 10 days of hydraulic retention time (HRT) was followed by a second phase of methane generation with the mixture feed of acidified food waste and EC sludge. The startup of the second phase AD reactor was shortened by the addition of a single dose of activated carbon (AC) at the beginning of the digestion. The results indicated that the two-stage co-digestion of food waste and iron-rich EC sludge with the addition of activated carbon significantly increased the production of biogas in volume (650-700 mL biogas/day) and improved the biogas quality (70%). The use of food wastes combined with black water treatment residues in anaerobic digester could lead to a solution for rural or decentralized communities to handle organic wastes while producing value added products and controlling carbon emissions.

BIOSORPTION OF HEAVY METALS BY FUNGI

Presenter: Alissa Ball
Category: Science & Engineering
Room Location: Online Only
Number: 4244
Mentor: Wei Zhang

Soil pollution with heavy metals raises concern over crop uptake of heavy metals and associated food safety risks. Fungi are abundant and are often involved in detoxification of pollutants in soils. Thus, this project aims to investigate the biosorption of heavy metals and underlying mechanisms by various soil fungi using culturing and batch sorption experiments. By identifying potent fungi species for adsorbing heavy metals and consequently decreasing metal uptake by crops, this project could help develop strategies for mitigating heavy metal pollution in soils.

IMPLEMENTING LANDSAT TIME SERIES CLUSTERING ACROSS NEON SITES FOR IMPROVED DISTURBANCE DETECTION

Presenter: Chakata Hart
Category: Science & Engineering
Room Location: Online Only
Number: 4245
Mentor: Phoebe Zarnetske, Jasper Van doninck

Remotely sensed image time series have potential to detect disturbances across different land cover types and ecoregions, over space and time. Various methods exist to detect disturbances from pixel time series, but by processing pixels individually, they often lose spatial information between pixels. We develop an alternative, object-based disturbance detection approach for disturbance detection and attribution which makes full use of the spatial information embedded within these pixels. We implemented a spatial segmentation method for Landsat image time series based on a region-growing clustering, grouping pixels with a similar spectral-temporal behavior first. Results provide insights about land cover change surrounding focal pixels, showing which clusters of pixels behaver similarly over time. The algorithm was developed in R, and ArcMap visually displays data. A user can choose between time series distance metrics (correlation and root mean squared distance) and clustering parameters, influencing the spectral-temporal features highlighted on results. When combining different time series distance metrics into a single region-growing algorithm, results show realistic clustering. We validated methodology over several National Ecological Observatory Network (NEON) sites, overlaying clustering results with false color composites of image time series and results of a pixel-based disturbance detection. This research advances methods to detect disturbance across multiple land cover types and specifically improves detection and attribution of disturbances across all NEON sites. Ultimately, this research will help produce a 30-m resolution disturbance product across the US, useful for many applications including explaining patterns of biodiversity across diverse land cover types.

DIETARY INTAKE OF 12-MONTH-OLD INFANTS RESIDING IN MICHIGAN'S LOWER PENINSULA

Presenter: Kennedy Zarembski
Category: Science & Engineering
Room Location: Online Only
Number: 4246
Mentor: Sarah Comstock

Obesity is a growing problem in America. This is an issue that is not only restricted to adults. In fact, obesity is also growing in children and even toddlers. The strongest predictor of a child's BMI is maternal pre-pregnancy BMI. The objective of my research is to describe dietary intake of infants that are fed a mixed diet. This research is a cross sectional analysis of twelve month old infants participating in a longitudinal cohort study. Descriptive statistics of infant dietary intake will be presented, this will include human milk, formula and complementary food. Results in this cohort will be compared to those of a national data set. Data collected in this study will eventually be paired to maternal pre-pregnancy BMI information. This will help determine important connections between maternal health and child diet. Furthermore, these results help determine if one contributor to the childhood obesity problem is dietary intake when the child is twelve months old.

THE ROLE OF THE MEDIAL AMYGDALA TO VENTRAL PALLIDUM BRAIN PATHWAY IN THE REGULATION OF SOCIAL PLAY BEHAVIOR

Presenter: Navya Kalia
Category: Science & Engineering
Room Location: Online Only
Number: 4247
Mentor: Alexa Veenema, Jessica Lee

Social play behavior is displayed by juveniles of various mammalian species and is critical for social competence throughout life. Autistic children engage in much less social play behavior, which may contribute to their life-long deficits in social competence. Thus, it is important to understand the neural mechanisms regulating social play behavior. The posterodorsal region of the medial amygdala (MePD) and the ventral pallidum (VP) are two brain regions that are part of a brain network involved in regulating social behavior. Furthermore, the MePD and the VP have each been shown to regulate social play behavior in juvenile rats. However, it is unknown whether and how the MePD to VP pathway regulates social play behavior in juvenile rats. Therefore, we aim to examine the involvement of the MePD to VP pathway in regulating social play behavior in juvenile male and female rats. First, by combining in situ hybridization with retrograde tract-tracing, we will determine whether MePD projections to the VP are inhibitory in nature by using gad1 as a marker for the GABAergic cells. Next, we will determine whether exposure to social play alters activation of VP-projecting cells in the MePD, using similar methods as the previous experiment, by using fos as an indirect measure of neural activity. Ultimately, outcomes of these experiments will provide insights into a neural pathway-specific modulation of social play behavior in juvenile male and female rats.

MAST CELL-SPECIFIC INACTIVATION OF FOSB EXACERBATES MAST CELL DEGRANULATION AFTER IGE-ANTIGEN STIMULATION IN VITRO AND IN VIVO

Presenter: Zak Dairi
Category: Science & Engineering
Room Location: Online Only
Number: 4248
Mentor: Natalia Duque-Wilckens

Mast cells (MC) are innate immune cells distributed throughout the body that can respond to a variety of stimuli and release a diverse repertoire of mediators ranging from cytokines and growth factors to neurotransmitters, allowing them to play key roles in multiple physiological processes. This vast heterogeneity in MC functions implies that their transcriptional profile needs to be extensively regulated, but the underlying mechanisms are not understood. The expression of FosB, a transcription factor known to mediate stimulus-triggered changes in neuronal function, is markedly upregulated in MCs after a variety of stimuli, so we hypothesized that FosB is important in promoting MC degranulation. To test this hypothesis, we crossed the Mcpt5-Cre with the Cre-dependent floxed FosB mouse strains, which allowed us to inhibit FosB expression specifically in MCs, and assessed MC activation and mediator release in response to stimulation of IgE-sensitized MCs with the antigen DNP. We found that, compared to Mcpt5-/-;FosB (fl/fl), bone marrow derived mast cells from Mcpt5-Cre+;FosB (fl/fl) mice exhibited

increased IgE-DNP mediated activation levels -as assessed by morphological scoring of electron microscopy images-, as well as elevated histamine and serotonin release. We next tested this model in vivo and found that previously sensitized Mcpt5-Cre+;FosB (fl/fl) mice, compared to Mcpt5-/-;FosB (fl/fl), exhibited greater serum histamine and serotonin levels and more severe hypothermia and clinical scores after an intraperitoneal injection of DNP. Together, these data suggest that FosB expression exerts a negative regulation on MC mediator release. Ongoing studies are expanding these findings to other models of MC stimulation.

CONSUMPTION OF WHOLE GRAIN WHEAT HAS MINIMAL IMPACT ON HUMAN GUT MICROBIAL DIVERSITY

Presenter: Eliot Haddad
Category: Science & Engineering
Room Location: Online Only
Number: 4249
Mentor: Sarah Comstock, Perry Ng

Diet is one of the principal determining factors of the human gut microbiome. However, there has been little agreement on the specific effects of whole grain wheat, a high fiber food, on the human gut microbiota. Herein, we aim to identify whether consumption of different varieties of whole wheat is associated with gut microbial diversity and markers of intestinal inflammation. To elucidate this, a sample of 28 adults consumed 100g of two different varieties of Michigan grown whole grain crackers: white whole grain and red whole grain. The study took place over a four-week period, each week representing a different time point (A, B, C, and D). In weeks B and D, participants consumed white and red wheat, respectively. In weeks A and C, participants consumed a generic wheat for a washout period. 16S rRNA gene sequencing was used to characterize the gut microbiome and lipocalin/calprotectin proteins were extracted from fecal samples collected at each timepoint. Gut microbial diversity was not significantly different across timepoints. However, Bifidobacterium levels were significantly higher in the week following red wheat consumption (week C) than during consumption of white wheat (week D). There were no significant differences between levels of lipocalin and calprotectin across the four weeks. Overall, the results of this study show that consumption of whole grain wheat at the provided dose has little impact on gut microbial diversity and markers of gut inflammation. This implies that the health benefits of whole wheat consumption may be independent of gut microbiota diversity.

IDENTIFYING N. PARVUM IN MICHIGAN COMMERCIAL BLUEBERRIES

Presenter: Deenarah Giraud
Category: Science & Engineering
Room Location: Online Only
Number: 4250
Mentor: Timothy Miles, Lexi Hegler

Blueberries, an economically important commercial crop native to North America, contain a multitude of health benefits. Michigan, being one of the most important cultivators of blueberries, suffers threats from fungal pathogens that have the potential to decrease crop yield and capital. The aim of this study was to observe and collect data that signifies pathogenicity of *Neofusicoccum parvum.* in Michigan blueberries. By following Koch's Postulates

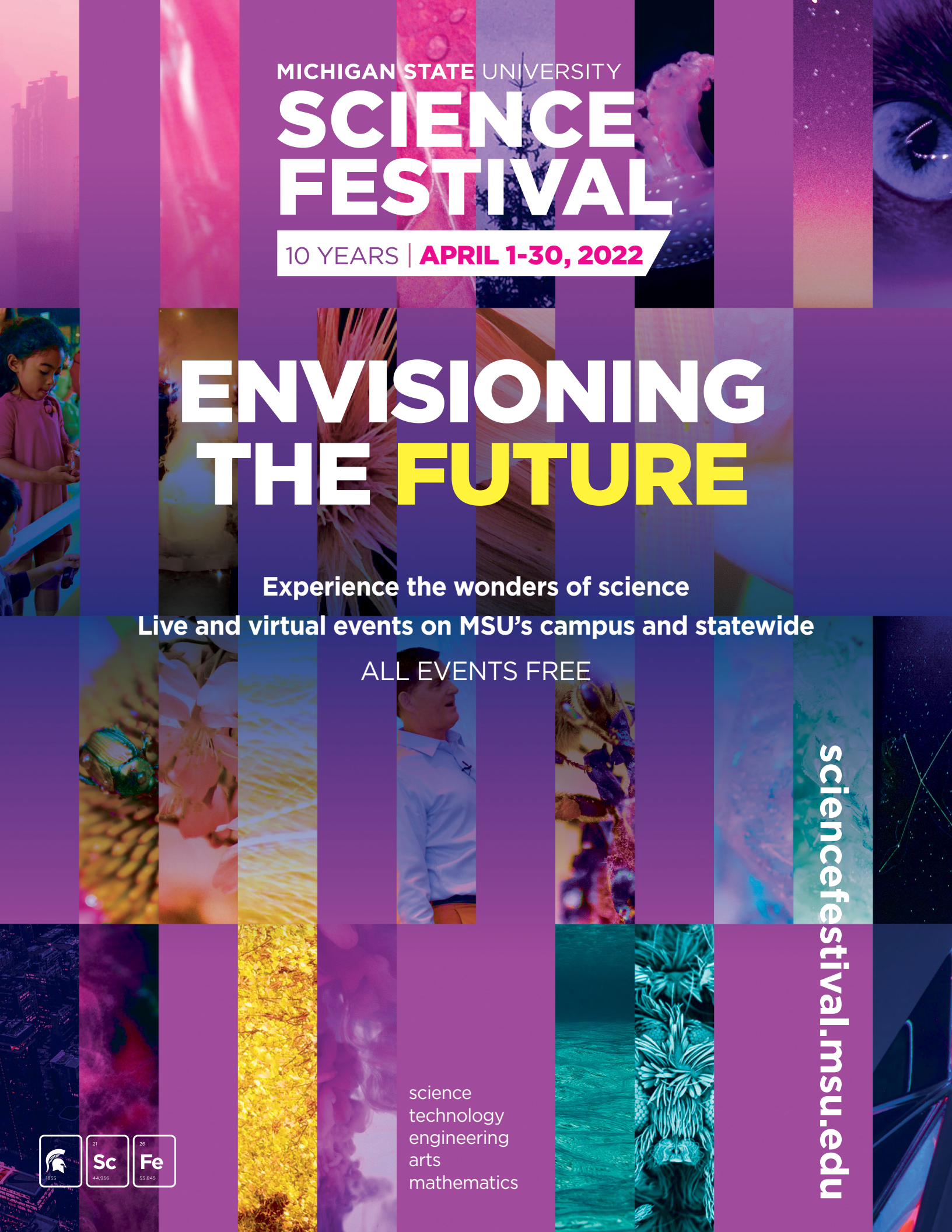
pathogenicity, *Neofisucoccum* was observed. Using isolate 1700 of the pathogen, 5 test plants were used, each plant had 3 shoots surface sterilized with a 3% NaOCL solution, then mechanically injured with a sterilized razor. Each sterilized shoot was then inoculated using a 7-day 5mm plug firmly pressed onto the wound then wrapped with parafilm locking in moisture. Three controls were used but were inoculated with regular 5mm PDA plugs. Plants were maintained in the same environment and were photographed on days 0, 7, and 12 after inoculation. Proposed results suggest that the pathogen is *Neofusicoccum,* as the symptoms exhibited by the plant correspond to what is induced by *Neofusicoccum spp*. However, sequencing will be conducted to thoroughly verify the pathogen to its species level, as there are some findings that point to this not being *Neofusicoccum parvum* but a completely different species. Knowing and understanding this pathogen assists with detection measures for farmers. The ability to understand and detect a pathogen will assist with the ability to rapidly understand how to control the pathogen.

PRESENTER INDEX

Student presenters are listed alphabetically by last name.

RESEARCH MENTORS

Many thanks to the dedicated research mentors who guided and supported the undergraduate research and creative activities presented throughout this program book. *Denotes external mentors.



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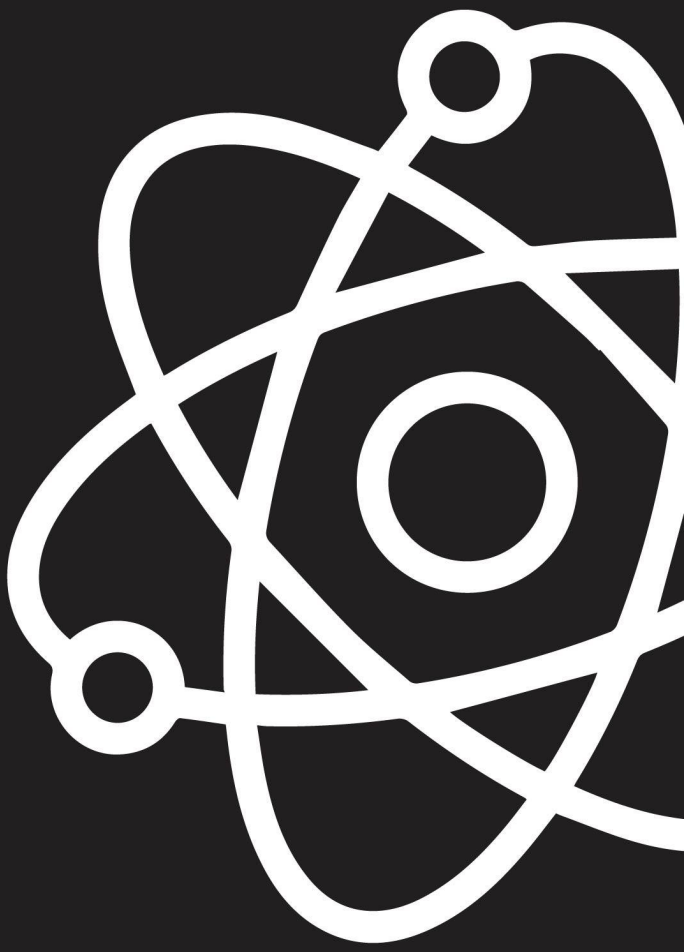

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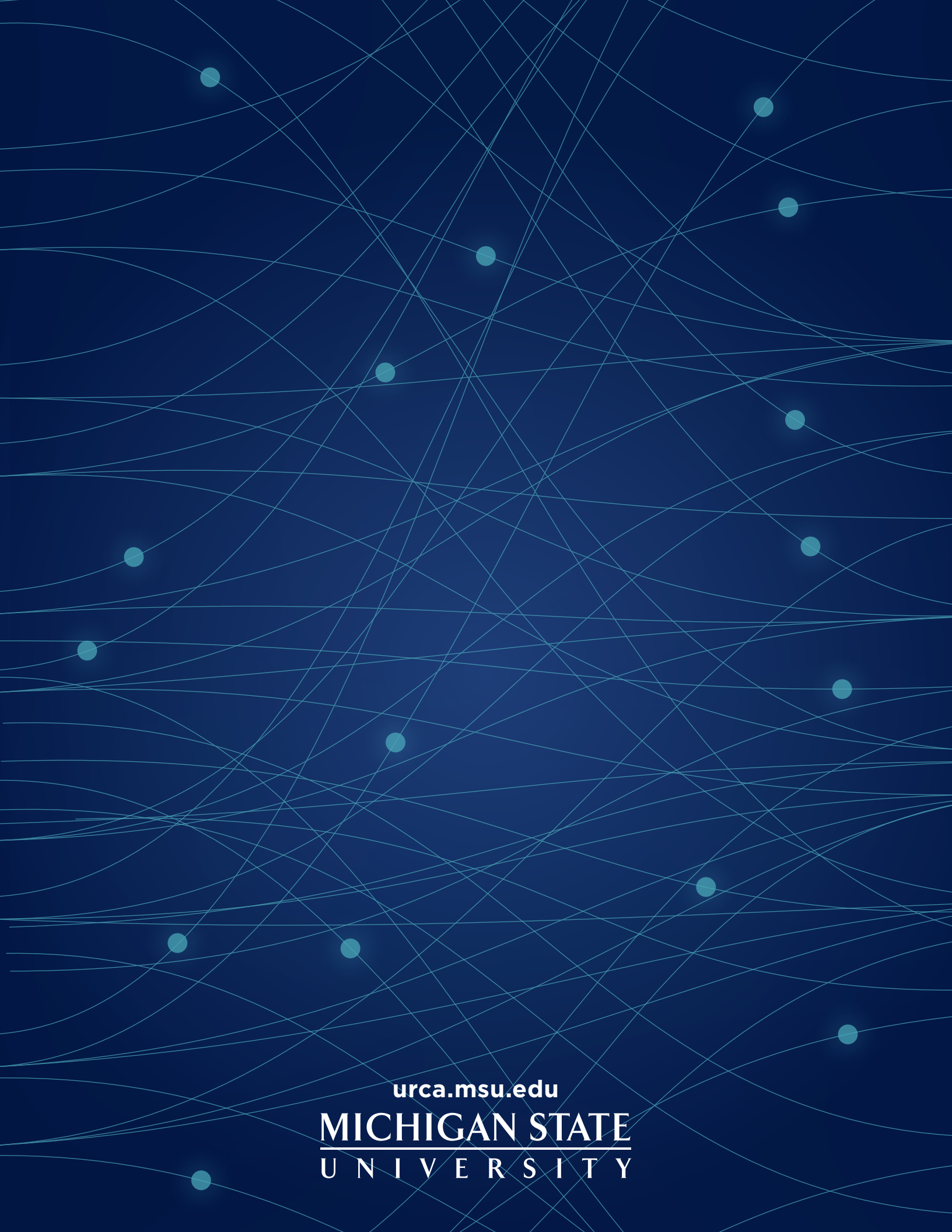
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